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ORIGINAL RESEARCH ARTICLE

Open Access



# Knowledge and perception of physiotherapy students and lecturers about the involvement of simulated patients in clinical examinations at physiotherapy training institutions in South-West, Nigeria

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## Abstract

**Background** Medical educators in Nigeria are beginning to incorporate the use of simulated patients (SPs) in clinical examinations. This study was designed to investigate and compare the knowledge and perception of physiotherapy students and lecturers about the involvement of SPs in clinical examinations at physiotherapy training institutions in South-West, Nigeria.

**Methods** This study used a mixed-method approach, combining cross-sectional analysis and focus group discussions. A validated questionnaire assessed the knowledge and perception of physiotherapy students and lecturers regarding SP involvement in clinical exams. Quantitative data were analyzed with descriptive statistics, chi-square, and Mann–Whitney *U* tests ( $p < 0.05$ ). Qualitative data were analyzed using thematic analysis.

**Results** Two hundred and seven clinical students (83 males, 124 females, average age  $22.02 \pm 1.65$  years) and 37 physiotherapy lecturers (25 males, 12 females, average age  $48.27 \pm 7.49$  years) participated in this study. Among the students, 151 were aware of SP involvement in clinical exams: 35.1% had poor knowledge, 53.0% had fair knowledge, and 11.9% had good knowledge. The majority of lecturers (70.3%) demonstrated good knowledge. Most students (147, 71.0%) and lecturers (32, 86.5%) had positive perceptions of SP involvement in exams. Qualitative analysis indicated insufficient training for SPs in clinical examinations at physiotherapy training institutions in South-West Nigeria. Reported drawbacks included a preference for using models, familiarity with SPs, and limitations in the conditions that SPs can simulate.

**Conclusion** Physiotherapy students at physiotherapy training institutions in South-West Nigeria had fair knowledge about the involvement of SPs in clinical examinations while lecturers had good knowledge about the involvement of SPs in clinical examinations. However, both students and lecturers had a positive perception about the involvement of SPs in clinical examinations though the concept of SPs should be differentiated from the use of models.

**Keywords** Simulated patients, Simulation, Physiotherapy education, Clinical examinations

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## Introduction

In health professions education, the assessment of clinical competence is essential, as it requires educators to thoroughly evaluate students' knowledge and practical skills [1]. Traditional assessment methods in health sciences are criticized for their subjectivity, lack of standardization, inability to evaluate communication skills, potential bias, and failure to predict future performance [2]. To address these shortcomings, newer assessment methods, such as the Objective Structured Clinical Examination (OSCE), have emerged [3]. The OSCE, developed in the 1970s, is widely recognized as the gold standard for assessing clinical skills [4, 5]. It has become a cornerstone in medical education and is increasingly adopted in nursing, physiotherapy, and other allied health programs [1]. OSCE involves a series of short assessment tasks, each evaluated objectively by examiners using predetermined criteria, typically requiring students to demonstrate skills and behaviors in simulated patient scenarios [4, 6].

Simulation is increasingly utilized in healthcare education to offer students a safe environment for practicing and enhancing various skills while minimizing risks to patients [7]. According to Gaba (2007), simulation involves replicating real-world experiences through guided interactions [8]. This definition aligns with the role of Simulated Patients (SPs) in healthcare education, where they create lifelike patient encounters within predetermined clinical scenarios [9]. Simulated patients are lay individuals trained to realistically depict specific medical conditions, including physical symptoms and emotional responses, within structured clinical scenarios [10]. They follow scripts to simulate various clinical situations, providing valuable feedback to healthcare professionals and students to improve their skills [11]. In assessment and research, they're often termed standardized patients [10].

Throughout history, simulated patients (SPs) have primarily served in medical education, with most literature on their involvement stemming from medical students and educators [11]. With rising student numbers and evolving healthcare systems, access to patients has become restricted, leading to the use of standardized patients to address this gap [12]. The use of SPs has gradually extended to nursing and various allied health fields such as social work, speech and language pathology, occupational therapy, physiotherapy, and dietetics [13]. Various studies have found that medical students generally view simulated patients (SPs) positively in their education, but there's limited research on lecturers' perspectives [14, 15]. Despite SPs becoming more common in physiotherapy and allied health programs, there's a lack of discipline-specific evidence [11]. In Nigeria, there's a dearth of literature on SPs, including their

recruitment costs and effectiveness as evaluation tools, as well as students' and lecturers' perceptions of SP involvement in clinical examinations. Madhavanprabakaran et al. (2015) argue that simulation's effectiveness in clinical education relies on prioritizing students' perceptions [16]. Additionally, as professionals promoting adult learning methods, health science educators should review teaching and assessment strategies, involving students in method evaluation [11]. The objective of this study is to investigate the understanding and views of physiotherapy students and lecturers regarding simulated patient (SP) participation in clinical examinations. The significance lies in addressing the gap in perceptions of SPs among these groups, which can inform future educational strategies. By highlighting these perceptions, we aim to improve the integration of SPs into clinical training for young physiotherapists, ultimately enhancing both student preparedness and patient care.

## Methods

### Study design and population

The study employed a concurrent mixed-method design, combining qualitative and quantitative data collection through a cross-sectional survey and focus group discussions (FGD) that were conducted simultaneously but analyzed separately. The study involved consenting physiotherapy students who had participated in clinical examinations and physiotherapy lecturers engaged in such examinations at physiotherapy training institutions in South-West Nigeria. Grounded in the concept of complementarity within mixed methods research, this approach aimed to delve deeper into aspects that may not be fully captured by the quantitative survey alone [17]. Beyond providing diverse data types and multiple data sources, the qualitative data also facilitated triangulation, a critical step in establishing the validity of research constructs [17]. It was hypothesized that insights from both the survey and focus group interviews would offer a comprehensive understanding of the topic.

The study adhered to the Mixed Methods Article Reporting Standards for reporting [18]. The inclusion criteria were (1) clinical students at the 400 and 500 levels of the undergraduate physiotherapy training program at physiotherapy training institutions in South-West Nigeria who have participated in clinical examinations for at least one session; (2) lecturers of the Department of Physiotherapy who have been involved in the clinical examinations of physiotherapy students at these institutions. Regarding the recruitment method, students were recruited through their respective classes, allowing for a representative sample of those currently engaged in clinical training. This approach facilitated access to participants while ensuring they met the inclusion criteria

for the study. The study locations were the University of Ibadan, Ibadan, University of Lagos, Lagos, and Obafemi Awolowo University, Ile-Ife. The study protocol was approved by the University of Ibadan/University College Hospital (UI/UCH) Health Research Ethics Committee (UI/EC/17/0304). All procedures were conducted with strict adherence to the principles outlined in the Declaration of Helsinki.

### Study instruments

The questionnaire on students' knowledge and perception about simulated patient involvement in clinical examinations was a self-developed questionnaire, based on existing literature [19]. The validation process involved several key steps: Face validity was established through reviews by six physiotherapy lecturers experienced in questionnaire development. They ensured that the items were clear and relevant to the study's objectives. Content validity was assessed using Item Content Validity (I-CV) and Scale Content Validity (S-CV) indices. The I-CV evaluated the relevance of individual items based on expert ratings, while the S-CV aggregated these scores to determine the overall validity of the scale [19]. A higher I-CV and S-CV indicated that the questionnaire effectively measured perceptions of SBL and covered essential topics related to the study [19].

The validated questionnaire comprises three sections: Section 1 comprises information on the socio-demographic variables of participants. Section 2 contained 15 items on knowledge about the involvement of SPs in clinical examinations. It consists of sub-section "a" and sub-section "b." Section 2a consists of 5 items presented as statements with response options of Yes and No. Section 2b consists of 10 items, each item had response options of Yes, No, and Not Sure. Correct responses received a score of 1, while incorrect answers and responses marked as "Not Sure" were assigned a score of 0. This scoring system was based on established guidelines and expert consensus regarding simulation-based learning (SBL) in physiotherapy education. A panel of physiotherapy lecturers reviewed each statement in the questionnaire, assessing response accuracy against current best practices and educational standards. This approach ensured that only accurate knowledge was acknowledged in the assessment.

The scores were categorized as follows: scores  $\leq 3$  were regarded as poor knowledge; scores ranging from 4 to 6 were regarded as fair knowledge while those from 7 to 10 were regarded as good knowledge. These cutoff points were determined by reviewing similar scoring methods in existing literature and aligning with typical standards in knowledge assessment. This approach provided a balanced framework for distinguishing varying levels of

understanding in a meaningful way for the study's objectives. Section 3 contained 15 items on the perception of the involvement of simulated patients in clinical examinations. The items are presented as statements, using a five-point Likert scale with response options of "strongly disagree" (1), "disagree" (2), "undecided" (3), "agree" (4), and "strongly agree" (5). For the purpose of data analysis, the Likert scale "strongly disagree" and "disagree" answers were merged into one category "1=disagree/strongly disagree"; the "strongly agree" and "agree" answers were merged into the "3=agree/strongly agree" category, and "neutral/uncertain" responses were recoded as "2" [20].

Lastly, a focus guide was created to investigate physiotherapy students' and lecturers' understanding and views on simulated patient (SP) participation in clinical examinations. The focus group discussion comprised five lecturers and seven students of the Department of Physiotherapy, University of Ibadan. The moderator facilitated deeper discussion by posing follow-up questions and integrating participant feedback.

### Sample size determination

At the time of this study, the total population of physiotherapy students and lecturers at the selected institutions was 347 and 37 respectively. Hence, a sample size formula,  $n = N / (1 + N e^2)$  was used to determine the sample population in this study ( $n$  = minimum number of samples;  $N$  = estimated area population size;  $e$  = 0.05 at 95% confidence interval). The sample size for students was calculated as  $n = 347 / (1 + 347(0.05^2)) = 186$ . Adjusting for the 10% non-response,  $n_{f} = n / (1 - N_r)$ . Therefore,  $n_{f} = 186 / (1 - 10\%) = 207$  students. All 37 lecturers at the selected training institutions were recruited for the survey.

### Sampling technique

Convenience sampling was employed for the cross-sectional survey, whereas purposive sampling was utilized for the focus group discussion.

### Statistical analysis

The statistical analysis in this study aimed to comprehensively evaluate demographic data, knowledge, and perceptions. Data were collated using Microsoft Excel, and quantitative analysis was performed with SPSS (Version 20). Descriptive statistics, including mean and standard deviation, were used to summarize participants' ages and their knowledge and perception scores about SP involvement. Frequencies and percentages were applied for categorical variables like sex, year of study, and graduation year to give a detailed participant profile. The chi-square test assessed associations between knowledge and perception among students and lecturers, as it is suited to

categorical data. For comparing differences in knowledge and perception scores between the student and lecturer groups, the Mann–Whitney *U* test was used, given its suitability for non-normally distributed ordinal data. For qualitative analysis, recordings were transcribed by an experienced transcriptionist and field notes were incorporated. Using ATLAS.ti (Version 9) with an inductive approach, data were coded, and common themes were identified, providing insights into perceptions of SP involvement. This methodological combination facilitated a balanced and detailed analysis of both quantitative and qualitative data.

**Results**

Two hundred and seven clinical students (83 males and 124 females) aged  $22.02 \pm 1.65$  years and 37 physiotherapy lecturers (25 males and 12 females) aged  $48.27 \pm 7.49$  years participated in this study. The distribution of participants’ sex, academic levels, ranks, and qualifications is summarized in Table 1. Sources of information about simulated patients among participants are represented in Fig. 1.

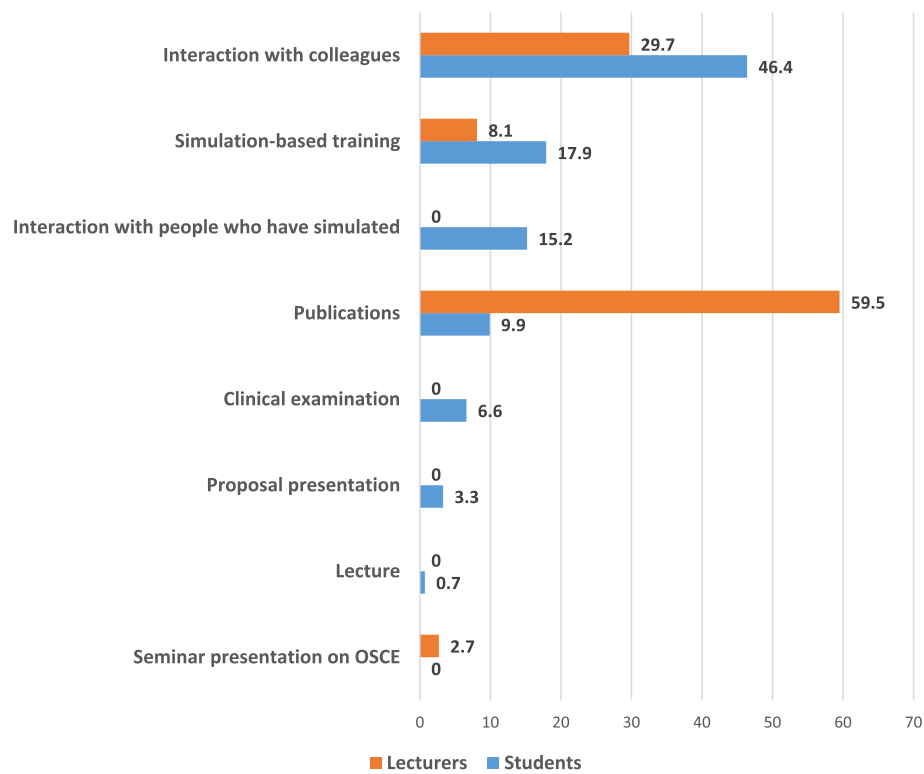
Out of the 151 students informed about simulated patient participation in clinical examinations, 35.1% showed poor knowledge, 53.0% demonstrated fair knowledge, and 11.9% exhibited good knowledge (Table 2). Similarly, among the lecturers, 70.3% possessed good knowledge, 21.6% had fair knowledge, and only 8.1% had poor knowledge. Regarding perception, 71% of students held positive views, while 29% held negative ones.

Among the lecturers, 86.5% had positive perceptions, with 13.5% having negative perceptions. Table 3 illustrates the relationship between knowledge and perception among physiotherapy students and lecturers. A significant association was observed between students’ perception and their knowledge ( $P < 0.05$ ), while no association was found among lecturers ( $P > 0.05$ ). Table 4 outlines the disparities in knowledge and perception between physiotherapy students and lecturers. A significant difference was noted in the mean rank of knowledge scores between students and lecturers ( $P < 0.05$ ), while no differences were observed in perception scores between the two groups ( $P < 0.05$ ).

The focus group interviews (7 students and 5 lecturers) uncovered 6 overarching themes and 9 sub-themes for students’ interviews while for the lecturers, there were 6 themes and 8 sub-themes. The themes were; the knowledge about simulated patients, the process involved in the use of simulated patients in clinical examinations, perception about the involvement of simulated patients in clinical examinations, advantages of involving SPs in clinical examinations, disadvantages of involving SPs in clinical examinations, and description, distinction, use/preference of different simulators, e.g., models, mannequins, simulated patients, high fidelity patient simulators. Table 5 shows the socio-demographic characteristics of participants in students’ and lecturers’ qualitative study.

**Table 1** Socio-demographic characteristics of the students and lecturers

Students				Lecturers			
Variable	Category	<i>n</i>	%	Variables	Category	<i>n</i>	%
Sex	Male	83	40.1	Sex	Male	25	67.6
	Female	124	59.9		Female	12	32.4
Age	Less than 21 years	36	17.4	Age	34–44	11	29.7
	21–24 years	150	72.5		45–55	20	54.1
	Greater than 24	21	10.1		56–66	6	16.2
University	University of Ibadan	38	18.4	University	University of Ibadan	16	43.2
	Obafemi Awolowo University	68	32.9		Obafemi Awolowo University	7	18.9
	University of Lagos	101	48.8		University of Lagos	14	37.8
Level	400 level	76	36.7	Rank	Associate lecturer	7	18.9
	500 level	131	63.3		Senior lecturer	21	56.8
					Associate Professor	3	8.1
					Professor	4	10.8
					Lecturer 1	2	5.4
					Highest academic qualification	MSc	6
					PhD	31	83.8



**Fig. 1** Participants' source of information about simulated patients

**Table 2** Knowledge and perception of physiotherapy students and lecturers about the involvement of simulated patients in clinical examinations

Variables	Students, N=207 (%)	Lecturers, N=37 (%)
Knowledge		
Good	11.9	70.3
Fair	53.0	21.6
Poor	35.1	8.1
Mean ± S.D	4.33 ± 1.74	6.78 ± 2.02
Perception		
Positive	71.0	86.5
Negative	29.0	13.5
Mean ± S.D	34.93 ± 4.91	35.84 ± 4.28

**Knowledge and perception of physiotherapy students about the involvement of simulated patients in clinical examinations at the University of Ibadan: exploratory qualitative study**

Qualitative study to further explore the knowledge and perception of physiotherapy students about the involvement of simulated patients in clinical examinations using focus group discussions was conducted. Four themes (knowledge and process involved in the use of simulated patients in clinical examinations, perception about the involvement of simulated patients in clinical examinations, advantages and disadvantages of involving SPs in clinical examinations, and description of different simulators) were generated, which were categorized into sub-themes (Fig. 2).

**Table 3** Association between knowledge and perception of physiotherapy students and lecturers about the involvement of simulated patients in clinical examinations

Knowledge	Students' perception				Lecturers' perception			
	Negative	Positive	df, $\chi^2$ -statistic	P value	Negative	Positive	df, $\chi^2$ -statistic	P value
Poor	17	36	2, 6.749	0.034	0	3	2, 1.46	0.428
Fair	11	69			2	6		
Good	3	15			3	23		

**Table 4** Differences in knowledge and perception between physiotherapy students and lecturers about the involvement of simulated patients in clinical examinations

Group	Knowledge Mean rank	P value	Perception	P value
Group		0.000		0.960
Students	82.2		94.6	
Lecturers	144.9		94.1	

**Theme 1: knowledge about simulated patients and process involved in the use of simulated patients in clinical examination**

**Sub-theme 1: knowledge about simulated patients**

Majority of the participants were able to provide their own meaning of simulated patients. The participants' definitions of the term simulated patients were quite similar. Participant 3 stated that:

*"Simulated patients are apparently healthy individuals that pretend to have a particular condition for a clinical examination, so they are models." (Male, 21 years, 400 Level)*

Participant 4 had this to say:

*"I feel for exam purposes, they are models."(Female, 21 years, 400 Level)*

Participant 2 expressed her thoughts this way:

*"My definition of SP is getting an individual to act or pretend to have a particular disease condition during clinical examinations."(Female, 22 years, 400 Level)*

Participant 6 with a different view opined thus:

*"I think there might be a slight difference between SPs and models. The difference might be that a SP has to pretend or act like he has some of the features*

*of that condition whereas, a model does not necessarily have to do that. A model can behave normally like he normally would and is just there for the student being examined to use."(Female, 22 years, 500 Level)*

**Sub-theme 2: recruitment of simulated patients**

Regarding the recruitment of simulated patients, participant 3, who spoke from her experience as a model in a clinical examination, had this to say:

*"I was willing and available I was just told that i was a six months old with Erbs palsy, right before the exam."(Female, 21 years, 500 Level)*

Antagonizing the above submission, participant 1 articulates:

*"I feel the criteria for recruiting SPs are more than willingness and availability, there should be a fundamental knowledge about the condition."(Male, 24 years, 400 Level)*

**Sub-theme 3: training of simulated patients**

The participants had a general consensus on the fact that simulated patients require training before they are involved in clinical examinations. However, there were varying thoughts on the level of training required based on the category of individuals or background of the persons being recruited as SPs. Participant 7 shared her thoughts this way:

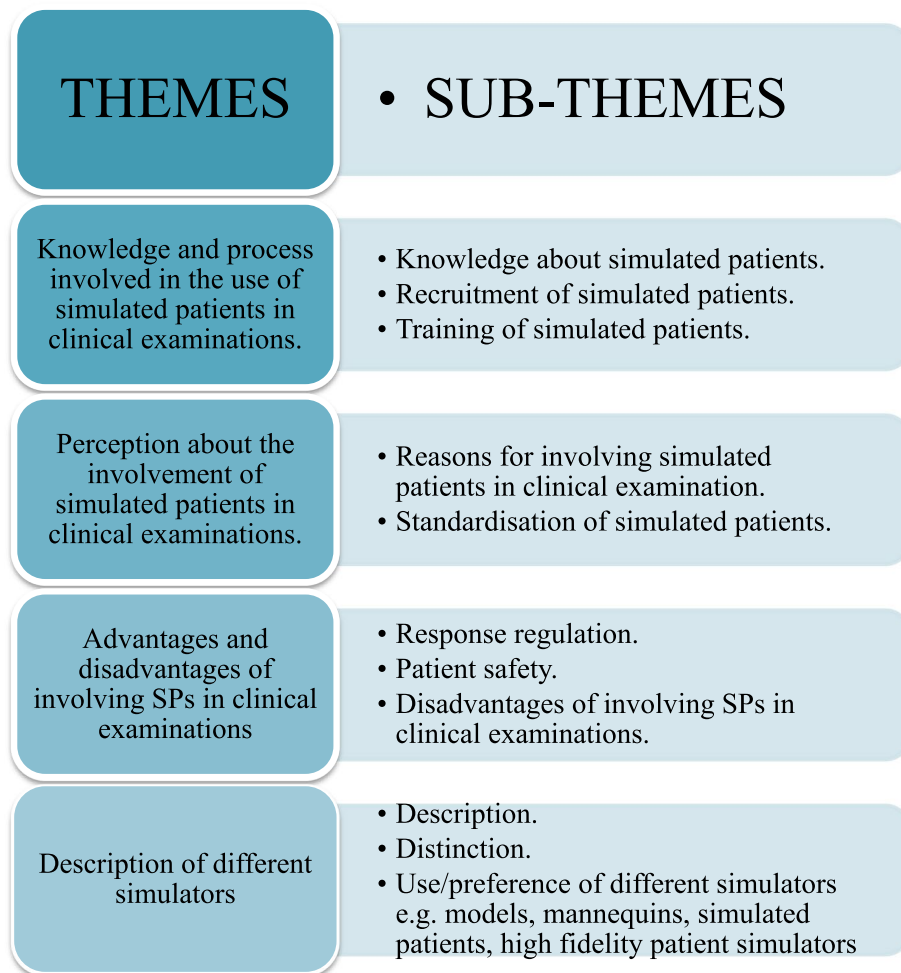
*"I think SPs need to be trained days or weeks before the examination". (Female, 22 years, 500 Level)*

Participant 6 who had a similar thought expressed herself this way:

*"I think training of SP is important because if do not train the SP in order to mimic a typical feature of an individual with a condition, the person being exam-*

**Table 5** Socio-demographic characteristics of participants in students and lecturers' qualitative study

Participants	Students (n = 7)			Lecturers (n = 5)		
	Sex	Level of study	Age (years)	Sex	Age (years)	Years of experience
Participant 1	Male	400	24	Male	39	10
Participant 2	Female	400	22	Male	62	38
Participant 3	Female	500	21	Female	45	16
Participant 4	Female	400	21	Male	55	28
Participant 5	Male	400	20	Female	49	20
Participant 6	Female	500	22			
Participant 7	Female	500	22			



**Fig. 2** Themes/sub-themes generated from the FGD-students

*ined will be confused and it might not be a true test of the knowledge of the student.” (Male, 22 years, 500 level)*

Based on the category of individuals being recruited as SPs, participant 5 opined thus:

*“If we want to use outsiders, I think they require training if they don’t know anything about the condition. But if students that have seen and treated these conditions are used, they should know what to present as features. So for people with clinical background, training is not needed.” (Male, 20 years, 400 Level)*

Participant 2 with a different view opined thus:

*“Acting or pretending does not come easy to some people, so there should be a screening process first, and then for outsiders e.g. actors, they need to undergo very rigorous training. If we are using students for instance*

*500 level students, maybe a little bit of training and screening.” (Female, 22 years, 400 Level)*

Participant 1 also stated his view this way:

*“Everyone requires training, because we want the SP to act as closer to the real patient as possible.” (Male, 24 years, 500 Level)*

**Theme 2: perception about the involvement of simulated patients in clinical examinations**

Two sub-themes which include the reason for involving simulated patients in clinical examinations, and standardization of simulated patients were generated.

**Sub-theme 1: reasons for involving simulated patients in clinical examinations**

Majority of the participants interviewed in the FGD felt that there is a need to involve simulated patients in



clinical examinations, stating different reasons for their stand. Participant 3 expressed her view this way:

*"I think it will be difficult not to involve SP, because I feel getting real patients for the conditions that we want to examine might prove a little difficult. I think getting the number of patients required for examination is difficult, so using SPs is inevitable." (Female, 21 years, 500 level)*

Participant 7 shared her thought this way:

*"I feel we need to involve SPs because over the years, I figured that most patients are unwilling to stay in the examination hall for so long." (Female, 22 years, 500 Level)*

Participant 5 bared his mind this way:

*"I think SPs are needed so as to control some variables for example the patient's mood." (Male, 20 years, 400 Level)*

Giving further clarifications on his position he speaks further:

*"Real patients, after the first three student, they are already getting tired, their mood will change. What the student is doing might be right, but they may act in a way that can even discourage the students. So I think simulated patients are still needed." (Male, 20 years, 400 Level)*

Participant 2 with a slightly varying view expressed her opinion thus:

*"I think we should have a mixture of real patients and simulate patients in clinical examinations. For me, the real life experience of handling a real patient helps you to get your nerves in control." (Female, 22 years, 400 Level)*

#### **Sub-theme 1: standardization of simulated patients**

Although the majority of the participants felt that there was a need to involve simulated patients in clinical examinations, they were however displeased with the current level of standardization of these simulators in their clinical examination. Participant 3 aired her mind this way:

*"I think having simulated patients in clinical examinations is inevitable, however, the way it is being practiced right now, there are simulated patients that have tried to help students before, maybe because you are familiar with the person you are meeting in a cubicle, you feel she should help you, and in the process of assisting, you might be doing more harm than good." (Female, 21 years, 500 Level)*

Participant 3 further expressed her displeasure this way:

*"I was once asked to act as a six months old baby with Erb's palsy, and it was very confusing for every single student being examined, because they would come to the cubicle, see me and be confused".*

Participant 1 opined thus:

*"We can use SPs, provided we do it in a standard way. We should use simulated patients that fit the condition we want to simulate age wise".*

#### **Theme 3: advantages of involving SPs in clinical examinations**

Two sub-themes which include response regulation and patient safety were also generated.

##### **Sub-theme 1: response regulation**

Participant 3 stated that:

*"For the student being examined, sometimes, a simulated patient is easier with the nerves than an actual patient. For a real patient, you can't really predict the person's mood or response. A real patient might have other factors intervening in his response." (Female, 21 years, 500 Level)*

Participant 7 with similar thoughts expressed herself this way:

*"A simulated patient is good because there is no mood swing and there are no unexpected events." (Female, 22 years, 500 Level)*

##### **Sub-theme 2: patient safety**

*"Since we are students, during the examination, there is tension, so to avoid worsening the patient's condition, SP is preferred." (Male, 24 years, 400 Level)*

##### **Sub-theme 3: disadvantages of involving SPs in clinical examinations**

The participants noted drawbacks like familiarity with a simulated patient and limitations in the conditions that can be simulated by an SP. Participant 3 stated that:

*"Some simulated patients try to help students, and in the process of assisting, you might be doing a little more harm than good." (Female, 21 years, 500 Level)*

Participant 2 shared her view this way:

*"All these clinical conditions, no matter how good you are at acting, it can never still be 100%. It is still*

*better experienced". (Female, 22 years, 400 Level)*

Participant 5 bared his mind this way:

*"I think in some cases, SPs do not work. For example, simulating a six months old baby, no matter how good the training is, there is no way I will treat an adult simulating a six months old baby like one". (Male, 20 years, 400 Level)*

Participant 1 opined thus:

*"I feel if we use SPs during exams, if we are not exposed to the real thing, we might not have the real feeling of how real patient ought to be". (Male, 24 years, 400 Level)*

#### **Theme 6: description of different simulators**

##### **Description of different simulators**

The participants were asked to describe, distinguish, and state the uses or preferences of different simulators, e.g., models, mannequins, simulated patients, and high fidelity patient simulators (HFPS). All the participants said they had no idea about high-fidelity patient simulators.

Participant 7 however spoke explicitly about the other types of simulators. Her thoughts were;

*"Mannequins are inanimate objects used to teach students about a particular procedure e.g. for CPR, mannequins are used". (Female, 22 years, 500 Level)*

*"For models, models are not trained, they are just asked to perform a particular role". (Female, 22 years, 500 Level)*

*"Simulated patients are trained to understand a particular condition and have the knowledge of how to act like a patient with a particular condition". (Female, 22 years, 500 Level)*

#### **Knowledge and perception of physiotherapy lecturers about the involvement of simulated patients in clinical examinations at the University of Ibadan: exploratory qualitative study**

Qualitative study to further explore the knowledge and perception of physiotherapy lecturers about the Involvement of Simulated Patients in Clinical Examinations using focus group discussions was conducted. Six themes (knowledge about simulated patients, process involved in the use of simulated patients in clinical examinations, perception about the involvement of simulated patients in clinical examinations, advantages of involving SPs in clinical examinations, disadvantages of involving SPs in clinical examinations, description, distinction, use/preference of different simulators, e.g., models, mannequins,

simulated patients, high fidelity patient simulators) were generated, which were categorized into sub-themes (Fig. 3).

#### **Theme 1: knowledge and process involved in the use of simulated patients in clinical examinations**

The respondents had similar views of the term simulated patients. Participant 1 stated that:

*"Simulated patients are models that are used in place of patients for examinations, to act as if they were patients". (Male, 39 years)*

Participant 3 had this view:

*"Simulated patients simply mean people who pretend to be patients. They are not real patients, but they act as if they have the symptoms of a particular disease condition". (Female, 45 years)*

In terms of people who act as simulated patients, participant 4 described SPs this way.

*"Simulated patients are not real patients, they are individuals, who from the onset were supposed to be lay people, and most times, people use actors because of their skill in acting". (Male, 55 years)*

#### **Sub-theme 2: recruitment of simulated patients**

In the words of participant 4:

*"Normally, there is the aspect of recruitment, and there is the aspect of training. When it comes to recruitment, there are certain things to look for in recruiting the people". (Male, 55 years)*

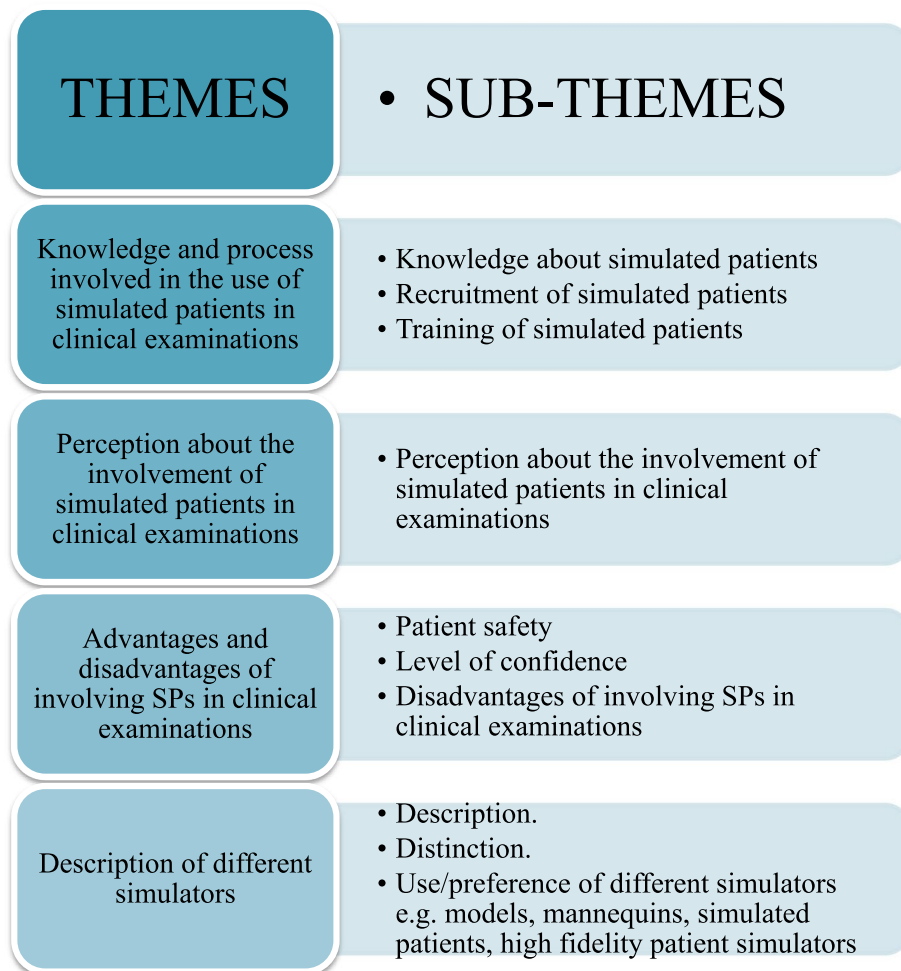
*"For example, SPs are not supposed to be people that are shy and withdrawn from the clinician in training or the student being examined". (Male, 55 years)*

As regards the submission above about the category of people that should be recruited as a simulated patient, participant 2 articulates:

*"In a situation when the SP is not like a typical actor, you find them being shy or timid. But if you have a professional actor, that is what he does most of the time, so he is ready to portray those symptoms and the student will not have problem interacting with such SP". (Male, 62 years)*

Participant 3 opined thus:

*"I think what is most important is the training, irrespective of whoever is recruited to act as SP". (Male, 45 years)*



**Fig. 3** Themes/sub-themes generated from the study-lecturers

However, the above participant mentioned some drawbacks to the use of some categories of people, e.g., students as SPs. In her words:

*“The only disadvantage I have with students is that they are also going to be interacting with fellow students, there is a problem of the possibility of leading the student along or going out of script, and that may be the reason why somebody who is not knowledgeable in that condition would be a better choice than a fellow student who may overdo things or lead the patient aright, which will affect the objectivity of the examination. So I feel somebody different, but not necessarily a professional actor”. (Participant 5, female, 49 years)*

**Sub-theme 3: training of simulated patients**

Most of the respondents, speaking from their experience in the involvement of SPs for clinical examinations

highlighted training of simulated patients as a crucial part of the process involved in SP use in clinical Examinations. Participant 3 described the process thus:

*“From what I have experienced as a coordinator of clinical examinations, what it involves is; we have a particular condition in mind, then we train the SP to mimic the symptoms or presentation of such condition”. (Female, 45 years)*

Participant 1 with a similar view also said:

*“From my own experience in the use of SPs, the models or people simulating patients are pre-briefed about what they are expected to do, how they are expected to comport themselves, and their informed consent is gotten”. (Male, 39 years)*

### Theme 2: perception about the involvement of simulated patients in clinical examinations

Majority of the participants felt involving simulated patients in clinical examinations is necessary and worthwhile. However, some participants felt it should only be incorporated as a backup, and used only when absolutely necessary. Participant 1 expressed his thoughts this way:

*"I think involving SPs is worthwhile, especially considering the fact that over the years, in the department, we have always been running out of patients for our clinical exams, so from that perspective, the better choice will be to go for SP"* (Male, 39 years)

Participant 3 aired her view this way:

*"I think it is something worthwhile to have simulated patients, if we can get the right training and right participant"*. (Female, 45 years)

Participant 2 who had a similar view also emphasized the importance of training.

*"As far as I am concerned, we should rely less on real patients and focus more on SPs, provided we have trained them very well"*. (Male, 62 years)

Antagonizing this position, participant 1 bared his mind this way:

*"It is good to simulate, but I believe that simulation cannot and should not replace real patients, because real patients have other circumstances surrounding them apart from the physical conditions they come with, which simulation will not take care of. For instance, a patient who has suffered burns might have lost a child in the fire, so you are not only treating that patient, that patient has an emotional angle to his or her condition, which is going to affect what you are able to do, and your skill as a clinician in handling that will determine how far you are able to get that patient to do anything at all"*. (Male, 39 years)

Participant 3 who shared a similar thought expressed herself this way:

*"No matter how well you train people to mimic a disease condition, it cannot be the same as real patients. I feel SPs should be used when it is absolutely necessary"*. (Female, 49 years)

Participant 5 has this to say:

*"I feel as much as possible, we should use actual patients for the condition we want to examine the students on"*. (Female, 49 years)

### Theme 3: advantages of involving SPs in clinical examinations

Two sub-themes which include patient safety, and level of confidence were generated.

#### Sub-theme 1: patient safety

Participant 3 stated that:

*"The use of simulated patient is to protect patients"*. (Female, 45 years)

#### Sub-theme 2: level of confidence

Participant 1 articulated that:

*"The use of SPs may give some students more confidence because they know that the person they are dealing with is not a real patient. Some students may have fear of handling real patient, so handling SP may give them some level of confidence"*. (Male, 39 years)

#### Sub-theme 3: disadvantages of involving SPs in clinical examinations

Despite the advantages highlighted above, some drawbacks were also noted, which include limitations in the conditions that we can use SPs for, the high cost of involving SPs in clinical examinations, and carelessness on the part of the students being examined. Participant 3 stated that.

*"There are certain symptoms that are difficult to simulate, particularly in cardio pulmonary and neurology. For example, how do you mimic spasticity, palpitations and arrhythmias"*. (Female, 45 years)

Participant 4 mentioned this:

*"Using SPs will impose a lot of expenses. They are paid during training and also at the time of service"*. (Male, 55 years)

Participant 3 also mentioned that:

*"Humans can afford to be careless, because they know that they are dealing with SPs, but if you know you are dealing with real patients, sometimes in your subconscious, you are more careful because you know you can hurt the patient"*. (Female, 45 years)

#### Sub-theme 4: description of different simulators

Two of the participants spoke about different types of simulators, their use, and preferences in various fields of medicine.

Participant 4 spoke explicitly about this:

*“Mannequins are more or less like steel objects, whereby when you want to assess skills, for instance psychomotor skills can be assessed through that. But where you want to actually elicit a response or a symptom, a mannequin will not work; rather a SP or a high fidelity patient simulator will suffice.” (Male, 55 years)*

*“The difference between SPs and high fidelity patient simulators for instance in Cardiorespiratory specialty, where you want to assess arrhythmia, a SP who is not arrhythmic cannot elicit that, but HEPS can be programmed for that. When we talk about models, models act like the mannequins, just that model is a living being, while the mannequin is an inanimate object. A model is not supposed to bring up any symptom unlike SP who has been trained to elicit certain symptom or reaction.” (Male, 55 years)*

Participant 3 also expressed her opinion thus:

*“I think each of them has its own role to play, one cannot replace the other. Simulated patients require training, models do not necessarily have to be trained.” (Female, 45 years)*

*“We know that some of these simulators are very good and relevant for certain procedures in the medical field, some of them are not useful for our procedures as physiotherapists, and so we should know the ones that are relevant to us as professionals.” (Female, 45 years)*

## Discussion

The utilization of simulated patients (SPs) in clinical examinations within medical education has been increasingly recognized over the years, with studies indicating significant benefits such as enhanced learning, performance monitoring, and standardization of clinical assessments [10, 21]. Similarly, there has been a scholarly focus on the contribution of simulated patients to physiotherapy education. Interacting with SPs has been shown to improve students' clinical reasoning skills, communication abilities, and motivation in a safe and controlled environment [22]. These interactions serve a valuable role in entry-level physical therapy education, providing students with practical experiences that closely resemble real-world clinical scenarios [23].

Also, research indicates that incorporating simulated patients into physiotherapy practice classes enhances student skill performance, particularly in areas such as cardiorespiratory practice [24]. By engaging with SPs,

students have the opportunity to apply theoretical knowledge to practical situations, honing their clinical skills and preparing them for clinical practice. Furthermore, utilizing simulated patients alongside well-designed evaluation instruments offers an effective means of measuring clinical performance in physical therapy [25]. Through structured assessments conducted with SPs, educators can objectively evaluate students' competency levels and identify areas for improvement, ultimately contributing to the development of competent and proficient physiotherapy professionals. Simulated patients, individuals trained to portray specific medical conditions, offer a valuable educational tool for students to enhance their clinical skills in a controlled environment. This study investigates the knowledge and perception of both physiotherapy students and lecturers regarding the involvement of SPs in clinical examinations at physiotherapy training institutions in South-West Nigeria.

The varying levels of knowledge among students and lecturers regarding the involvement of simulated patients (SPs) in clinical examinations underscore the importance of addressing educational gaps in physiotherapy training programs. While a majority of lecturers demonstrated good knowledge, a significant proportion of students exhibited only a fair or poor understanding of SPs' role in clinical education. Inadequate knowledge among students regarding the involvement of simulated patients (SPs) in clinical examinations highlights a crucial area for improvement in physiotherapy education. The findings suggest that there may be gaps in the curriculum or teaching methods that hinder students' understanding of the role and significance of SPs in clinical practice. This is consistent with previous studies indicating that students may lack sufficient awareness or understanding of the purpose and benefits of using SPs in medical education [26]. One possible explanation for this lack of knowledge could be insufficient exposure to simulated patient encounters during training and trained facilitators [26]. Studies from the literature reported that students who have more opportunities to engage with SPs tend to have a better understanding of their role and value in clinical education [27–30]. Therefore, increasing the frequency and quality of SP-based learning experiences within the curriculum may help address this knowledge gap. Previous researches have also highlighted the positive impact of simulation-based learning on students' knowledge acquisition and clinical skills development [31, 32]. However, the disparities observed in this study suggest that current educational strategies may not effectively convey the importance and utility of SPs to all students. According to this study, current educational strategies may be ineffective in communicating the significance and benefits of simulated patients (SPs) for several reasons.

Limited exposure to SPs among some students hinders their appreciation of the value these experiences offer. Additionally, differing perspectives among lecturers about SP effectiveness can create mixed messages, leading to confusion for students. Furthermore, inadequate integration of SPs into the curriculum may result in varying levels of student engagement, diminishing their perceived utility. Concerns about SP training and preparation can also affect students' trust in the simulation experience. Lastly, a preference for real patient interactions may reflect a lack of recognition of the unique benefits that SPs provide. Addressing these issues could enhance students' understanding and appreciation of SPs in their education.

Lecturers on the other hand demonstrated a notably high level of knowledge, with 70.3% classified as possessing good knowledge. This is consistent with findings from previous studies indicating that educators tend to have a strong grasp of the subject matter they teach [33, 34]. The extensive experience and training of lecturers in their respective fields likely contribute to their proficiency in understanding the use of simulated patients in clinical examinations. Additionally, ongoing professional development opportunities and engagement in scholarly activities may further enhance their knowledge base. This substantial level of expertise among lecturers is pivotal as they play a critical role in guiding and shaping the educational experiences of students [35].

The perception of both students and lecturers regarding the involvement of simulated patients in clinical examinations was predominantly positive, reflecting a favorable attitude towards this educational approach. Among students, 71% reported a positive perception, indicating their recognition of the value and effectiveness of simulated patient encounters in enhancing their learning experiences. This aligns with previous studies highlighting the benefits of simulation-based education in improving clinical skills acquisition and confidence levels among learners [36, 37]. Similarly, lecturers exhibited an even higher level of positive perception, with 86.5% expressing favorable views towards the use of simulated patients in clinical examinations. This strong endorsement from educators demonstrates the widespread acceptance of simulation as a valuable pedagogical tool in medical education. Educators recognize the role of simulated patient encounters in providing learners with realistic clinical scenarios [38], promoting active engagement [28], and facilitating the development of critical thinking and decision-making skills [39, 40]. The overall positive perception among both students and lecturers suggests a shared appreciation for the benefits of simulation-based training in medical education.

Both students and lecturers offer insightful perspectives on the concept of SPs, shedding light on their understanding and perceptions within the educational setting. From the students' standpoint, SPs are commonly viewed as substitutes for real patients during clinical examinations. They describe SPs as models or actors who mimic specific disease symptoms, emphasizing their role in simulating real-life scenarios for assessment purposes. This perspective highlights the practical utility of SPs in providing students with hands-on experience in diagnosing and managing medical conditions within a controlled environment [41]. On the other hand, lecturers contribute a wealth of insight into the role of simulated patients (SPs), leveraging their extensive experience and expertise in medical education. These instructors have a profound comprehension of the educational principles that support the utilization of simulated patients (SPs) and are highly knowledgeable about the complexities involved in clinical simulation methodologies. Lecturers often serve as facilitators and mentors in simulation-based learning environments, guiding students through immersive scenarios designed to replicate real-world clinical situations [42]. Through their involvement in curriculum development and instructional design, lecturers ensure that SP encounters align closely with learning objectives and competencies outlined in medical education standards [7].

Students emphasized the significance of recruiting simulated patients (SPs) based on their willingness and availability, while also highlighting the importance of SPs having a comprehensive understanding of the simulated medical conditions. This perspective stems from the students' practical approach to ensuring the effectiveness of clinical examinations. They believe that SPs who are willing and available can contribute to smoother examination processes and interactions with students. In contrast, lecturers advocate for a more holistic approach to SP recruitment, emphasizing not only the willingness and availability of SPs but also their clinical knowledge and authenticity. They argue that SPs should possess a deep understanding of the simulated conditions to accurately portray symptoms and behaviors, thereby enhancing the educational value of clinical simulations. This viewpoint coincides with research highlighting the critical role of SPs' comprehensive understanding of medical conditions for effective clinical simulations [43]. Supporting this stance, studies have shown that SPs with a thorough understanding of medical conditions can provide more realistic and immersive learning experiences for students [44]. By recruiting SPs who possess clinical knowledge, educators can ensure that simulated scenarios closely resemble real-life patient encounters, thereby better preparing students for clinical practice [44]. Additionally,

SPs who are well-versed in the simulated conditions can effectively challenge students' clinical reasoning skills and decision-making abilities [40]. Furthermore, the authenticity of SP interactions can significantly impact students' learning experiences. Research suggests that SPs who convincingly portray symptoms and behaviors contribute to higher levels of student engagement and learning outcomes [45]. Therefore, by prioritizing SPs' clinical knowledge and authenticity during recruitment, educators can create more effective and impactful learning environments for medical students.

The consensus between students and lecturers is evident regarding the integration of simulated patients (SPs) into clinical examinations. Students often point to the challenges associated with accessing real patients as a primary justification for the use of SPs, reflecting the findings of Nestle and colleagues in 2011 [46]. Despite this agreement, both students and lecturers express reservations regarding the standardization of SP performances. Similarly, lecturers acknowledge the need for enhanced training and selection processes to ensure the reliability of SP performances, consistent with recommendations by Resende and colleagues in 2020 [47].

The findings of this study underscore the critical role of simulated patients (SPs) in enhancing the clinical education of physiotherapy students. To effectively integrate SPs into clinical practice, educational institutions should prioritize the development of structured programs that facilitate regular interactions between students and SPs. This can be achieved by incorporating SP encounters into the core curriculum, ensuring that students gain practical experience in a controlled environment that mirrors real-life clinical situations. Furthermore, training programs for SPs should be established to ensure they possess a thorough understanding of the medical conditions they are simulating. This will enhance the authenticity of their performances and provide students with realistic scenarios that challenge their clinical reasoning and decision-making skills. Regular feedback and evaluation of SPs' performances can help maintain high standards and consistency across simulations. Additionally, ongoing professional development for lecturers is essential to ensure they are equipped with the latest pedagogical strategies for utilizing SPs effectively. By fostering a collaborative approach between educators, SPs, and students, institutions can create a robust learning environment that not only enhances the educational experience but also better prepares students for future clinical practice. Overall, the integration of SPs into physiotherapy training programs can significantly improve student preparedness, ultimately leading to higher-quality patient care.

## Limitations

This study's use of a mixed-method approach is a notable strength, providing a comprehensive exploration of the topic by combining quantitative and qualitative data collection. However, several limitations exist. Resource constraints, such as inadequate access to advanced technology and training for simulated patients, may have influenced the findings, differing significantly from better-equipped regions. The reliance on self-reported knowledge and perceptions introduces potential bias, as participants might overestimate or underestimate their experiences. Variability in the use of simulated patients across institutions could affect result consistency due to differing practices and standards. The cross-sectional design captures a single point in time, not accounting for changes in perceptions and knowledge over time. Lastly, the qualitative data, while adding depth, may be limited by the number of focus groups conducted, potentially missing broader perspectives.

In addition, the varied ages and experiences of lecturers could introduce biases in the data, as older lecturers may have had more exposure to simulation practices over time compared to their younger counterparts. This factor may contribute to variations in understanding and perceptions, indicating a need for further research to explore these differences comprehensively and to examine how they influence the educational outcomes in physiotherapy training.

## Conclusion

Physiotherapy students in South-West Nigeria have a low level of knowledge about the involvement of simulated patients in clinical examinations compared to their lecturers. However, both students and lecturers have a positive perception of the involvement of SPs in clinical examinations. There is a need for educators to improve on the planning and structuring of clinical examinations involving simulated patients, in terms of the criteria for recruitment and training of the simulated patients. Further studies on the use of simulated patients in clinical examinations should be conducted outside the South-West region of the country.

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## Authors' contributions

Adesola C. Odole and Nse A. Odunaiya made substantial contributions to the conception and design of the study. Omoniyi S. Ojo participated in the data collection. Adesola C. Odole and Abiola O. Fafolahan analyzed and interpreted the data. Francis Fatoye, Chidozie E. Mbada, Clara F. Fatoye, and Aderonke O.

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#### Declarations

##### Ethics approval and consent to participate

The study protocol was approved by the University of Ibadan/University College Hospital (UI/UCH) Health Research Ethics Committee (UI/EC/17/0304).

##### Competing interests

The authors declare that they have no competing interests.

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