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Applying the three delays qualitative model to sepsis care seeking and emergency care in a private hospital in Lagos, Nigeria

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Abstract

Background Sepsis remains a leading cause of death among hospitalized and critically ill patients in Nigeria. Despite progress in antimicrobial therapy access and emergency resuscitative care, it continues to account for a significant proportion of death and disability in low and middle-income countries and represents a significant burden of disease. This study aimed to define the factors impacting patient care-seeking and clinician emergency care practices for septic patients at a private hospital in Lagos, Nigeria.

Methods The study explored barriers to providing care among clinicians in group discussions using the three-delays model. Patients or caregivers completed in-depth interviews to explain barriers to seeking care. The study used pilot-tested, semi-structured group/interview guides to facilitate data collection from patients and clinicians. Interviews/group discussions were audiotaped, transcribed, and coded. Data was collected and analyzed until thematic saturation was achieved.

Results A total of 15 clinicians and 30 patients or caregivers participated. Delays in seeking appropriate care (Delay 1) included seeking alternative sources of care, communal or family decision-making issues, and symptom and illness perception. For delay 2 (reaching appropriate care), work schedule considerations, proximity to the healthcare facility, mode of transportation, and patients' time preference for hospital presentation emerged as common themes. In delay 3 (receiving appropriate care), the clinical condition at presentation, the selected clinical approach to management, system delays at the hospital, and financial considerations impacted the time to provision of definitive care.

Conclusions Delays in patient healthcare-seeking and clinician delivery of emergency stabilization in sepsis occur in Nigeria and align with the three-delays model. The decision to seek care (delay1) is frequently made communally with family and friends. Patients initially prefer alternative sources of care for convenience. Upon arriving at the hospital for appropriate care (delay 2), work schedule considerations, long commute times to the hospital, and long waiting times impacted patients' time to arrival. Finally, receiving definitive care (delay 3) was affected by financial considerations, clinicians' knowledge of sepsis symptom management and treatment, and delays in completing diagnostic laboratory investigations.

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Keywords Sepsis, , Low and middle income countries, Sub Saharan Africa, Three Delays model , Emergency care

Introduction

Sepsis disproportionately affects sub-Saharan Africa (SSA) due to significant pathogen diversity, a high prevalence of neglected tropical diseases, limited healthcare access, and rising antimicrobial resistance [1]. A paucity of regional data makes incidence, prevalence, and etiology estimates difficult. Nevertheless, the existing data shows a significant burden of sepsis in SSA, with significantly worse outcomes once patients require intensive care [2].The majority of available data from SSA comes from Eastern and Southern Africa. A recent analysis of pooled data from Eastern and Southern Africa reported a hospital-wide prevalence of sepsis of 17%, hospital-wide mortality of 15%, ICU-based prevalence of 31%, and ICU-based mortality of 46% [1, 2].

Research has focused on perinatal and puerperal sepsis [3, 4]. Therefore, this study excludes neonates and pregnant women and focuses on pediatric patients outside the neonatal period and adults, including pregnant women up to 24 weeks of gestation. In Nigeria, significant differences exist in sepsis recognition and outcomes, and there is no centralized repository or registry for national sepsis data to guide management. Case fatality rates can range from 25–50% in some hospital-based studies [5]. Data on community-acquired sepsis is sparse, but indications point to even higher mortality in rural and under-resourced settings. A study conducted in southeastern Nigeria indicated an adult sepsis incidence of 7.41% and a fatality rate of 30.5%. In comparison, another study from northern Nigeria recorded a mortality rate of 53%, despite only 20% of the patient group being categorized as critically ill [6]. A pediatric study from southeastern Nigeria reported an emergency department mortality rate of 3.9%, with sepsis, malaria, and acute gastroenteritis accounting for 28.8%, 24%, and 11.2% of deaths, respectively [7, 8]. The leading causes of pediatric sepsis in Nigeria include malaria, pneumonia, and meningitis, with malaria accounting for 30.7% of pediatric sepsis cases [9]. These studies demonstrate a high sepsis case fatality rate in Nigeria and highlight the urgent need for optimized management strategies that are cost-effective, given widespread multigenerational poverty [10, 11].

To guide the development of a locally relevant clinical practice guideline for sepsis, this study sought to understand the local context of sepsis care-seeking behaviour and clinicians' baseline knowledge and management practices. The Three-Delays model, first described by Thaddeus and Maine, identifies three crucial delays: (1) the delay in seeking care, (2) the delay in arriving at a medical facility, and (3) the delay in receiving definitive care [12, 13]. This model is a valuable tool for policymakers and researchers to frame barriers to care and was used in this study [14, 15]. Studies exploring decision-making in care-seeking behaviour are sparse. Prior research indicates that a significant number of Nigerians eschew hospital-based medical care. Adeoti et al. (2022) reported that care seeking for childhood illnesses among caregivers in Nigeria was suboptimal, particularly for children under five [16]. At least 25% of parents did not seek care for children with fever or acute respiratory infections, and over one-third did not seek care for diarrheal illnesses. Only 15% and 13% of caregivers demonstrated appropriate care-seeking for fever and acute respiratory infections, respectively, while 27% sought care from a formal provider for diarrhea. These findings underscore the urgent need for interventions to raise caregivers' awareness of the ubiquity of delayed presentation in Nigeria and the potential impact on sepsis outcomes. Simultaneously, quality-of-care initiatives are needed to rebuild trust in formal healthcare facilities in Nigeria [17].

Several healthcare-related factors play a role in the high case fatality rates seen in Nigeria. Specifically, inadequate knowledge, particularly among doctors, and insufficient investigative and management plans drive poor outcomes [18, 19]. The majority of hospitals have limited diagnostic capability, which obscures the identification and management of febrile cases, including sepsis [20]. Lastly, SSA, including Nigeria, has high rates of HIV and tuberculosis, which further complicates sepsis and worsens outcomes [21].

Based on available information, this is the first study of its kind in Nigeria. This study seeks to identify the fundamental elements affecting patients'choices to pursue care, delays in accessing healthcare services, and obstacles to obtaining prompt treatment. The results will offer essential insights into the cultural, social, and systemic barriers in sepsis care, facilitating the creation of a culturally relevant local practice guideline.

Materials and methods

This study applied the three-delays model to explore patients' barriers to seeking emergency care and clinicians' barriers to delivering emergency care for sepsis at a private hospital in Lagos, Nigeria. The study used a descriptive qualitative approach to ensure an unforced presentation of the barriers and perceptions described by the patients and caregivers [22].

Study setting

The study was conducted at a multi-site specialist hospital in Lagos, Nigeria. The hospital is a secondary-level

private 210-bed hospital with a census of 193,828 patients in 2023. The hospital offers comprehensive emergency/critical care services to patients from diverse socio-economic and ethnic backgrounds, is centrally located in Lagos, and was selected as the study site to ensure efficient study management and supervision. Daily outpatient clinics are staffed by medical and surgical specialists, residents, and junior interns serving over 800 patients daily, and the emergency department (ED) receives approximately 3,500 visits a year. The ED was established in 2022 and is a three-bed unit supervised by a consultant emergency physician, junior medical staff, and specialist emergency nurses. An ongoing sepsis registry was commenced in 2023 to document clinical data for all patients diagnosed with sepsis at the facility to improve the quality of sepsis care in the ED. The hospital runs a mixed, high-dependency, and intensive critical unit (HDU/ICU).

Study population and participant recruitment

The study population comprised two groups of participants: (a) 30 adult patients or caregivers of paediatric patients treated for sepsis at the study site, and (b) 15 clinicians who routinely provide sepsis care at the facility. The patient population included adult patients aged ≥ 18 years and the primary caregivers of paediatric patients aged > 28 days to < 18 years who met the Systemic Inflammatory Response Syndrome (SIRS) criteria [19, 20] were managed on an inpatient basis, and were discharged from the hospital at the time of participation. The patients invited to participate were identified from participants enrolled in the ED sepsis registry who had consented to be part of the study and were followed up via phone calls 30 days after discharge from the hospital. After expressing interest and providing informed consent, thirty participants were interviewed. Approximately 100 patients declined to participate, while 50 patients initially consented but later withdrew from the study, citing convenience and logistics challenges. The study recruited 30 participants for the patient/caregiver group in-depth patient interviews (IDIs), of whom 20 were adult patients and 10 were primary caregivers of pediatric patients. The response rate for patients was 20%. In the clinician cohort, three nurses and twelve physicians of various cadres and expertise, ranging from consultants to house officers, participated in group discussions.

Study instrument

The research team developed two semi-structured guides exploring various aspects of the three delays to facilitate data collection from patients and clinicians. The IDI guide focused on the initial identification of illness, the factors influencing care-seeking behavior, and the patient's experiences with the care received at the facility. The clinician guide investigated knowledge of sepsis presentations, diagnosis, and treatment. Additionally, background professional information was collected, including the length of practice at the facility, staff cadres, clinical designation, years of clinical experience, and typical patients' demographics. The guides were pretested with one patient and one clinician before use to reduce ambiguity and ensure completeness. Interview and group discussion guides are in Appendices I and II, respectively.

Data collection

Six sepsis research team members facilitated interviews and group discussions: AP, CO, AI, OA, AO, and IM. All are medical officers and have bachelor's degrees in medicine and surgery (MBBS) except AI, who is a registered nurse (RN), and AO, who has a bachelor's degree in Zoology. At the time of the study, all physicians except IM were employed as medical officers. AI was employed as a nurse at the hospital. All researchers were female except AP. Researchers underwent a 1-hour training session before data collection. They also underwent three additional 1-hour training sessions with AT, a qualitative data research expert. Data collection was overseen weekly by OO, an expert researcher and methodologist. The interviews were conducted by medical officers and research associates (non-clinicians). Research associates are not hospital employees. The junior doctors who participated in the study were of the same professional level as the interviewers. To avoid any potential coercion of participants, the principal investigator, a consultant and the medical director, did not participate in the interviews. Details of the research team's roles and responsibilities are in Appendix IV.

Additionally, none of the interviewers held supervisory authority over the participants in group discussions. The participants'responses were not disclosed to their line supervisors, and no administrative consequences were associated with participating in the study. Researchers introduced themselves to participants before each session according to the approved script, which detailed their position, reason, and interest in data collection.

Six (6) dyadic and triadic group discussions and thirty (30) in-depth interviews were completed. The data was collected in a secluded space within the hospital premises, which allowed participants the privacy to articulate their subjective experiences [24]. Identifying information was collected in the study consent form, accessible only to the research assistant, AO, and the principal investigator, AFA. The documents are kept in a secure drive with restricted access to AO and AFA only. No repeat interviews were carried out. In-depth interviews lasted an average of 20 to 30 min, while the healthcare provider discussions lasted an average of 50 to 60 min. Discussions and interviews were recorded on two separate devices (a

laptop and an ipad) simultaneously. Research assistants recorded their observations of the participation of the interviewees as field notes in all data collection sessions, which spanned February to May 2024. Participants did not review interview transcripts for comments.

Data management and analysis

All interviews and discussions were recorded, transcribed verbatim, and de-identified. A second research team member not directly involved in the interviews reviewed all transcripts to ensure respondent anonymity and accurate transcription. Respondent characteristics are presented in Table 1. Applying the three delays model, a deductive thematic analysis methodology was applied in three stages. First, a deductive thematic analysis was applied to four (4) transcripts (two patient interviews and two group discussions) to develop a codebook using Dedoose (Version 9.2.006) [25]. Dedoose is a commercial qualitative data analysis software. This stage was performed in two phases: an independent coding phase by three research team members and twelve iterative group coding exercises of three to four research team members to revise the codebook and capture new codes.

During codebook development, three coders were present at every meeting. The researchers also ensured coherence and clear distinctions between codes. Second, to evaluate the thoroughness and clarity of the codebook and its applicability to the data, two research team members who were not involved in the initial codebook development independently applied the codebook to the data, and their codes were compared to evaluate consistency.

Using the generated codebook, two researchers independently coded the same transcripts (one GD, one IDI). After the initial coding, disagreements were resolved by the research manager in the following fashion: comparing the codes applied and reviewing areas of concordance and disagreement within 3 min as a tiebreaker. In a group meeting, researchers discussed their application of the codes. The principal investigator resolved disagreements and made final recommendations on the codebook. Disagreements occurred due to different levels of familiarity of coders with Dedoose, differences in coding styles, and cases of uncoded sections by either party. This exercise took a month to complete.

Next, nine transcripts (30% of the data) were double-coded using the same independent coding consistency test template. After the coding consistency test, two coders analyzed the same transcripts and focused on the code descriptions to ensure coherence and clarity. This further reinforced the consistency and relevance of the codebook. The double coding exercise resulted in the following: creation of new codes, redefinition and re-categorization of existing codes, and clarification of code descriptions. After all recommendations were adopted in the codebook, the single coding phase commenced with five coders analyzing the remaining twenty-one (21) transcripts.

Following the coding consistency test, the codebook was revised for accuracy. There were 119 unique codes, grouped deductively into 58 categories along the three-delays model. Third, a deductive thematic analysis of the outstanding transcripts concluded the analysis. All analyses were performed using Dedoose version 9.2.006 [25]. Data saturation was systematically monitored at each stage of the coding process, including phases of codebook creation, inter-coding, and double coding. Data saturation was achieved after 22 coding sessions when the absence of new code generation was confirmed. The analytic framework is presented in Fig. 1. Major and minor themes are presented in the results along with representative quotations from the de-identified transcripts to illustrate the findings. This report is guided by the Consolidated Criteria for Reporting Qualitative Research (COREQ) 32-item checklist [23].

Table 1 Sociodemographic Characteristics of Clinicians

S/N	Characteristics		Total ($n=15$)
1	Gender	Male	8
		Female	7
2	Clinical Qualification	Residency Training	3
		MBBS	9
		RN	3
3	Clinician Designation	Consultants	3
		Senior Residents	2
		Medical Officers	4
		Nursing Officers	3
		House Officers	3
4	Years of clinical experience	< 1 year	8
		1–5 years	2
		5—10 years	2
		> 10 years	3

Reflexivity

The research team comprised a diverse range of educational backgrounds that enriched the interpretation of the data. Researcher positionality and reflexivity were considered continually throughout the project, and the study employed strategies to ensure the transparency and credibility of the research process. All interviews were conducted by a leading researcher and observed by another; researchers debriefed after each interview, and frequent discussions within the larger research group improved the interviewing skills and strategies. All transcripts were reviewed by two researchers, excluding the interviewers. Additionally, memos on transcripts and peer feedback on transcription and interview quality occurred continuously to improve the quality of

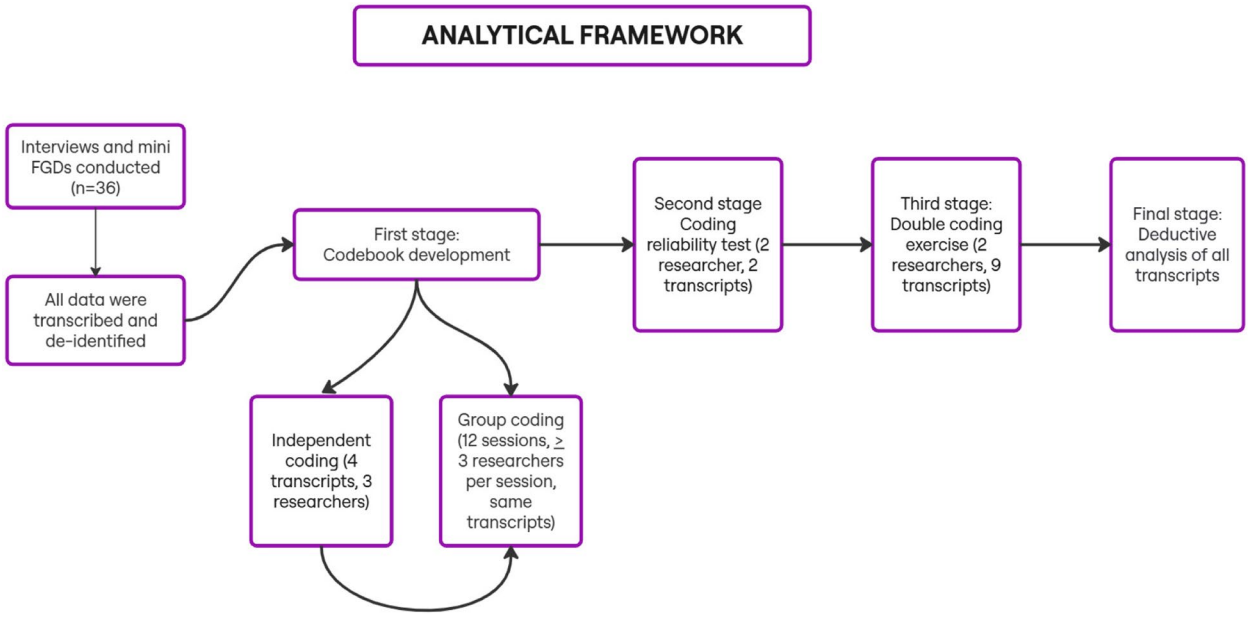

Fig. 1 Qualitative analysis framework

Table 2 Sociodemographic Characteristics of Patients and Caregivers

S/N	Characteristics		Total (*n* = 30)
1	Gender	Male	11
		Female	19
2	Category	Patient	20
		Caregiver	10
3	Point of Entry	Emergency Department	9
		In-patient Department	2
		Out-patient Department	19
4	Duration of Admission	< 7 days	19
		7–30 days	11

interview data. Lastly, the independent coder and double coding exercises reinforced the integrity of the codebook.

Results

Participant demographics are represented in Tables 1 and 2.

Analysis of results

Codes were categorized according to the three-delays framework. The study codebook is represented in Fig. 2.

Delay 1: identifying illness and the decision to seek care

In delay 1, four themes emerged: alternative sources of care, communal or family decision-making, healthcare-seeking behavior, and symptom and illness perception.

Alternative sources of care

The majority of respondents recognized concerning symptoms in themselves or their children. However, based on perceived severity, many respondents initially preferred to try other options, particularly local pharmacies, due to proximity, finances and convenience. There was a negative prejudice against hospitals, which prompted consideration of out-of-hospital care options.

> *"it depends on the issue at hand. If it were to be mild, I would go to a pharmacy, but if it were to be, you know, the other way round, the hospital will be [my first choice]."(A patient with a history of hypertension who presented to the emergency department with acute onset chest pain and dyspnea) IDI 006*

Another participant stated:

> *"most times I don't like going to the hospital, I try to get drugs first, then if it doesn't work, then I go to the hospital" - IDI 001*

A clinician stated:

> *"Most of them would prefer to do whatever it is they want to do, the WebMD and co. they want to do and manage...then when they see that, oh, this is, I cannot manage this thing, then they'd come. So, in a way yes …, they know when they should come, but not early enough, … for them to present, yes."GD 001*

Paracetamol and antibiotics were the most commonly used medications, with some respondents reporting the reuse of medications previously prescribed for similar symptoms. Other alternatives used included traditional remedies and informal medical care provided by friends

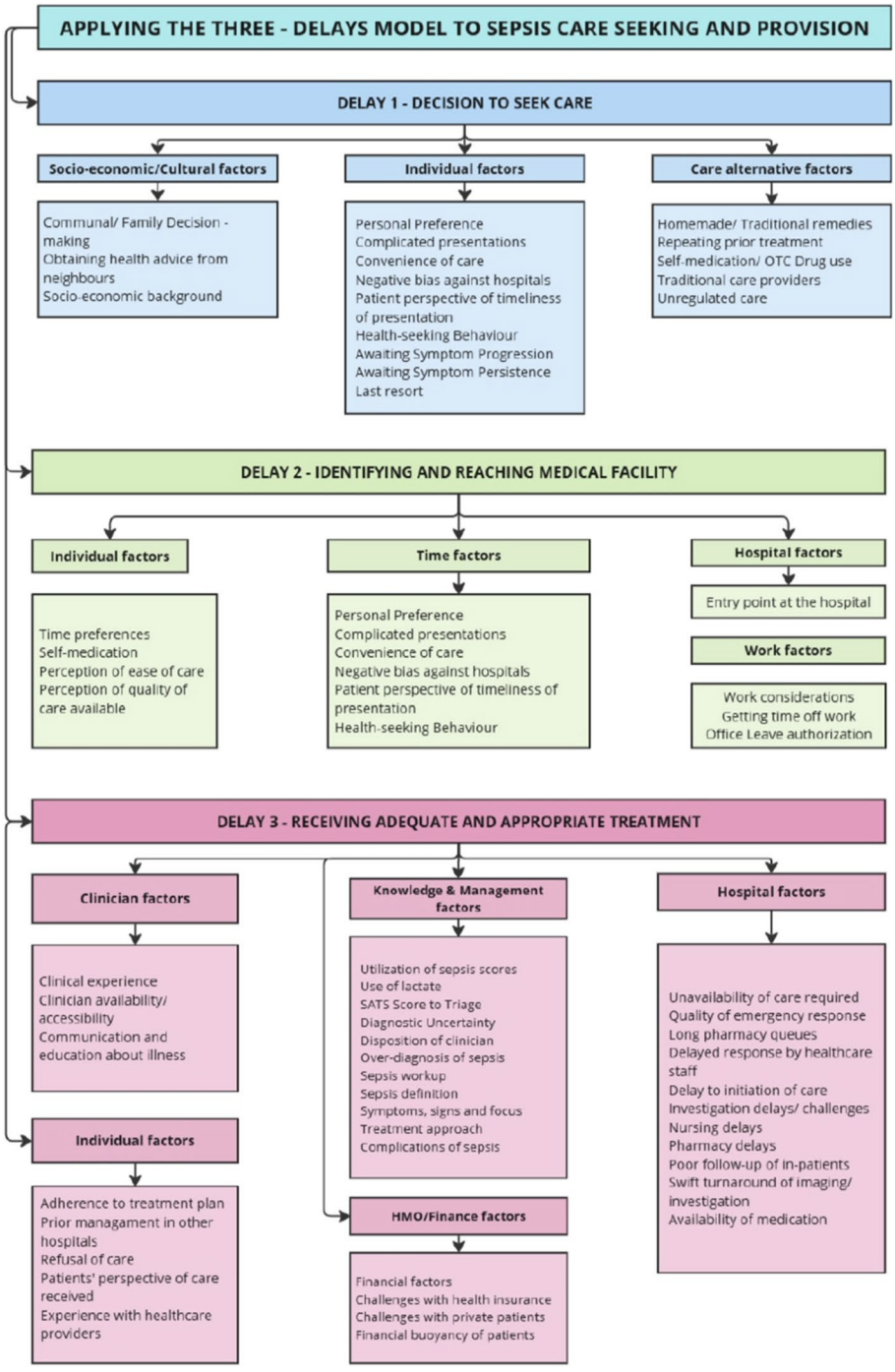

Fig. 2 Codebook Framework. Representative quotes are presented in the participants' own words

and family members in healthcare or allied healthcare professions.

> *"the first time it happened to me, I thought it was a normal stomachache. So, I took flagyl which after three days subsided. Then it came to me a second time which I still did not understand, but it was more painful than before. So, I took antibiotics, and it subsided again after a week. It was the third time that I could not actually move, which my brother had to intervene and said we should go to the hospital." IDI 021*

A clinician corroborated this pattern of care-seeking.

"Most times before someone presents with what we eventually diagnose as sepsis, you can be sure that they've tried a lot of things. They've treated malaria because that's usually the first thing. If you have a fever, well, feeling feverish, you just go and buy malaria drugs and, we know that that takes about 3 days so they complete the course, and then they wouldn't see any improvements. And they'll say, okay, let's try something else. At this point, they usually add antibiotics. So, usually, by the time they are presenting to us, they have at least a week or more, in some cases, of treatment at home." (Medical officer working in the outpatient department) GD 002

Communal or family decision-making

For some respondents and caregivers, the decision to seek care was made collaboratively with family and friends or by family and friends on their behalf. Among younger respondents, financial dependence necessitated the involvement of others in the decision-making process.

"My mom's friend …, more like a family friend. …, it didn't look as if I was making any progress. So, she was like, she wants me to come where she has people she can trust, and she can always keep an eye on me" (A known diabetic patient with complaints of loss of appetite and weight loss. Initial care was received at a regional government hospital, and he arrived at [the] hospital 6 weeks later) IDI 014

Occasionally, women seeking care required spousal permission.

"I wasn't brought here by my husband anyway, but he actually told the one who brought me here to.... So he gave me the go-ahead to go to the hospital." (A patient with a history of hypertension presented to the emergency department with acute onset of chest pain and dyspnea) IDI 006

Symptoms and illness perception

The majority of the respondents demonstrated symptom awareness with a proportion seeking medical care when they perceived their symptoms as severe.

"Normally, if it's a malaria thing, you've taken medication, you'll feel better. But two days I came back, I did not feel better at all. And it was almost as if the symptoms were just there, so I knew it could be beyond what was initially" IDI 009

A caregiver stated

"if my child is running temperature, I normally give him panadol. So, once I tried for 3days and I did not see any results, I decided to bring him to the hospital. So, when I knew that panadol can't do the work, I had to bring my child to the hospital for more treatment." IDI 013

A clinician stated

"Well, a lot of them don't except it is life threatening to themselves; they feel, 'Ah, alright they cannot live, they cannot survive again, and then they come down to the hospital, but if it has not gotten to that point, a lot of them still prefer to sit at home and let's try this one, let's try this one, let's try this one." GD 002

Healthcare seeking behavior

Respondents exhibited a high level of health awareness, demonstrating the ability to recognize symptoms of illness in themselves and their children.

"he was said to have HbSS and all that, so I don't like taking chances when I notice there is temperature" (Mother of known sickle cell disease patient with complaints of fever and arrived at [the] hospital within 24 hours) IDI 011

Another parent stated

"I'm not seeing results of what I used in the first place. I had to bring my child to the hospital for more safety. I want my child to get better and get well." IDI 013

Delay 2: delayed arrival at health facility

Three themes emerged from this delay (delay in reaching care) – Work schedule considerations, proximity to healthcare facility and means of transportation, preference of time to come to the hospital.

Work schedule considerations

When participants were asked why they did not present at the hospital at the onset of symptoms; consideration of work schedules emerged as a significant influence on their decision to seek hospital treatment. Such constraints often lead individuals to postpone seeking immediate care, contributing to delays.

"I was in the work, one, I can't leave work like that, there was…I think that if I take that one(a drug),it will help… I couldn't know that if I take it, it would worst" IDI 007

Another patient stated:

> *"I work in a bank, so it can be pretty challenging to come." IDI 011.*

Proximity and means of transportation

The distance from the participants' residence to the hospital and traffic patterns can considerably impact the time to presentation. A participant indicated the necessity of departing early from home when traveling to the hospital due to the considerable distance, which takes up a significant duration of time.

> *"Very far…I'm living in Ikorodu in Igbogbo. From Igbogbo to here is very far. So, I have to leave early– (Patient is a known sickle cell anemia patient with complaints of joint pain, abdominal pain, and fever. Initial treatment was received at the hospital, but presented 4 days later after his condition deteriorated.) IDI 024*

Another patient stated:

> *"Depends on my situation, actually sometimes I come in cabs most times especially if something is wrong with me or it's my child, and I can't carry them other times if I feel up for it I take public transport." IDI 025*

Patients' time preference for hospital presentation

Participants' preference for specific times to visit the hospital also impacted time of presentation, as individuals may delay seeking treatment because of a desire to avoid the wait times, or the assumption that clinicians are available or at their best at a particular time of the day.

> *"I believe you would get consultants or the people you believe you would want to see in the morning. I have this bias. I don't know how true it is. I believe anything after 5 pm, you probably get… guys that are just standing in.... So I always want to come earlier in the day." (Patient with a history of recurrent malaria admissions and treatments presented to the hospital for further evaluation and management) IDI 9*

Another patient stated:

> *It depends if it is starts in the night, I'd go very early in. the morning… but I've had to take my daughter to the hospital in the middle of the night before. … she is asthmatic, … I have had to and it was getting serious, so we had to go through, but for him, he rarely falls sick, so I'd wait till daybreak, then we would go.) IDI 001*

Delay 3: delayed provision of adequate care

Once patients arrived at the health facility, factors that caused additional delays included variations in sepsis management, selection of empiric treatment and a lack of familiarity with sepsis scoring tools.

Approach to sepsis management

Depending on practice location and experience, sepsis workups varied considerably. Lactate testing is not routinely incorporated. Clinicians highlighted initiating broad-spectrum antibiotics promptly, often based on initial lab results like FBC alone.

> *"Okay so we do our full blood count, … we hardly do lactate, we do lactate once in a while for older patients, but what we do is, ok you say you are not doing neonatal side but we also do C reactive protein, our ESR, we do it once in a while … but our major investigations we do is our full blood count, then we do our urine MCS and urinalysis, and C-reactive protein, sometimes lactate, EUCR, … I forgot to mention that EUC. Just things to get the complications... That is all, that is mostly what we do. … But our major investigation that we do is the full blood count, a complete blood count rather and EUCR, CRP, ESR." (Medical officer, GD 001)*

Challenges with scoring tools

While some clinicians followed the SIRS criteria or considered white cell counts crucial, many did not utilize formal decision scores like SIRS or qSOFA.

> *"Interviewer: … Do you use a clinical decision score, like Q-SOFA Score when you are evaluating septic patients?*
> *Respondent: No*
> *INTERVIEWER: Is there a reason why?*
> *Respondent: I don't know. It never occurred for me to use them. I don't use them. It's not part of the protocol of the department." (Medical officer, GD 004)*

Another clinician stated:

> *" I think I am more comfortable with SIRS, SIRS is even more straight forward, unlike the SOFA that requires a table, start looking at the liver, kidneys, so in the OPD like that, using the Q-SOFA sending them to the lab, Q-SOFA requires sending them to the lab to get some of these vitals before we do the Q-SOFA but with SIRS you can just easily see form*

the vitals, put them together and get what you want" (Medical officer, GD 002)

Delays across the care delivery spectrum

Patients and clinicians highlighted several delays along the continuum of care delivery, including delays in health management organization (HMO) approvals. One mother shared,

"Those people that come with your drugs, sometimes your drugs will not come in early, they'll tell me they are waiting for the pharmacy to supply drugs, and you'll miss the time you're supposed to take your drugs." IDI 023

Another patient stated:

"Interviewer: Would you say that services … is available all the time or there are certain hours that they are unavailable?
Participant: … I think they are available all the time, just there days time you have to wait longer than others." IDI 011

A clinician stated

"First of all HMO, they should try to in whatever ways they can, make the process much faster. That's the first one. And also the lab. Fine, we know that some investigations take a while, but some investigations don't. They should be made available as at when due so that patient treatment can be facilitated." (Medical officer, GD 004)

Regarding clinicians' availability to respond to new concerns

The availability of medical professionals and the timeliness of their responses varied among respondents.

"So we got there, there was no doctor around at that very moment; it was only a nurse, the nurse called the doctor, the doctor said he would be coming...we came 3:00 am but we were there till past 5 before the doctor came in" IDI 002

Another patient stated:

"Interviewer: …Did you feel you received the treatment you need?
Respondent: Yes, I did. They really tried. At least when I call on Doctor. They are always there to attend to the patients immediately. They tried. (IDI 022)

A house officer reported:

"Yeah, In fact there are time I don't reach the MO (medical officer), I call the consultant straight and they are almost always available., In fact in medicine you call the consultant straight, I don't always call the MO at times if I think it's a bit serious, I just call her (the consultant) directlyand she's almost always, even if you text her in the night without even calling she will reply. I don't know how she does it but she always replies"." (House officer, GD 004)

Financial considerations

This code highlights the financial factors influencing the patient's ability to access diagnostic investigations and treatment. From clinicians' perspectives, the socioeconomic status and insurance coverage of many patients significantly impact their ability to afford healthcare services.

Challenges with health insurance

Clinicians widely view HMOs as a significant barrier to providing optimal care, particularly when it comes to diagnostic tests and investigations.

"Well, honestly, the delays are primarily around the HMO. Having to get approval for every single step from the consultation to the labs to the medication. Having to get approval is... Oh, God, it can take hours. Some, well, depending on the HMO and the coverage plan, some respond faster than others. … I think for us, it's primarily the HMO approvals that usually delays." (Medical officer, GD 002)

Another clinician stated:

"We don't really know the details of their HMO until we start managing them, although with time you get to know this HMO, they probably don't cover this... NHIS (National Health Insurance Scheme) patients are a bit selective with things you do for them.... Unless they are admitted to a private ward, then you expect that some things are likely not going to be an issue compared to the general ward" – (House officer, GD 004)

Financial capacity of patients

Patient finances impact the quality and depth of investigations for sepsis regardless of insurance status. Clinicians appear to modify their workups based on finances in order to maximize available funds.

"There are some private patients that would come to the hospital. Private patients are those that pay

out of pocket… sometimes for private patients, even when you request for certain investigations, they would tell you they still don't have the money….So then you would now begin to look at which investigations can we do without so that they don't have to pay for that" (Medical Officer, GD 002)"

The same clinician stated:

"Often time, even though we say patients are usually on the health insurance, but the lapses between the health insurance and what they have to pay out of pocket, they will still tell you that they cannot even afford that" (Medical Officer, GD 002)

Discussion

Based on available information, this is the first study where the three-delays model was applied to sepsis care seeking and treatment in a sub-Saharan African country. This study identifies three critical elements in providing timely sepsis care within this clinical setting: First, variations in clinicians'understanding of the pathophysiology of sepsis, management, and treatment impact timely care. Second, financial factors and the capacity to pay, given limited insurance coverage and substantial out-of-pocket expenses, affect healthcare-seeking behavior and care provision. Third, alternative care sources and self-diagnosis and treatment are seen as expedient and more cost-effective than the formal medical system, especially because of long wait times.

The most discussed delay occurred upon reaching definitive care (delay 3). Previous studies using the three delays model reported that Delay 3 factors such as the unavailability of medications and, poor training of clinicians affect sepsis diagnosis and treatment [14]. The study findings suggest systemic delays in HMO approval and payment and sample processing in the laboratory delay treatment. In addition, physicians, especially junior doctors, may not recognize sepsis upon presentation. There is a need to develop quality improvement programs that include the re-education of clinicians and closely monitor outcomes in sepsis patients [32]. Hospitals need to institute guidelines and algorithms for sepsis care that drive the adoption of best practices.

Other studies underscore the benefit of integrated algorithms, clinical scores and, early recognition for disease processes like sepsis in reducing variations in care and treatment delays [28, 29]. This study corroborates this knowledge and reveals variations in diagnosis and workup that delay treatment initiation and are further impacted by financial considerations. Clinicians rely heavily on clinical gestalt rather than validated scoring tools like qSOFA, which could help with the rapid identification of severe sepsis and disposition planning [30, 31]. The majority of clinicians in the study did not routinely use qSOFA or other scoring tools in the diagnosis of sepsis.

Previous research on sepsis in sub-Saharan Africa is largely quantitative and reveals high in–hospital mortality, inadequate integration of diagnostic investigations, significant rates of tuberculosis and HIV co-infection, and inconsistent application of clinical scoring tools like the qSOFA score [20, 28] Based on available information, limited research exists on the sociodemographic and socioeconomic factors influencing sepsis care, which are crucial for developing culturally relevant clinical practice guidelines and public education initiatives. Furthermore, Africa and Nigeria bear a significant burden of poverty [27]; cost-effective care that is impactful is a priority for treatment.

Lastly, culturally relevant patient education and advocacy should be implemented in local parlance in collaboration with key stakeholders and community organizations to educate the general public about sepsis and its presentation. Such programs must emphasize the importance of early presentation. This study suggests that late presentation and delay in seeking care impact disease severity and progression.

Limitations

Scheduling clinician participants for focus group discussions was challenging due to time constraints. The study employed triadic and dyadic discussions as an alternative to address this. These smaller group formats facilitated effective data collection while mitigating the logistical difficulties of organizing larger focus groups. This approach also enhanced the depth and richness of the data gathered by allowing for more focused and interactive discussions. This study was unable to provide participants with their transcripts for verification. However, to mitigate this limitation, the transcripts were subjected to multiple reviews within the research team. This iterative process helped us to enhance the credibility of the data by cross-checking and ensuring consistency in the interpretation of participants'responses.

Conclusion

This study elucidates the local context that influences patient health-seeking behaviour and the impact of clinician's knowledge and early identification of sepsis in a local private hospital in Lagos, Nigeria. Practice variations in management are common and driven by multi-factorial considerations, including financial considerations. The challenges reported are common to many resource-constrained settings in sub-Saharan Africa, particularly urban contexts. Future clinical practice guidelines and care algorithms should consider the impact of delayed presentation, frequent initial self-medication,

and systematic hospital-based delays in sepsis mitigation strategies and embed sepsis education and clinical quality assurance programs as key components of disease-mitigating strategies.

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12913-025-13110-z.

Supplementary Material 1.

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Authors' contributions
All authors have reviewed this manuscript and are accountable for their contribution to the development of this manuscript. AFA and CS conceptualized the study, designed the methodology, supervised the research process, and developed and revised the manuscript. AA and FO handled methodological writing, analysis, and interpretation of data in the manuscript. AO and AP were involved in data collection; these two authors and SO contributed to the analysis and writing of the manuscript. AT, OO, and JV contributed to developing the methodology and reviewing and revising the manuscript.

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Data availability
Anonymized data used for the study is available from the corresponding author upon reasonable request and with permission from R Jolad Hospital, but restrictions apply to patients'protected health information.

Declarations
The authors declare no conflicts of interest, financial or otherwise, that could have influenced the research, analysis, or interpretation of the findings presented in this manuscript. This manuscript is original and has not been published, nor is it under consideration for publication elsewhere. The authors confirm that it does not contain substantial overlap with any previously published work. All literatures used in this manuscript have been properly cited and used in accordance with copyright laws.

Ethics approval and consent to participate
The Duke University Health System Institutional Review Board approved the study protocol.
under the IRB protocol number Pro00113408 and the Nigerian Institute of Medical Research (NIMR) with protocol number IRB-23–026. Written informed consent was obtained from study participants before group discussions or interviews. The management of R Jolad Hospital approved the study. The study adhered to the principles outlined in the Declaration of Helsinki.

Consent for publication
Consent for publication was not required for this study and is not applicable.

Competing interests
The authors declare no competing interests.

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