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Abstract

Aim: To explore the resources supporting current nurse practice in the post-emergency country of Liberia, using the nursing intellectual capital framework, as nurses work to meet the targets set by Government of Liberia's Essential Package of Health Services.

Design: Case study.

Methods: Data were collected in Liberia February–June 2019. Direct observation, semi-structured interviews and photographs were used to investigate how nurse practice is supported. Field notes, transcripts and photographs were coded using both directed and conventional content analysis. Reports were then generated by code to triangulate the data.

Results: Thirty-seven nurses at 12 health facilities participated. The intellectual capital supporting inpatient and outpatient nurse practice differs in important ways. Inpatient nurse practice is more likely to be supported by facility-based protocols and trainings, whereas outpatient nurse practice is more likely to be supported by external protocols and trainings, often developed by the Liberian government or non-governmental organizations. This can lead to uneven provision of inpatient protocols and trainings, often favouring private facilities. Similarly, inpatient nurses rely primarily on other nurses at their facilities for clinical support while outpatient nurses often have external professional relationships that provided them with clinical guidance.

Conclusion: Much has been accomplished to enable outpatient nurses to provide the primary- and secondary-care target services in the Essential Package of Health Services. However, as the Liberian government and its partners continue to work towards providing certain tertiary care services, developing analogous protocols, trainings and clinical mentorship networks for inpatient nurses will likely be fruitful, and will decrease the burden on individual facilities.

Impact: Nurses are often expected to meet new service provision targets in post-emergency states. Further research into how best to support nurses as they work to meet those targets has the potential to strengthen health systems.

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KEYWORDS

case study research, clinical guidelines, health services research, international health, nurse education, nursing models, nursing theory, occupational health, workforce issues

1 | INTRODUCTION

Multiple sources of disruption globally have caused major health emergencies in recent years, including 38 highly violent conflicts across the globe in 2019 (Heidelberg Institute for International Conflict Research [HIIC], 2020), and the COVID-19 pandemic that claimed over almost 3.5 million lives (World Health Organization, 2021). The World Health Organization has identified the need to improve the management of health emergencies, in part by effectively rebuilding health systems after the emergencies pass (World Health Organization, 2018). Better understanding of how the health workforce can best meet population needs in post-emergency settings is an important aspect of health systems strengthening (Kruk et al., 2010).

1.1 | Background

Liberia is an exemplar case of a post-emergency setting in which health system rebuilding has focused heavily on development of its nursing workforce. Liberia has, fortunately, seen relatively few deaths from COVID-19 (National Public Health Institute of Liberia [nphil6], 2021). Prior to the COVID-19 pandemic, however, the Liberian health system had been weakened by decades of civil war, ending in 2003, and the Ebola epidemic of 2014–2015, which cost the lives of 8% of the Liberian healthcare workforce (Evans, Goldstein, & Popova, 2015).

To combat the effects of the civil war, the Liberian government developed and implemented a Basic Package of Health Services (BPHS) in 2008, followed by an Essential Package of Health Services (EPHS) in 2011. The 'package' approach, where the government targets particular high-impact services for inclusion at health facilities throughout the country, has been used in other conflict-affected states, such as Afghanistan, Bosnia and Herzegovina, and Somaliland (Newbrander et al., 2014). In the BPHS, nurses were the planned chief clinicians at both the primary and secondary levels of the health system (Ministry of Health and Social Welfare, Government of Liberia [MOHSW], 2007). They were expected to provide a wide range of services in primary and secondary clinics, for maternal and newborn health, including safe delivery, adolescent care, and treatment of infectious diseases such as malaria (MOHSW, 2007; MOHSW, 2011). In the current Liberian health system, at the primary care level, 'out-patient nurses' practice in free-standing clinics but may also work in ambulatory services at secondary and tertiary facilities. Inpatient nurses in Liberia practice in secondary and tertiary-level facilities.

The Government of Liberia's efforts to implement these two packages has focused on both the number and distribution of healthcare workers and on ensuring healthcare workers have the

clinical expertise to provide the services identified in the EPHS (Government of Liberia, 2015a, 2015b). These efforts have been met with some success. In 2006, there were about 700 nurses and midwives in Liberia (Varpilah et al., 2011); as of 2018, there were 2445 nurses, 158 physicians and 952 midwives (Govindaraj et al., 2018). Further, the majority of nurses, midwives and physicians practice in a rural setting (Govindaraj et al., 2018). Nevertheless, this proportion of healthcare workers (0.7 per 1000) is well below the WHO recommended 4.45 per 1000 people to achieve the Sustainable Development Goals (WHO, 2016).

The development of a fit for purpose healthcare workforce has also been challenging. The Government of Liberia (2015b) has noted issues with the quality of nursing education in the country. Liberian nurses and other healthcare workers have reported feeling unprepared to implement the BPHS, with few opportunities for support and consultation with colleagues (Petit et al., 2013), and with limited clinical or didactic training in the tasks they perform routinely (Udaya et al., 2011). Further efforts to strengthen both pre- and post-licensure nursing education in Liberia began in 2015 (Government of Liberia, 2015b), but evaluations of these efforts, and of the effects of BPHS and EPHS implementation on nurse practice, are lacking. The purpose of this case study is to explore how EPHS implementation has impacted nursing knowledge and practice in Liberia.

1.2 | Theoretical framework

The framework of nursing intellectual capital guided this study. The concept of intellectual capital comes from the business literature and helps frame how knowledge is stored, transmitted and used in organizations (Evans, Brown, & Baker, 2015). Frameworks of nursing intellectual capital have been developed to interrogate how nurses' knowledge, skills and experience influence patient and organizational outcomes in high-income country settings (Covell, 2008; Covell & Sidani, 2013; Evans, Brown, & Baker, 2015), but only one study has explored nursing intellectual capital in low- and middle-income country settings (Spies, 2016).

Nursing intellectual capital has three main components: human, structural (Covell, 2008) and relational capital (Evans, Brown, & Baker, 2015). Nursing human capital is defined as the knowledge, skills and experience of the nurses themselves, developed via pre- and post-service training (Covell, 2008; McGillis Hall, 2003). Nursing structural capital is defined as the resources that are used to support the work of nurses, such as clinical protocols (Covell, 2008). Relational capital is defined as knowledge available through networks of relationships internal and external to the organization (Evans, Brown, & Baker, 2015). In this case study, the three nursing

intellectual capital domains (Table 1) are used to explore the knowledge, resources and relationships Liberian nurses use in caring for their patients.

2 | THE STUDY

2.1 | Aims

This study aims to explore the resources supporting current Liberian nurse practice using the nursing intellectual capital framework to better understand post-emergency health systems strengthening.

2.2 | Design

We used a case study design. Case study is a methodology that has been used in resource-constrained and crisis settings to examine the implementation of national plans for human resources for health development, as it allows a deep understanding of the political, cultural and health systems factors impacting the implementation (Egger et al., 2010). The results presented here, part of a larger case study of nurses and health systems in Liberia, focus on the intangible resources that support nurse practice in the Liberian health system.

2.3 | Sample/participants

The sample consisted of nurses in Montserrado or Nimba counties. These counties were selected for their size, as approximately one-third of Liberians live in these areas (Liberia Institute of Statistics and Geo-information Services et al., 2014). The targeted sample sought to include nurses working in direct care as well as nursing administrators. Nurses were excluded if they had been employed at their current facility for less than 6 months, or if they were previously known to the researcher. Purposive and snowball sampling were used to ensure a representative sample of nurses in both counties working in all facility types, including public, private for-profit and private faith-based facilities at each level of the Liberian healthcare system (primary, secondary and tertiary), since this diversity of facility types was considered essential to answering the research question. Prospective participants were approached either via phone or in person depending on how they were referred to the

researcher. A target sample size of 30–50 nurses was identified and is consistent with sampling projections for case study methodology (Yin, 2018). All participants gave informed consent prior to beginning direct observation; participants had the opportunity to decline to sign the informed consent form and give verbal consent only if they chose. Some participants preferred verbal consent since the informed consent was the only document tying their name to the study; field notes and interviews did not include name. Permission was obtained for verbal consent from the IRBs. Participants were offered an incentive of \$5 USD, an amount recommended by the Liberian IRB. Signed site permissions for data collection were also obtained from senior administrators or clinicians (e.g. the Officer in Charge or Medical Director) at each site.

2.4 | Data collection

Data collection occurred between February and June 2019. Data collection involved direct observation of nurse practice at their clinical practice site, semi-structured explanatory interviews following direct observation and document review (Table 2).

Data collection was conducted by a nurse researcher from the United States with extensive experience working with nurses in Liberia (LJR), who emphasized to every participant that she was just observing to learn (i.e. not to assess the quality of their work), and that they could end their participation at any time and still receive the full incentive. Only one participant ended his participation early; he did not have time to complete the interview. Patients to whom the participants were providing care were told by participants they could request that the researcher leave the office or bedside. The semi-structured explanatory interviews were conducted wherever the participant chose to ensure the participant comfort; some of the questions checked the researcher's understanding of what she had observed.

Interviews were audio-recorded, except for the two participants who preferred the researcher take handwritten notes, then transcribed verbatim by either an experienced transcriber in Liberia or a transcription agency in the United States. Transcripts were checked for accuracy by the PI who had collected the data. If the participant had requested that the interview not be audio-recorded, the PI transcribed her notes from the interview for analysis. Data collection continued until data saturation, the point at which data was no longer generating new insights (Creswell, 2014), was achieved.

TABLE 1 Nursing intellectual capital framework and definitions

Nursing intellectual capital construct	Definition	Sources
Human capital	Knowledge, skills and experience of individual nurses	Academic preparation, continuing professional development, clinical experience
Structural capital	Resources containing nursing knowledge belonging to the institution	Practice guidelines, care maps, written protocols
Relational capital	Knowledge available through internal and external relationships	Colleagues, supervisors, clinical area experts

TABLE 2 Data collection

Data collection method	Direct observation	Semi-structured interviews	Document review
Instrument	Field notes, including: title, degree, length of experience, start and end times of direct observation	Interview guide: developed with input from researchers with experience in Liberia as well as the University of Liberia's Institutional Review Board (IRB) using safety capital framework. See supplemental materials	Photographs of documents publicly displayed or provided to the researcher
Procedures	Direct observation took place during one shift of each participant's choosing	Interviews occurred after the directly observed shift unless another time was preferred by participant	Photographs were taken during the directly observed shift

2.5 | Ethical considerations

The University of Liberia's IRB approved this study, protocol #17-10-071, in Liberia. New York University's Committee on Activities Involving Human Subjects approved this study, protocol #FY2018-1723, in the United States. The Liberian IRB provided significant guidance about the opportunity of the researcher observing inappropriate care; they urged the researcher to respect the participants' expertise in their own field, and to only intervene if a participant was in imminent danger (e.g. of a fall).

2.6 | Data analysis

Interview transcripts, field notes and photographs of documents were analysed in Atlas.ti 8.3.1. The first round of coding used directed content analysis, working from a list of themes that the study team derived from the *nursing intellectual capital* framework prior to data collection. Directed content analysis is a preferred qualitative analysis technique when working with a pre-existing conceptual framework (Hsieh & Shannon, 2005). A second round of coding using general thematic analysis was conducted to capture additional themes not pre-defined by the nursing intellectual capital framework (Hsieh & Shannon, 2005). All documents, including photographs, were coded using these approaches by one member of the study team (LJR). Early in the coding process, a second study team member (APS) reviewed coded data for coding accuracy and discussed her findings with LJR. All study team members reviewed multiple drafts of the final case report.

2.6.1 | Rigour

A variety of techniques were used to safeguard rigour. After coding was completed, the data were triangulated by generating reports using Atlas.ti organizing the data by theme. That is, each theme had its own report generated which included all data coded for that theme. This allowed the researchers to assess for convergence of evidence for each finding across data types. Construct validity, defined by Yin as 'identifying correct operational measures for

the concepts being studied' (p. 42, Yin, 2018), was established by including multiple sources of evidence during data collection, and by adhering carefully to the pre-existing definitions of the three dimensions of nursing intellectual capital during the coding process (Yin, 2018). Reliability was ensured by using a nurse researcher with experience in Liberia for data collection, and by partnering with a transcription service that specialized in Liberian English for accurate transcription. Transcripts were further verified for accuracy by LJR. Last, in agreement with Carolan et al.'s (2016) contention that case study researchers must be particularly careful about the relationship of the self to the research, the researcher completed self-reflexive journaling after each participant to ensure awareness of her own assumptions and reactions to the day's observation/interview and of how her assumptions and reactions might influence her future analysis. While this journaling did, in the researcher's opinion, help to safeguard against this influence, it must be acknowledged that it can never be totally done away with.

3 | FINDINGS

Thirty-seven nurses at 12 facilities in two counties participated in this study. Participant characteristics are described in Table 3.

This study identified different patterns in nursing intellectual capital in Liberia that varied by facility type and practice settings (most importantly, inpatient vs. outpatient) but not by county. Findings associated with inpatient care will be discussed first and the discussion of outpatient care will follow.

3.1 | Inpatient care

In general, inpatient nurses relied on prelicensure training to a greater degree than outpatient nurses for human capital. They used short facility-generated protocols for structural capital. Colleagues and supervisors were an important source of internal relational capital. External relational capital did not appear to be significant for this group. Table 4 presents a summary of relevant categories in each domain of intellectual capital, direct information shared by participants, as well as direct observations in the facilities.

TABLE 3 Participant characteristics ($n = 37$)

	Montserrat	Nimba	Total
Nurses (total)	21	16	37
Practice setting			
Outpatient	10	6	16
Inpatient	4	6	10
ED	5	2	7
Directors of nursing	2	2	4
Facility type (total)	7	5	12
Public facilities	2	3	5
Private facilities	5	2	7
Range of experience as a registered nurse	1–23 years ($M = 7.75$ years)	2–34 years ($M = 10.56$ years)	1–34 years ($M = 9.03$ years)

3.1.1 | Human capital

Liberian nurses providing inpatient care expressed a high degree of confidence in their clinical skills and performing their assigned clinical tasks. Inpatient nurses identified several skills from prelicensure education that were relevant to their current position. Blood transfusions, patient suction and drug calculations were skills they learned in nursing school that were particularly helpful to their current practice. Coursework in tropical and communicable diseases, focused on management of diseases such as typhoid and malaria was also highlighted as particularly relevant. Participants emphasized the importance of the hands-on clinical components of their education to the development of their nursing knowledge. As one participant put it, 'I learned it from the field...we were students and then we used to go to these...various hospitals to practice' (inpatient, private, tertiary, Montserrat).

Didactic post-licensure training for inpatient nurses was offered at all facilities that consistently provided inpatient care. One private tertiary care facility in Montserrat had a system for identifying trainings needed by inpatient nurses through periodic surveys or audits. Another private tertiary care facility in Nimba county offered grand rounds-type presentations on topics like paediatric pneumonia. Such trainings build the human capital of the individual inpatient nurse; the institutional structure of offering them is a component of structural capital.

Some of nurses' skill-building was less formally structured. Many participants reported using the internet to seek information when needed. Most participants did not have a preferred online source of information, 'certain apps they sent us, but I can't really use it, I just use Google' (inpatient, private, tertiary, Montserrat).

3.1.2 | Structural capital

Structural capital is the property of the organization and thus cannot travel with individual nurses. Structural capital did not seem to differ between Montserrat and Nimba counties.

Three main types of structural capital emerged as important to inpatient nurses in Liberia: facility-provided posted protocols, post-licensure training and established routines. Posted protocols, usually one or two pages in length, included: the five rights of medication administration, dosing protocols for specific medications, the timing of medication administration and the proper procedure for a blood transfusion. Other posters noted were dosing protocols for specific medications, including: artemether (an antimalarial), ciprofloxacin, ampicillin and gentamycin. These posters were often handwritten, or one-page print outs generated by a staff member of the facility itself. Facility-provided post-licensure training was also a form of structural capital as they reflected organizational, not individual, capacity. Last, routines, particularly organized end-of-shift patient handoffs, were established at multiple inpatient facilities.

3.1.3 | Relational capital

Inpatient nurses used primarily internal relationships. They reported strong relationships with their colleagues, nursing supervisors and providers (physicians and physician assistants). In describing collegial relationships, one nurse's comment was typical: 'Anything you don't know, your friend knows that' (inpatient, private, tertiary, Nimba).

Nurse supervisors on inpatient wards were frequently observed providing clinical teaching. An inpatient nurse supervisor in a private tertiary centre in Nimba county, for example, was asked by a nurse to come to the bedside to show her how to properly administer a medication. The Director of Nursing in a private tertiary facility in Montserrat, had a dual role of mentoring inpatient nurses and providing clinical supervision due to her specialty expertise in ophthalmology: 'I know she sees me as a resource, I have to be prepared'. Nurses in the inpatient setting, including supervisors, saw Directors of Nursing as clinical partners, with multiple nurses reporting they regularly sought their advice.

Relationships between nurses and medical doctors and physician assistants were also seen as important. Several of the nurses reported that physicians at their facility at times provided nurses with impromptu structured learning. While there were only two certified

TABLE 4 Forms of intellectual capital across settings

Intellectual capital domains	Nursing setting	Themes/categories	Illustrative quotes	Examples or observations
Human capital	Inpatient	Prelicensure training <ul style="list-style-type: none"> Clinical skills (suctioning, blood transfusion, drug calculations) Coursework (tropical and communicable diseases, for example malaria) 	"I learned it from the field...we were students and then we used to go to these...various hospitals to practice." (emergency department, private, tertiary, Montserrado)	Participants observed administering blood transfusions in private facility in Montserrado and public facility in Nimba
		Post-licensure training <ul style="list-style-type: none"> Grand-rounds presentations, for example paediatric pneumonia In-services, 'e-trainings' on measles, meningitis, etc. Online resources	'We do a lot of training to improve gaps after doing a survey or doing an audit'. (private, tertiary, Montserrado) 'YouTube videos for skills'. (ED, private, tertiary, Montserrado).	One participant at a private tertiary care facility in Nimba prepared her grand rounds presentation during breaks in her shift using Google
Structural capital	Outpatient	Post-licensure training seen as very important <ul style="list-style-type: none"> Patient communication Management of gout 	'There are things we do in a clinical setting that we did not really learn in the classroom'. (public, primary, Nimba) 'I feel confident because this is Africa. We see so many patients'. (public, primary, Nimba).	One faith-based facility had training schedule posted, closed early once a month to hold trainings, ending direct observation day early
		Specific areas of training: malaria, childhood illness, family planning, TB management, ophthalmic care and HIV care (more extensive in private facilities)	'When there [are] any new cases, we discuss, we go and read on that, we go and research... from there we discuss what to do'. (Private, secondary, Montserrado)	Participant observed providing care in eye clinic at faith-based private facility in Montserrado
Structural capital	Inpatient	Facility investment in post-licensure training	'We do a lot of training to improve gaps after doing a survey or doing an audit'. (private, tertiary, Montserrado)	One facility held multiple trainings on a particular communication technique ('SBAR') that she wanted inpatient nurses to use more often
		Established routines	'Everyone will sit here and they present the patients and the cases. How was this patient? What was the intervention? What did not go well? And what do we need to do next?' (public, tertiary, Nimba)	Structured hand-offs at end-of-shift
Structural capital	Outpatient	Brief protocols/algorithms posted on walls	—	Five 'rights' of medication administration poster
		Written protocols/manuals very important <ul style="list-style-type: none"> Book length Focused on management of specific diseases: HIV/AIDS, TB, Malaria, childhood illness Often written by NGOs 	One participant (public, tertiary, Montserrado) reported that whenever she could not reach a clinical mentor, she would always 'get in [her] book'	See Table 5 for further detail <ul style="list-style-type: none"> Three on HIV/AIDS Six on ICMI Two on tuberculosis One on management of malaria in pregnancy. Doctors Without Borders, the World Health Organization, Unicef, and UNAIDS

(Continues)

TABLE 4 (Continued)

Intellectual capital domains	Nursing setting	Themes/categories	Illustrative quotes	Examples or observations
Relational capital	Inpatient	Nurse supervisors offer clinical teaching/guidance	'You learn one by seeing; two by acting with the help of a supervisor'. (private, tertiary, Montserrado) 'Training, colleagues, and curiosity'. (private, tertiary, Montserrado)	Nurse supervisors observed providing clinical teaching at multiple facilities
		Relationships between nurses and MDs or PAs seen as important	'I ask him, doc, what is the diagnosis? Sometimes he gives me a little lecture on it and then he tells me to go and read'. (ED, private, tertiary, Montserrado)	Nurse supervisor and MD observed rounding together in NICU of public tertiary care facility in Montserrado
	Outpatient	Practice independently but rely on colleagues and supervisors	'If...my colleague is not helping me, my bosses will see it and know that'. (public, outpatient, Montserrado)	Nurse asks supervising PA to assist with pregnant patient who reports bleeding from the vagina
		Often supervised by a physician assistant (on site or at another facility)	'We have so many supervisors ... anything we do not understand, we sometimes call and ask for clarity'. (primary, public, Nimba)	
		Use of offsite clinical collaborators important for those with clinical specialties, for example family planning	'We have some ladies they sent them the other time to Sweden for family planning training... we get access to call, we call and ask'. (public, tertiary, Montserrado)	—
		One program offers trainees a mentor based in geographic area		

registered nurse anaesthetists (CRNA) in this study, both affirmed the importance of relational capital to their practice. Collaboration and clinical support were however challenged by a shortage of anaesthesia providers.

3.2 | Outpatient care

There were some similarities between the intellectual capital of outpatient and inpatient nurses. Nurses working in outpatient settings also reported a high degree of confidence in their work, and one of their most-cited sources of relational capital was their colleagues. However, there were also differences. Outpatient nurses emphasized the importance of post-licensure relative to prelicensure training. The structural capital they had available tended to be book-length protocols. Last, outpatient nurses were more likely to have clinical mentors outside of their facilities.

3.2.1 | Human capital

Didactic post-licensure trainings, relative to classroom education, were often identified by outpatient nurses as important to their practice. These trainings could be intended for staff in one facility, or for staff across multiple facilities in the same network. For example, one facility offered a training 'patient communication' that had been attended by participants from two facilities. In general, faith-based private facilities described the most extensive post-licensure educational programs. Further, nurses working in outpatient settings in a clinical specialty area such as HIV or family planning, were especially likely to emphasize the importance of post-licensure training.

Skills learned in formal post-licensure didactic setting included: tuberculosis management, ophthalmic care, HIV management, performing cardiopulmonary and neonatal resuscitation, gastrointestinal ulcer management, the integrated management of childhood illness, spinal injury care and family planning. Some training programs, such as for HIV management or ophthalmic care, lasted 6–12 months. Other courses lasted only a few days. Some trainings

were offered by the Government of Liberia, and others, such as the ophthalmic training, were offered by NGOs.

Like inpatient nurses, outpatient nurses also independently developed their own clinical knowledge by using the internet, although consultation with colleagues was more common. An outpatient nurse in a public tertiary facility in Montserrado county, for example was observed Googling 'family planning' and 'reproductive health' in an effort to keep up with new developments.

3.2.2 | Structural capital

In Liberia, most the structural capital for outpatient nurses has been produced by actors outside of individual facilities, for example the Government of Liberia and non-governmental organizations (NGOs); thus, the same structural capital is available in different settings and did not vary by county. Further, most nursing structural capital had been developed for nurses working in the outpatient setting: more and longer written protocols were available to nurses in outpatient settings; some nurses had multiple book-length protocols at their disposal.

Table 5 provides a detailed summary of structural capital containing clinical guidance. These protocols focused on managing a variety of disease processes: HIV/AIDS, the integrated management of childhood illness tuberculosis, malaria and others. These protocols were reported as being very important to some participants. An outpatient nurse at a public tertiary facility in Montserrado reported that whenever she could not reach a clinical mentor, she would always 'get in [her] book'. However, at most facilities very few nurses were observed consulting these protocols. At a primary public facility in Nimba, for example, the nurse had to unearth the protocols relevant to her work from underneath a pile of office supplies.

3.2.3 | Relational capital

Outpatient nurses, like their inpatient counterparts, had strong relationships with colleagues and supervisors and sought their clinical

TABLE 5 Structural capital containing clinical guidance, inpatient versus outpatient

Clinical area	Inpatient		Outpatient	
	Detailed manual	Quick reference	Detailed manual	Quick reference
HIV/AIDS			2	2
Emergency triage		1		
ICMI		1	4	
Medication guide	1		1	
Pregnancy care			7	
TB			1	
Total	1	2	15	2

input as needed. An outpatient nurse in a private facility asked another nurse to help her establish a pregnant patient's fetal position. Another nurse at a public primary care facility in Nimba identified her colleagues in the antenatal care unit as her primary clinical resource.

Nurses in the outpatient setting were often directly supervised by a physician assistant, and these physician assistants were often called on for their clinical opinion. Sometimes colleagues and supervisors were not onsite. At a private primary care facility in Montserrado, a participant identified a physician at a separate private secondary facility as an important clinical resource for him. Another nurse in charge at a public primary facility in Nimba reported that nurses, physician assistants and the District County Officer were important clinical resources.

The use of offsite clinical collaborators was particularly marked among outpatient nurses with clinical specialties. One programme, the National AIDS and STI Control Program (NACP), offers each of its trainees a mentor based on their geographic area. Two participants were mentees, and both expressed satisfaction with their mentors, with one nurse at a public tertiary facility in Nimba recalling a time the mentor spoke to a patient on the phone to persuade the patient to adhere to their HIV medication regimen. Another nurse in a public primary facility in Montserrado, who offered TB care, also mentioned clinicians she could call if she needed TB-specific advice.

3.3 | Facilities' relational capital

Facilities themselves can also have relational capital, and it can be highly valuable. One public outpatient facility in Nimba county had a longstanding relationship with a Christian aid organization. That organization supplied the facility with acetaminophen. At the time of observation, acetaminophen was the only medication the clinic had in stock.

Relational capital was highest among private, especially faith-based, facilities. While a few public facilities had connections with an NGO, faith-based facilities that provided extensive inpatient and outpatient patient care partnered with providers from outside Liberia to provide care directly at the facility, to mentor Liberian clinicians who worked at the facility, and to improve the facility's operations.

3.4 | Inpatient and outpatient rotation

Nurses in Liberia who work in large facilities are typically rotated from unit to unit, including between inpatient and outpatient care, for a variety of reasons. Nurses often stated that rotating through different units improved their skills, because it exposed them to new things, and gave them a chance to spend time on units that were seen as more educational. One nurse supervisor at a private tertiary facility in Nimba, describing the reaction of her supervisees to frequent rotation, paraphrased: 'Oh, thank you for sending me there, I

have learned a lot'. These comments suggest that nurses in Liberia view frequent rotations and the opportunity to practice in a variety of clinical settings as an important source of intellectual capital.

4 | DISCUSSION

This case study found that, overall, the intellectual capital supporting nurse practice in Liberia varies considerably between inpatient and outpatient settings, and between private and public facilities. These differences have important implications for EPHS implementation and health care access in Liberia.

Clearly, important strides have been made. Unlike in Petit et al.'s (2013) findings of nearly a decade ago, nurses now express a high degree of confidence in their ability to provide the care expected of them. Since so many nurses have joined the workforce in recent years, we believe this likely reflects both stronger prelicensure education overall and stronger post-licensure training for outpatient nurses. Advancing both pre- and post-licensure training is critical to post-emergency health system strengthening but is so challenging that many states struggle to do it well (Kruk et al., 2010; Roome et al., 2014). Thus, Liberia's multifaceted investment in training (Varpilah et al., 2011) may prove to be a model for other post-emergency states.

Second, the robust intellectual capital available to outpatient nurses, such as long protocols and focused clinical mentorship, reflects efforts focused on Liberia's nursing workforce to broaden primary- and secondary-care access in Liberia and to reach EPHS service provision targets in those areas (Varpilah et al., 2011). These nurses, particularly those who worked in a clinical specialty area, were more apt to rely on both pre- and post-licensure training to inform care, than inpatient nurses, who focused on prelicensure training. The large number of book-length clinical protocols available to guide decision-making further reflected this priority, and, likely, the relative ease with which vertical funding streams could be applied in these settings. However, there are opportunities for improvement. Nurses in outpatient specialty care (e.g. TB) report a high degree of reliance on their clinical mentors and a great deal of satisfaction with that arrangement; generalist outpatient nurses might be helped by similar support. This would also address the concern expressed by healthcare workers that they have limited opportunities to consult with colleagues (Petit et al., 2013).

Successes for outpatient nurses have not all translated to the inpatient, tertiary-care setting. Most of the structural capital available to inpatient nurses was brief and generated by the facility. This has several disadvantages. Nurses' exposure to post-licensure education is contingent on the facility's capacity to offer these trainings, and staff turnover can be a heavy burden as nursing administrators need to develop and offer trainings for new nurses. Nursing administrators may be duplicating efforts as they develop similar trainings in parallel, which is a waste of their valuable time. Last, this decentralized approach makes it harder for inpatient nursing experts, both from in Liberia and without, to disseminate their expertise.

More centralized attention to the development of inpatient intellectual capital, particularly structural and relational, would facilitate

EPHS implementation, particularly with regards to the achievement of many tertiary-care service targets (e.g. management of pulmonary embolism). Including inpatient nurses, particularly nursing supervisors, in the development and dissemination of this capital, is very important. Nurse supervisors, who were observed providing a great deal of bedside mentorship, are likely to be able to suggest which inpatient clinical protocols would be most useful, and to disseminate tertiary-care nursing knowledge after receiving centralized post-licensure training. Further, nursing supervisors would be critical in the development of offsite clinical mentorship for inpatient nurses (including supervisors) that mirrors the mentorship offered to outpatient nurses which they find so valuable. For other countries that have used the 'package' approach, creating and disseminating inpatient-oriented nursing structural capital early in the process will likely facilitate achieving a variety of tertiary-care goals, like safe surgery.

Last, there is the gap between private facilities and public ones. Private facilities, which are often run by NGOs, typically offered both stronger structural and relational (via external relationships) capital than public ones. However, the Government of Liberia, particularly the Ministry of Health and Social Welfare, has successfully worked with NGOs on several important health system strengthening efforts (Varpilah et al., 2011). While transferring relational capital would obviously be difficult, the dissemination of the structural capital developed at private facilities to public ones would be a worthwhile effort. Countries that are seeking to develop their nursing intellectual capital might consider formal agreements along these lines. An agreement like this would have the potential to strengthen nursing structural capital in all settings and to better align NGO training efforts with country needs, which has been a challenge in several post-emergency states (Roome et al., 2014).

We found nursing intellectual capital was a useful theoretical framework for this study as it allowed the study team to categorize intangible resources, and to identify gaps in implementation, by comparing the resources available across groups. Because this study is one of the first applications of nursing intellectual capital to a low-income country, we opted to use the framework's broadest definitions for each subtype of capital. Some of the components of these subtypes identified by Covell (2008) (e.g. staffing as a component of human capital) would not have been suitable for this study as they were intended to assess the nursing intellectual capital available to discrete hospital units. However, they may be useful in other studies. Further, it is important to note that the role of intellectual capital is always moderated by the availability of physical resources; operational laboratory facilities, for example, must be available to the nurse for her to act on her intellectual capital pertaining to diagnostics. Thus, studies using this framework to assess the impact of intellectual capital on patients must be confident their research question does not assume the availability of certain resources.

Overall, these findings have significant implications for post-emergency countries seeking to rebuild their health systems whether they have adopted the 'package' approach or not. Liberia's focus on primary care has led to the development of a variety of care protocols targeted at low-resource settings that could, with proper

validation, be used beyond Liberia, as the BPHS itself was adapted from Afghanistan (Newbrander et al., 2014). Policymakers in resource-constrained settings should keep in mind that offsite mentorship has been feasible and acceptable to outpatient nurses in Liberia and may be a good option in their countries for both inpatient and outpatient nurses. Countries that have adopted the package approach, or simply service provision goals that require inpatient care, would do well to include nurses with a focus on inpatient nursing care in implementation, and to centralize efforts to improve inpatient nursing care.

4.1 | Limitations

This study was conducted in two counties in Liberia, one of which, Montserrado, contains Liberia's capital city. Nimba county is more rural, but still is connected via paved road to Montserrado. It is possible that this accessibility resulted in greater dissemination of intellectual capital to those counties than others. Although generalizing from single case studies should always be done with caution, we believe that gathering data from individual nurses at multiple different facilities and using the theoretical framework of nursing intellectual capital throughout analysis strengthens the external validity of this study (Yin, 2018). We are also aware of direct observation's vulnerability to the Hawthorne effect, and of interviewing's vulnerability to the social desirability bias. To offset these issues, we relied on triangulation as part of the analytic plan to ensure findings are supported by more than one type of data.

5 | CONCLUSION

This case study explored how a post-emergency, low-income country has developed the intellectual capital of its nursing workforce to meet its population's needs. There are broad differences between the types of intellectual capital developed based on the work setting of the nurse. Opportunities for strengthening intellectual capital in ways that are likely to benefit both nurses and patients include greater attention to post-licensure training for nurses who work in inpatient settings. This strategy is likely to be useful in other post-emergency settings.

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CONFLICT OF INTEREST

No conflict of interest has been declared by the authors.

AUTHOR CONTRIBUTIONS

All authors have agreed on the final version and meet at least one of the following criteria (recommended by the ICMJE*): (1) substantial contributions to conception and design, acquisition of data or analysis and interpretation of data; (2) drafting the article or revising it critically for important intellectual content.

PEER REVIEW

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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