

Assessment of Quality of Care for Children with Sickle Cell Disease in the South Tongu District of Ghana: Nurses' Perspective

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Author' contribution

This work was largely the contribution of the author. The author read and approved the final manuscript.

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ABSTRACT

Sickle cell disease (SCD) is a genetic disorder of erythrocytes with frequent episodes of vaso-occlusive crisis and complex morbidities. Studies identify gaps in quality of care for children with SCD including poor knowledge of providers and inadequate logistics. South Tongu district of Ghana records increasing incidence of SCD children's morbidities and prolonged hospitalizations.

Aims: The study sought to examine the quality of nursing care for children with SCD in South Tongu district and identify opportunities for improvement. The study was conducted in the two hospitals of the South Tongu district of Ghana.

Study Design: A descriptive cross-sectional survey was employed to examine nurses' knowledge of comprehensive care and their perspectives on quality of structures, processes and outcomes of care for SCD children.

Methodology: Convenient sampling method was used to obtain data from 74 nurses using structured questionnaires based on Donabedian model.

Results: Results showed a mean score of 10.25 out of 20 (51%) indicating inadequate knowledge of comprehensive care. Nurses' perception regarding quality of service structures for SCD children obtained the worst evaluations (mean=41.50); mostly in the aspects of service logistics and supplies, and access to emergency vehicles (ambulance). The process dimension had the best

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evaluation (mean=58.68), followed by outcome (mean=43.17). Communication problems within the nursing team and interpersonal relationships with SCD children/families were major challenges affecting quality care in the process and outcome domains. A weak positive relationship ($p=0.188$) was found between the process and outcome measures.

Conclusion: The study suggests continuous education and training of nurses on comprehensive care for children with SCD and strengthening of all the dimensions of quality care, particularly the structure.

Keywords: Quality of care; sickle cell disease; comprehensive care; children; assessment.

1. INTRODUCTION

- Sickle cell disease (SCD) is an autosomal recessive disease that results from a point mutation on the beta-globin molecule leading to erythrocyte rigidity and increased episodes of vaso-occlusive crisis [1]. It is a multi-organ and system disease affecting many tissues of the body [1,2]. Globally, more than 300 000 babies are born annually with SCD [3] with vast majority in Sub-Sahara Africa (SSA) [4]. Greater than 70% of sufferers live in Africa [5] yet limited resources prevent early diagnosis and management of the disease [6]. It is estimated that 50% to 90% of infants born with SCD in sub-Saharan Africa will die before their 5th birthday from unrecognized splenic sequestration, overwhelming pneumococcal sepsis, or severe malaria due to absence of early diagnostic and prophylactic care [3,6].
- Health professionals including nurses face difficulties in caring for children with SCD due to inadequate knowledge and training as well as limited health facilities and equipment needed to provide quality care [2,6,7]. As a result, many health professionals expressed the need for guidelines and protocols for comprehensive management of sickle cell disease in order to improve the quality of care [8,9,10]. The World Health Organisation (WHO) in June, 2010 proposed that by 2020, half of the 23-Member States with high prevalence of SCD should have developed and commenced the implementation of a clearly designed National Sickle Cell Control programme within the national context; and that 25% of the countries in the African Region should have adopted the concept of comprehensive health care management for SCD [9]. Similarly, the American Academy of Pediatrics (AAP) in 2011 developed Quality-of-Care indicators as a tool for managing and evaluating quality of care for children with SCD [8,10]. Ghana has no clear and comprehensive policy guidelines on management of sickle cell disease [11,12].
- Management of children with SCD in Ghana remains a challenge as a result of limited health resources and inadequate practical knowledge among health care providers and the general public [6,11]. Ansong, Akoto, Ocloo, and Ohene-frempong [13] also revealed that children born with SCD in Ghana have limited access to quality clinical care due to unavailability of health facilities and logistics. Similarly, Alhassan et al. [14] discovered many gaps in the quality of care provided by health facilities in Ghana specifically with regard to technical and uniform processes of care. It is therefore imperative for nurses to enhance their competency in providing quality care for children with SCD [15] so as to reduce the frequency of complications associated with the disease. Children with SCD are burdened with numerous morbidities and crises including frequent sepsis, sequestration crisis, aplastic crisis, haemolytic crisis, acute chest syndrome (ACS), acute organ damage (including myocardial infarction), stroke, multi-organ injury progressing to end-organ damage, pulmonary embolism, pulmonary hypertension, cardiomyopathy, hepatic disease as well as anxiety and depression; [16] which nurses must identify early and monitor to ensure timely interventions. Kavanagh [8] suggests that evaluating the quality of care for children with SCD is a critical step in improving quality and preventing complications associated with the disease.
- Donabedian specified dimensions of quality health care and suggested

measuring quality of care from the structure, process and outcomes perspectives in order to have a whollistic picture regarding quality of healthcare delivery [17]. Therefore the Donabedian quality care triad of structure-process-outcome framework was used to guide evaluation of the quality of healthcare nurses provided for children with SCD in the South Tongu district of the Volta Region.

1.1 Statement of the Problem

- Health professionals particularly nurses are confronted with many challenges with respect to SCD, including inadequate training on management of SCD and lack of basic facilities for care of these children [13,18]. In Ghana, there is currently no comprehensive guideline for management of children with SCD, and as such care provided by doctors and nurses to these children are often of less quality leading to frequent hospitalizations and complications [11,12]. Additionally, critical infrastructure and equipment for management of children with SCD are often unavailable in most district health facilities in Ghana [13]. The incidence of morbidities, duration of hospitalization and crises suffered by SCD children in South Tongu district have been on the increase. The district recorded 35% increase in rate of SCD admissions from 2017 to 2018; which is a cause for concern [19]. Currently 25% of the Ghanaian populations are carriers of SCD, and 2% of all babies born have SCD with limited access to quality clinical care [13].
- Inadequate knowledge of physicians and nurses on management of children with SCD was also identified by some studies; [7,20,21] which may translate into poor management of the disease. A study by [22] in Brazil to assess the quality of care provided by healthcare providers for children with SCD found their actions below expectation. For example only 36.6% of SCD children had their growth and development charts monitored and 28.6% had the minimum recommended follow ups. The complex nature of SCD management in children makes it essential for nurses to provide quality care with reference to guidelines [8] to ensure comprehensive and quality care for children with SCD. As a result of the absence of specific guidelines for management of SCD in Ghana, health care provision for SCD children is left at the discretions of physicians and nurses especially in many districts where specialist cares are absent. Similar challenges were found among other locales such as Brazil, where cares provided by nurses to children with SCD were found to be of less quality [15]. According to Muoghalu & Awolowo, [18] ensuring quality in the management of SCD is crucial given its potential impact on the quality of life of the patient. As a result the researchers wish to investigate the quality of care nurses provide for SCD children in Ghana using the Donabedian model so as to identify opportunities to improve care.
- The purpose of this study was to examine the quality of care nurses provide for children with sickle cell disease in the South Tongu district of Ghana. Specific objectives for this study included; assessment of nurses' knowledge on comprehensive care for children with sickle cell disease, examination of structural components of Donabedian's model that affect quality of nursing care for children with SCD and identification of the relationship between the processes of nursing care for children with SCD and its outcomes. The researchers hypothesized that good processes of care for children with SCD positively influence good outcomes. Voyce [23] emphasized Donabedian standpoint that understanding of elements of processes of care and their interrelations influence outcomes of care.
- This study reviewed published articles, and guidelines in English from 2010 to 2018 on the topic. Data bases such as PubMed, CINAHL and Google Scholar were used for the search. Search terms such as "quality of care for SCD children", "comprehensive care for SCD", "nursing care for SCD children", "barriers to care for SCD children", "management of SCD in children"; among others were utilized.

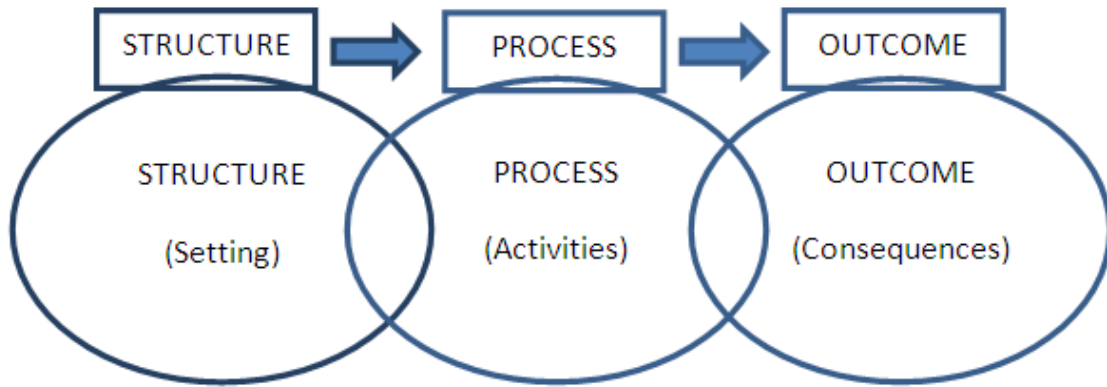


Fig. 1. Donabedian Model [23]

1.2 Donabedian Quality of Care Framework

- Donabedian proposed the “structure-process-outcome” model as the bases for evaluating the quality of healthcare services and the causal associations among them in defining quality.²³ According to Donabedian, structure refers to the setting; health care facilities, features of the system, medical equipment, the service provider characteristics; process is set of activities- technical or interpersonal interactions between providers themselves or between providers and the patient; whereas outcomes are the consequences of care [23]. It is posited that good structures influence good processes and in turn, increase the likelihood of good outcomes [23]. Fig. 1 shows the Donabedian’s Model and its relationships.
- Donabedian model has been applied to assess quality of care in several domains and disciplines of health care including maternal and child health services, prenatal and preconception care, pharmacy, surgical care, infection prevention and chronic disease management [24,25,26]. For example, a study was done by Sardasht, Shourab, Jafarnejad, and Esmaily [26] to assess the outcomes of preconception care in an urban centre in Iran using the model. Applying Donabedian model in this study would help evaluate the quality of nursing care for SCD children from the three dimensions using validated structured questionnaire of the model.

2. METHODOLOGY

2.1 Study Design

- A cross-sectional survey was employed with a structured questionnaire based on Donabedian quality care model that assessed knowledge of nurses on Comprehensive Care for children with SCD as well as nurses’ perspective of quality regarding the Structures, Processes and Outcomes of care for these children. The questionnaire consisted of five main sections that collected information about Demographical and Professional background, Knowledge on comprehensive care, quality of Structures, Processes and Outcomes of care.

2.2 Study Setting

- The two hospitals in South Tongu district; namely District Hospital, Sogakope (DHS) and Richard Novati Catholic Hospital were used for the study. South Tongu is a district located in southern part of the Volta Region, Ghana. The district has a population of about 104,600 people who are predominantly farmers, fishermen and traders. The capital town of the district is Sogakope, located half way on the Tema-Aflao highway; bounded by a tributary of the Volta River and a bridge. The two hospitals of the district have bed capacities of 80 and 60 respectively. Both hospitals are primary care referral facilities that offer in-patient and outpatient care and other allied health services. Nurses formed the population of the study of which 74 were conveniently recruited to participate.

2.3 Target Population

- Target population was nurses from the two hospitals in the district.

2.4 Inclusion Criteria

- Staff nurses who worked at the outpatient department (OPD), the Emergency department and the Paediatric wards were included in the study.

2.5 Exclusion Criteria

- Staff nurses who worked less than 3 months in the selected facilities were excluded since they were less likely to nurse a child with SCD.

2.6 Sample Size Determination

- Yamane's formula of (1967) for calculating sample size [27] was used to determine the sample size from the sampling frame of the target population in the district. The population of Nurses (N) from the three departments in DHS was 50 and that of Novati 41; making a total of 91.

$$n = \frac{N}{1 + N * (e)^2}$$

n - The sample size

N - The population size (91)

e - The acceptable sampling error (0.05). Hence the sample sizes (n) of 74 nurses were recruited.

2.7 Sampling Technique

- Convenient sampling technique was used to obtain data from the nurses.

2.8 Data Collection Procedure

- Structured questionnaire derived from studies on Donabedian model of nurses perceptions of quality care carried out in Brazil and Portugal [23] was used. The instrument was based on the three constructs in the Donabedian quality of care model with 56 items, including Knowledge of nurses on Comprehensive care for children with SCD. The questionnaires were administered to

nurses who meet the inclusion criteria and were readily available and collected on the same day within 30 minutes. Participants were given Information sheet and a Consent form to sign before answering the questionnaires. Charge nurses of the various departments were trained to administer the questionnaires in the absence of the researcher, and the questionnaires later retrieved upon completion. Respondents were guided as to how to fill the questionnaire and all concerns related to the instrument were clarified. It took averagely two weeks to administer and retrieved all questionnaires from the participants. The entire study took three months from March to June, 2019.

2.9 Validity and Reliability of the Instrument

- Content validity was ensured by adapting a validated Donabedian instrument on quality care [23] with reference to the American Academy of Pediatrics (AAP) Quality-Of-Care indicators for SCD children, and face validity by ensuring that the instrument reflected the objectives of the study. Reliability was ensured by pre-testing of the questionnaire and verifying using Cronbach's alpha [23]. The alpha value for the knowledge aspect of the questionnaire was 0.8, which is an acceptable value for reliability of the instrument [28]. The three dimensions of quality care, structure-process-outcome components of the instrument used in previous studied had alpha values of 0.71 or higher [23,29].

2.10 Data Analysis

- Data was analyzed using the Statistical Package for Social Sciences (SPSS) software version 20. The questionnaires were numbered from 1 to 74 and alphabets were used to code the response choices. Tables and figures were included for clarity of the analysis. Descriptive analysis including mean, percentages, standard deviation and p-values were determined. Chi-square tests, including Phi and Cramer's V values were used to determine the association and relationships between the variables.

2.11 Declaration of Conflict of Interest and Originality

- The researcher has no conflict of interest. The study is the original paper of the authors and all studies used were cited and referenced accordingly.

3. RESULTS

3.1 Demographic/Professional Data

- Seventy four (74) nurses completed and returned the survey with overall response rate of 100%. Forty (40) of the respondents were from District Hospital, Sogakope, and 34 from Richard Novati Catholic Hospital. The majority were females (n = 52, 70.3%), and were between 25-34 years old (74.3%). Forty-nine nurses (66.2%) were Registered nurses and the rest (33.8%) were Enrolled nurses. Thirty-two nurses (43.2%) had diploma in nursing, and 20.3% held bachelor degrees and 33.8% certificates. Years of working experience ranged from 5 years or less (67.6%) to more than 6 years (32.4%). Majority of the nurses (n = 49, 66.2%) had training in management of SCD within the last 2 years. Table 1 presents details of demographic data.

3.2 Knowledge of Comprehensive Care for Children with Sickle Cell Disease

- The questionnaire examined areas covering newborn screening, prophylactic and acute care management, recognition of early signs of complication, complications management and referral needs. Knowledge of Comprehensive Care for SCD children covered 20 items on the questionnaire with True or False options. Each correct answer carries a score of 1 and a wrong answer a score of 0. The score ranged from 0 to 20 and the total was calculated using the number of correct answers which were then converted to percentages. Questions that were left unanswered were considered incorrect [30]. The respondents scores ranged from 4 (20%) to 16 (80%) out of 20 questions. A score below 8 (<40%) was considered poor knowledge and a score of 14 and above (≥70%) was a demonstration of good knowledge of care. Only two of the

nurses (n=2, 2.7%) had a score of 70% or above indicating good knowledge on comprehensive care for children with SCD.

- The overall mean score of the level of knowledge was 10.25 out of 20 (51% out of 100%). The findings revealed that the nurses had inadequate knowledge of comprehensive care for children with SCD. For example with regard to maintenance fluid requirements, only 10 nurses (13.5%) had the correct answer (Q6) and only 16 nurses (21.6%) knew the preferred choice of blood product for transfusion in SCD children with acute severe anaemia (Q15). Fifty-six nurses (75.7%) did not know what acute chest syndrome was (Q11) and 41.9% had no knowledge about newborn screening (Q1). On the other hand, the participants demonstrated good knowledge about fever in SCD children (90.5%, Q5), splenic sequestration crises (71.6%, Q13), priapism (79.7%, Q18) and screening for renal disease (85.1%, Q19). Further details of the participants' responses to the knowledge questions are presented in (Table 2).

3.3 Nurses Perception regarding Quality of Service Structures for SCD Children

- The results with relative frequencies expressing the responses of the respondents regarding service structures, processes and outcomes for SCD children are presented in Tables 4, 5 and 6. The statements were ordered in the tables from higher to lower percentages obtained in the agreement and disagreement scores (i.e. totally disagree- TD, partially disagree- PD, neutral-N, partially agree- PA and totally agree- TA). Table 7 indicates the favorability score of the three evaluated dimensions.
- In terms of the structure dimension (Table 4), majority of the nurses rated most structural components of quality care high, except the location and availability of the emergency vehicle (ambulance), of which 52.7% totally disagreed and 14.9% partially disagreed on its availability; and an organized and functional SCD clinic, of which 54.1% and 13.5% totally and partially disagreed on its availability. There was no consensus on sufficiency of other

supplies and consumables from the nurses' responses. Though majority of the components received favourable ratings from the nurses it must be noted that ambulance service and functional SCD clinic are critical components of quality care for SCD children that must be seriously addressed if quality and safety of SCD children is to be improved.

3.4 Nurses Perception Regarding Service Processes for SCD Children

- Table 5 presents findings regarding the process of care dimension for SCD

children. The results in this dimension show strong agreements on good processes of care for SCD children by a wide majority of the nurses except with inspection of immunization and growth charts (29.7% total and 29.7% partial), and provision of Penicillin V prophylaxes where only 32.4% totally and 24.3% partially agreed. A good majority (71.6% either totally or partially agreed) that the quality of the service being delivered was reduced by the communication problems among members of the nursing team.

Table 1. Demographic/professional data

Characteristics	Frequency	Percent (%)	P value	
Age(years)	20-24	9	12.2	
	25-29	28	37.8	
	30-34	27	36.5	0.00
	35-39	8	10.8	
	40-44	1	1.3	
	45-49	1	1.3	
	50-54	0	0	
	55-59	0	0	
Gender	Male	22	29.7	
	Female	52	70.3	
Marital status	Single	35	47.3	
	Married	35	47.3	
	Divorced/widower	1	1.3	0.00
	No response	3	4.1	
Nurse category	Registered nurse	49	66.2	
	Enrolled	25	33.8	
Duration of your training as a nurse	2 years	24	22.4	
	3 years	36	48.6	
	4 years	6	8.1	0.00
	> 4 years	8	10.8	
	Qualification	Certificate	25	33.8
	Diploma	32	43.2	
	degree	15	20.3	0.00
	Maters	0	0	
	No response	2	2.7	
Number of years in service	< 1	11	14.9	
	1-5 years	39	52.7	0.00
	6-10 years	20	27	
	11-15 years	3	4.1	
	> 16 years	1	1.3	
How long was it, since your last training in management of children with SCD	<1 YEAR	28	37.8	
	1-2 YEARS	21	28.4	
	3-5 years	13	17.6	0.00
	> 5 years	6	8.1	
	No response	6	8.1	

(South Tongu district field data, 2019)

Table 2. Knowledge of comprehensive care for children with sickle cell disease

True and False Questions	False(F)		True(T)		No Response	
	N	%	N	%	N	%
Q1. Newborn screening for SCD is done in district hospitals in Ghana (F)	41	55.4	31	41.9	2	2.7
Q2. Painful episodes (vaso-occlusive crises) of SCD are caused by infections (F)	28	37.8	45	60.8	1	1.4
Q3. Episodes of painful crises are reduced by hydroxyurea (T)	28	37.8	37	50.0	9	12.2
Q4. Opiate analgesics are not recommended for children with SCD (F)	34	45.9	36	48.6	4	5.4
Q5. Fever is an emergency in children with SCD (T)	5	6.8	67	90.5	2	2.7
Q6. Children hospitalized with SCD need 2 times maintenance fluids (F)	10	13.5	60	81.1	4	5.4
Q7. Children with SCD have high metabolic rates (T)	17	23	46	62.2	11	14.9
Q8. Pneumococcal infections are rare in children with SCD (F)	44	59.5	22	29.7	8	10.8
Q9. Penicillin V prophylaxes are recommended for children with SCD from 5 years and above (F)	24	32.4	45	60.8	5	6.8
Q10. Dactylitis and swelling of the feet and toes are common in adolescent with SCD (F)	26	35.1	45	60.8	3	4.1
Q11. Acute chest syndrome (ACS) occurs in children with SCD who also have asthma (F)	16	21.6	56	75.7	2	2.7
Q12. Incentive spirometry reduces the risk of ACS in Children with SCD (T)	30	40.5	36	48.6	8	10.8
Q13. Splenic sequestration crisis requires transfusion (T)	18	24.3	53	71.6	3	4.1
Q14. Splenic sequestration crises resolve by themselves (F)	52	70.3	19	25.7	3	4.1
Q15. Whole blood is the preferred choice for transfusion in acute severe anaemia for children with SCD (F)	16	21.6	55	74.3	3	4.1
Q16. Children with SCD must be screened for stroke (T)	44	59.5	28	37.8	2	2.7
Q17. Children with SCD have early puberty and menarche (F)	49	66.2	20	27.0	5	6.8
Q18. SCD is the commonest cause of priapism in children (T)	10	13.5	59	79.7	5	6.8
Q19. Children with SCD must be screened annually for renal disease by age 10 (T)	8	10.8	63	85.1	3	4.1
Q20. Children with SCD need referrals to dentists and ophthalmologists by age 10 (T)	38	51.4	33	44.6	3	4.1

(South Tongu district field data, 2019)

Table 3. Nurses perception regarding quality of service structures

Statements	Scale Degrees					
	TD %	PD %	N %	PA %	TA %	No Response %
Q1. Emergency vehicle (ambulance) is readily available for use by SCD children	52.7	14.9	4.1	10.8	16.2	1.4
Q2. Guidelines or protocol for managing children with SCD is available in my unit.	14.9	9.5	6.8	10.8	55.4	2.7
Q3. My facility has an organized and	54.1	13.5	10.8	16.2	2.7	2.7

Statements	Scale Degrees					
	TD %	PD %	N %	PA %	TA %	No Response %
functional SCD clinic for children						
Q4. There are insufficient supplies to provide service to children with SCD	21.6	18.9	10.8	27.0	20.3	1.4
Q5. Resuscitation equipment and supplies are readily available to manage SCD children in crises.	10.8	12.2	14.9	31.1	31.1	0
Q6. Pain assessment tools/charts are available for assessing pain.	9.5	14.9	14.9	18.9	41.9	0
Q7. Children with SCD have access to all their acute care and prophylactic medications from the pharmacy.	12.2	4.1	6.8	31.1	45.9	0
Q8. The medication room is well equipped to permit safe medication preparation and administration, without errors.	5.4	8.1	23.0	35.1	25.1	0
Q9. There is difficult accessibility to stretchers, wheelchairs or other transportation equipment at my department.	35.1	18.9	12.2	13.5	18.9	1.4
Q10. Laboratory services in my hospital cover basic tests for SCD children.	2.7	2.7	9.5	20.3	64.9	0
Q11. Education support services (clinical meetings) in my facility improve my care for SCD children.	9.5	6.8	14.9	29.7	39.2	0
Q12. The nursing staff is sufficient to provide good service.	12.2	10.8	13.5	33.8	29.7	0

(South Tongu district field data, 2019)

Table 4. Nurses perception regarding processes of nursing services

Statements	Scale Degrees					
	TD %	PD %	N %	PA %	TA %	No Response %
Q1. Nursing care plan is a useful tool that helps to improve the quality of care rendered to SCD children.	2.7	4.1	5.4	12.2	75.7	0
Q2. In case of adverse incidence relative to nursing services, the necessary actions are implemented to prevent it from occurring again	8.1	6.8	10.8	36.5	37.8	0
Q3. I make conscious efforts to improve my knowledge and skills in my nursing practice	1.4	2.7	4.1	14.9	77.0	0
Q4. I register and document all nursing activities rendered to SCD children in appropriate records.	1.4	2.7	4.1	8.1	83.8	0
Q5. Penicillin V prophylaxes are given to SCD children in my facility.	13.5	10.8	18.9	23.0	32.4	1.4
Q6. Individualized care plans for SCD children are kept and updated regularly.	6.8	6.8	20.3	24.3	41.9	0
Q7. I suggest implementation of nursing actions where necessary for the purpose of improving the quality of nursing care rendered	2.7	0	2.7	23.0	71.6	0
Q8. I educate SCD children and their families on health maintenance each time I attend to them	2.7	1.4	6.8	14.9	74.3	0

Statements	Scale Degrees					No Response %
	TD %	PD %	N %	PA %	TA %	
Q9. I regularly assess pain of SCD children and give appropriate analgesics for pain relief.	5.4	0	4.1	18.9	71.6	0
Q10. I inspect SCD children's immunization and growth charts to monitor their status	6.8	6.8	24.3	29.7	29.7	2.7
Q11. I participate in nursing team meetings to discuss on service being delivered	6.8	5.4	8.1	29.7	48.6	1.4
Q12. The quality of the service being delivered is reduced by the communication problems among members of the nursing team.	10.8	9.5	8.1	41.9	29.7	0

(South Tongu district field data, 2019)

3.4 Nurses Perception Regarding Outcomes of Nursing Services for SCD Children

- Results in the Outcome dimension of the quality of nursing services in Table 6 also showed high ratings for outcomes of care by the respondents. For instance, 83.8% of the nurses (60.5% totally and 20.3% partially) indicated that the nursing orders prescribe specific actions related to SCD children's needs, and that 78.4% (58.1% total agreement and 20.3% partial agreement) valued the opinions of the children/families in the service processes. Further details can be seen in (Table 6). Despite the high percentage of agreement found on good outcomes, there was more partial agreement in the statement that "the frequency of SCD children's hospitalizations has reduced" (44.6% partial agreement and 24.3% total agreement).
- Table 7 shows the comparability of the favourability score of the three dimensions. The average favorability score of nurses,

regarding the process dimension was 58.68 (sd± 10.15), superior to those of structure and outcomes. The comparison between the three dimensions and that of structure presented less favorability, with a statistically significant difference, $p < 0.021$. This revealed a strong relationship between the three dimensions of care for quality.

- The researchers tested the hypothesis that "Good processes of care for children with SCD would positively influence good outcomes" as proven in (Table 7). Therefore the quality of nursing care processes for SCD children are very likely to influence the outcome of their care. The results from the Chi-Square test that measured the association between the Process and Outcome dimensions in (Table 8) and the values of Phi and Cramer's V tests that measured the strength of association between the dimensions in (Table 9) revealed some association between the Process and Outcome measures; which is weak and yet rejects the null hypothesis.

Table 5. Nurses perception regarding outcomes of nursing services

Statements	Scale Degrees					No response %
	TD %	PD %	N %	PA %	TA %	
Q1. Nursing orders state specific actions to meet the needs of children with SCD	4.1	5.4	6.8	20.3	63.5	0
Q2. Adverse incidents related to nursing care are discussed with superiors.	4.1	0	10.8	17.6	64.9	2.7
Q3. Children with SCD and their families are referred for community and specialist care	5.4	14.9	12.2	20.3	45.9	1.4
Q4. I am satisfied with the nursing care	2.7	4.1	13.5	37.8	40.5	1.4

Statements	Scale Degrees					
	TD %	PD %	N %	PA %	TA %	No response %
delivered by the nursing team.						
Q5. The frequency of SCD children's hospitalizations have reduced	2.7	9.5	18.9	44.6	24.3	0
Q6. I value the opinion of SCD children and their families regarding nursing care	2.7	1.4	13.5	20.3	58.1	4.1
Q7. The information provided by patient relatives is not taken into consideration in the care delivered to SCD children.	62.2	16.2	9.5	6.8	4.1	1.4
Q8. The orientation that I deliver to SCD children and their families at the moment of discharge do not meet their needs.	50.0	18.9	16.2	10.8	4.1	0
Q9. I find it unnecessary to know the opinion of patients regarding the nursing care they receive	62.2	18.9	9.5	2.7	6.8	0
Q10. SCD children and families report having received excellent nursing services	4.1	4.1	28.4	21.6	40.5	1.4
Q11. Nursing discussions regarding care for SCD children have changed my practice	9.5	6.8	16.2	28.4	37.8	1.4
Q12. The nursing team needs to improve the interpersonal relationship with patients and their families.	8.1	4.1	9.5	27.0	51.4	0

(South Tongu district field data, 2019)

Table 6. Favourability score of the three dimensions

Dimension	N	Mean	Sd	Median	Minimum	Maximum	P value
Structure	74	41.50	15.10	46.33	14.00	63.00	
Process	74	58.68	10.15	61.50	41.00	70.00	0.021
Outcome	74	43.17	21.43	50.33	7.00	62.00	

Table 7. Chi-square tests- process and outcome

Test Descriptions	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	91.000 ^a	80	.188
Likelihood Ratio	47.501	80	.999
Linear-by-Linear Association	2.329	1	.127
N of Valid Cases	12		

a. 99 cells (100.0%) have expected count less than 5. The minimum expected count is 08.
(South Tongu district field data, 2019)

Table 8. Symmetric measures (process and outcome)

Test Descriptions	Value	Approx. Sig.
Nominal by Nominal	Phi	2.754
	Cramer's V	.974
N of Valid Cases	12	

Phi and Cramer's V are both tests of the strength of association. We can see that the strength of association between the variables is very weak. The test statistics values for both Phi and Cramer's V are higher than p – value of 0.188

(South Tongu district field data, 2019)

- Despite the weak association, the findings reject the null hypothesis that “there are no effects of processes of care on outcomes” and therefore reaffirm the researcher’s hypothesis of “good processes of care were likely to lead to good outcomes”. The findings of the three dimensions with a p-value of 0.021 also reaffirms Donabedian’s standpoint of association between the structure, process and outcome variables for quality care. It is essential for professionals to strengthen the three dimensions of Donabedian quality of care model in order to achieve maximum improvement in quality of care.

4. DISCUSSION

- To the best of the researcher’s knowledge this is the first study conducted to examine the level of knowledge on comprehensive care, and to assess the quality of care provided by nurses for SCD children in Ghana using Donabedian model. Consistent with this study, few studies conducted to assess knowledge of physicians and nurses on SCD revealed their level of knowledge to be inadequate or poor [7,15,20,21]. Yaqoob and Nasaif [30] found the level of knowledge and attitudes of nursing staff regarding pain assessment and management of SCD patients poor among the nurses with a mean score of 47.8% which was similar to previous studies that assessed knowledge of nurses on pain management with the same scale. This was not far from a mean score of 51% scored by nurses in this study. On the contrary, Stoverock [31] examined nursing knowledge of Sickle Cell Disease (SCD) and found the participants who completed all 20 item questionnaire had scores ranging from 73%-100%; indicating high knowledge on SCD and its management. The differences in the knowledge scores of the nurses in these studies may be due to the varying instruments used. However it is generally found that nurses and doctors have lower knowledge and self-efficacy for SCD management [32].
- A study showed that health professionals after participating in educational interventions had improved knowledge about sickle cell disease management [33]. It is observed that majority of this study respondents (66.2%) had training in management of SCD within the last 2 years and this might have influenced the average knowledge scores. Yaqoob and Nasaif [30] asserts that lack of training and continuing education program could contribute to poor knowledge of SCD management and its pain assessment. Despite the poor performance of the nurses regarding some of the important care indicators for SCD children, the respondents performed very well in some components of comprehensive care for SCD children such as Fever as emergency (90.5%), Acute Chest Syndrome (75.1%), SCD as commonest cause of Priapism (79.7%) and screening for renal disease (85.9%). Some of these indicators were also rated high by respondents in the study by Stoverock [31] where the nurses recognized priapism as a painful event (100%), and 85.9% recognized gall stones as common in SCD patients. Kavanagh [8] recommended strong adherence to quality-of-care indicators for SCD children for improved quality of care and to reduce morbidity and mortality. It is hoped that this study would prompt nurses on these care indicators for SCD children and help improve the quality of care they offer.
- For the structure dimension of quality care, though a fair majority of the nurses in this study agreed on availability of: guidelines/protocols for managing SCD children, resuscitation equipment, pain assessment tools/charts, well equipped medication rooms, laboratory services for SCD children, access to all medications from pharmacy, access to stretchers, wheelchairs, and sufficient staff to provide service; the rates of agreements obtained by the nurses were lower compared to that of a study done by Yuri and Tronchin [29] to assess service structures for maternal and child health in Brazil. Oduro [34] underscored the importance of ambulance service in prompt referral management and in improving quality of care, unfortunately majority of districts in Ghana including South Tongu district did not have functional ambulance to transport referral cases; as a result patient resorted to taxis or public transport which posed threats to the safety of referred clients. On the contrary, 98.2% of nurses in the study by Yuri and Tronchin [29] in Brazil were

confident of availability and easy accessibility of emergency vehicles for clients.

- The case of unavailability of functional SCD clinic was highly expected as care for SCD was not highly prioritized in Ghana, and many district hospitals lack specialists. The lack of these organized clinics makes access to comprehensive care for SCD children in these districts difficult as most preventive and prophylactic treatments were often ignored. Lack of organized clinics for SCD was also identified in a study by Muoghalu & Awolowo [18] as major barriers of care for SCD children in an urban facility in Nigeria. There was however no consensus by the nurses in this study concerning sufficiency of supplies to provide service for SCD children. This is quite worrying as it revealed gaps in adequacy of supplies and logistics for quality care. This was not the case in the study by Yuri and Tronchin [29] in Brazil where nearly 90% of the nurses disagreed on insufficiency of supplies. These findings support the assertion by Adu-Gyamfi and Brenya [35] that administrative measures and logistics were inadequate in most facilities in Ghana which lowered nurses' moral to give optimal care. Similarly, Muoghalu & Awolowo [18] identified inadequate health logistics and consumables as some structural barriers to quality care for SCD children.
- Assessment of the processes of care dimension for SCD children revealed solid agreements on good processes of care for SCD children by majority of the nurses. The nurses agreed on implementation of necessary actions to prevent adverse incidents recurring. This was consistent with findings by Yuri and Tronchin; [29] and highlighted the commitment by nurses to ensure safe care for SCD patients. A high majority of nurses reported that they registered and documented all nursing activities for SCD children in appropriate records. Nursing documentation is critical to nursing practice as it preserves patient records and progress notes, ensures continuity of care and serves as a means of communication and coordination of care [36]. The nurses also invested personally in their own knowledge and skills to

improve practice, which is commendable as continuous education is vital for quality improvement. Muoghalu & Awolowo [18] advocated as a matter of priority for government to invest in continuous training of health professionals in the management of sickle cell disease to improve standards of care. Consistent with Yuri and Tronchin, [29] majority of the nurses in this study specified implementing nursing actions where necessary for improving the quality of nursing care rendered but many admitted communication problems among members of the nursing team reduced the quality of care they offered. The resultant effect of ineffective communication in healthcare is delayed treatment, misdiagnosis, medication errors, patient injury, or death [37] and must be taken seriously as communication problems were one of the major findings from this study that could hinder quality care.

- Outcome of care measures assessed including; nursing orders prescribing specific actions related to SCD children's needs, valuing the opinions of the children/families, orientation meeting the expectations of children/families at the moment of discharge, referral of SCD children/families for specialist and community care; were all rated high in this study similar to those by Yuri and Tronchin [29]. A good majority of the nurses also reported being satisfied with the services provided by their team that were acknowledged by SCD children and their families. Sardasht et al. [26] highlighted the importance of measuring outcome of care as the effect of health care services and the reflection of health care rendered on patient's health status. The study reflected good outcomes of care on majority of indicators assessed coupled with the nurses' opinion of good satisfaction report from clients on the services provided. Though the outcome results are quite reassuring, only 24.3% of nurses totally agreed with the statement that 'frequency of SCD children's hospitalization has reduced'. Reduction in frequency of hospitalizations, disease or death is a technical outcome measure of quality [38] and as many nurses could not agree strongly on this outcome measure, it points to a gap in the quality of care being provided to SCD children. Majority of the

nurses also identified the need to improve interpersonal relationship with SCD children and their families. Alhassan et al. [14] underscored the need to identify the concerns of clients and provide client-centered care so as to improve interpersonal relationship and to increase client satisfaction.

- Evaluation of the structure-process-outcome components of quality care revealed the process dimension emerging as the best, followed by that of outcome; consistent with Yuri and Tronchin [29]. These findings imply that the process-of-care activities for SCD children were well performed by the nurses. Equal improvement in the structure and outcome dimensions would contribute significantly to improving care holistically for children with SCD.

4.1 Limitations of the Study

- Convenience sampling method is one of the limitations of this study as selections of participants were not random. The survey designed also explored the perception of nurses about the quality of care, which may not reflect entire measure quality care as quality. The findings had however identified areas for improvement of care for SCD children in South Tongu district of Ghana.

5. CONCLUSION

- The results of this study revealed inadequate knowledge of the nurses on comprehensive care for SCD children and identified some gaps in the quality of care with regard to the structure, process and outcome dimensions. Inadequate knowledge of healthcare providers is a major barrier to care and impacts the quality of care provided. The nurses in this study needs to improve upon their knowledge on indicators of quality care for SCD children in order to provide evidence-based and high quality care. Continuous in-service training and professional development programs on care for SCD children would most likely bridge the gap.
- Nurses' perception regarding quality of the service structures for SCD children obtained the worst evaluations, mostly in the aspects of service logistics and

supplies, access to emergency vehicle (ambulance) and functional SCD clinic. The process dimension received the best evaluation from nurses, however the communication problems within the nursing team was a major issue in compromising service quality. The outcomes dimensions also received favourable ratings compared to the structures. However the nurses need to improve interpersonal relationships with SCD children and their families, and also prioritize strategies to improve quality of care for SCD children; particularly preventive care in order to reduce the frequency of hospitalizations.

- Quality of care evaluations are multidimensional and involve several strategies and tools. Assessing the knowledge and perception of healthcare providers on care indicators and quality of services is a major step in improving quality. SCD children have complex and diverse care needs and as such nurses and healthcare facilities need to adequately prepare to provide the quality of care.

CONSENT

Respondents were given a consent form explaining the purpose and procedure of the study. Each respondent was informed that their participation is voluntary and that they could refuse to participate, discontinue participation, or skip any questions they will not wish to answer at any time. They were informed that their decision would not affect their employment. The risks and benefits were explained as they may experience some mild, temporary discomfort relating to answering some questions on the questionnaire as they concerned their practices. Their confidentiality was upheld and only the principal researcher would have access to research results associated with their identity if any. The respondents were also given the contact information for the researcher for any questions regarding the research study.

ETHICAL APPROVAL

Ethical approval was also obtained from the Ghana Health Service (GHS)-Ethics Review Committee (ERC) with GHS-ERC Number GHS-ERC 071/02/19. Permission was sought from the South Tongu District Director of Health Services

(DDHS) and head of selected health facilities for the study to collect data.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Sobngwi E, Mbango ND, Balti EV, Sack FN, Moor VA, Mbanya JC. Relative adrenal insufficiency in adults with sickle cell disease. *Pan African Medical Journal*. 2018;29. Available: <https://doi.org/10.11604/pamj.2018.29.30.6025>
2. Chakravorty S, Williams TN. Sickle cell disease: A neglected chronic disease of increasing global health importance. *Archives of Disease in Childhood*. 2015;100(1):48–53. Available: <https://doi.org/10.1136/archdischild-2013-303773>
3. Mcgann PT. Time to invest in sickle cell anemia as a global health priority: Difficult or Expensive. *Paediatrics*. 2016; 137(6). Available: <https://doi.org/10.1542/peds.2016-0348>
4. Ambrose EE, Makani J, Chami N, Masoza T, Kabyemera R, Peck RN, Kamugisha E, Manjurano A, Kayange N, Smart, LR. High birth prevalence of sickle cell disease in Northwestern Tanzania. *Pediatric Blood & Cancer*. 2018;65(1). Available: <https://doi.org/10.1002/pbc.26735>
5. Makani J, Williams TN, Marsh, K. Sickle cell disease in Africa: Burden and research priorities Sickle Haemoglobin and Sickle Cell Disease. *Europe PMC Funders Group*. 2017;101(1):3–14. Available: <https://doi.org/10.1179/136485907X154638>. Sickle
6. Mcgann PT, Hernandez AG, Ware RE. Sickle cell anemia in sub-Saharan Africa: advancing the clinical paradigm through partnerships and research. *Blood Forum*. 2018;129(2):155–162. Available: <https://doi.org/10.1182/blood-2016-09-702324>. There
7. Azonobi IC, Anderson BL, Byams VR, Grant AM, Schulkin J. Obstetrician-Gynecologists' knowledge of sickle cell disease screening and management. *BMC Pregnancy and Childbirth*. 2014;14: 356. Available: <http://www.biomedcentral.com/1471-2393/14/356>; 1–5.
8. Kavanagh PL. Quality-of-care indicators for children with sickle cell disease; 2015. Available: <https://doi.org/10.1542/peds.2010-1791>
9. Odunvbun ME, Okolo AA. Implementing comprehensive health care management for sickle cell disease in an African setting. *Nigerian Journal of Paediatrics*. 2015;42(4):298–302.
10. Yawn BP, John-sawah MJ, Heart N. Management of sickle cell disease: Recommendations from the 2014 Expert Panel Report; 2015.
11. Bosu WK. A comprehensive review of the policy and programmatic response to chronic non-communicable disease in Ghana. *Ghana Med J*. 2012;46(2):69–78.
12. Ghana Ministry of Health. National policy for the prevention and control of chronic non-communicable diseases in Ghana. Ghana Ministry of Health; 2012. Available: [http://www.iccp-portal.org/sites/default/files/plans/national_policy_for_the_prevention_and_control_of_chronic_non-communicable_diseases_in_ghana\(1\).pdf](http://www.iccp-portal.org/sites/default/files/plans/national_policy_for_the_prevention_and_control_of_chronic_non-communicable_diseases_in_ghana(1).pdf)
13. Ansong D, Akoto AO, Ocloo D, Ohene-frempong K. Sickle cell disease: Management options and challenges in developing countries; 2012. Available: <https://doi.org/10.4084/MJHID.2013.062>
14. Alhassan RK, Duku SO, Janssens W, Nketiah E, Spieker N, Ostenberg PV, Arhinful DK. Comparison of perceived and technical healthcare quality in primary health facilities: Implications for a sustainable national health insurance scheme in Ghana. *PLoS ONE*. 2015;10(10):1–19. Available: <https://doi.org/10.1371/journal.pone.0140109>
15. Familia S. Nursing care in sickle cell disease in the family health strategy assistência de enfermagem na doença falciforme na estratégia saúde da. *J res*. 2018;10(1):36–45. Available: <https://doi.org/10.9789/2175-5361.2018.v10i1.36-45>
16. Kanter J, Kruse-jarres R. Management of sickle cell disease from childhood through adulthood. *Blood Reviews YBLRE*. 2013;27(6):279–287.
17. Ayanian JZ, Markel H. Donabedian' s lasting framework for health care quality. N

18. Engl J Med. 2016;375(3):205–207.
18. Muoghalu CO, Awolowo O. The Health Workers Perspectives in the Management of Sickle Cell Disease in an Urban Health Centre in Ile-Ife, Nigeria. *J Hematol Thrombo Dis.* 2017;5(1): 1–5. Available: <https://doi.org/10.4172/2329-8790.1000262>
19. Ghana District Health Information Management System (DHIMS2) Database. Ghana Health Service South Tongu District Sickle Cell Disease Admissions data; 2016-2018. Available: www.chimgh.org Available: <https://doi.org/10.4172/2329-8790.1000262>
20. Alomar A, Baawadh AA, Alotaibi A, Sadek NA, Mansi S, Alharthi MM, Eid AOA. Interventions to improve appropriate use of therapies for sickle cell disease. *EC Endocrinology And Metabolic Research.* 2017;1:39–48.
21. Gomes LMX, Vieira MM, Reis TC, Barbosa TLA, Caldeira AP. Knowledge of family health program practitioners in Brazil about sickle cell disease: A descriptive cross-sectional study. *BMC Family Practice.* 2011;12(89). Available: <http://www.biomedcentral.com/1471-2296/12/89>
22. Mourão L, Gomes X, Reis TC, Vieira MM, Andrade-barbosa TLD. Quality of assistance provided to children with sickle cell disease by primary healthcare services. *Rev. Bras. Hematol. Hemoter.* 2011;33(4): 277–282. Available: <https://doi.org/10.5581/1516-8484.20110077>
23. Joyce J. A Donabedian model of the quality of nursing care from nurses' perspectives in a Portuguese hospital: A pilot study. *J. Nurs Meas.* 2015;23(3):474–84. Available: <https://doi.org/10.1891/1061-3749.23.3.474>
24. Akachi Y, Kruk ME. Quality of care: Measuring a neglected driver of improved health; 2017. *Bull World Health Organ.* 2017;95:465–472: Available: <http://dx.doi.org/10.2471/BLT.16.180190>
25. Nylenna M, Bjertnaes O, Saunes IS, Lindahl AK. What is Good Quality of Health Care?, *Professions and Professionalism.* 2015;5(1): 1–15.
26. Sardasht FG, Shourab NJ, Jafarnejad F, Esmaily H. Application of donabedian quality-of-care framework to assess the outcomes of preconception care in urban health centers, Mashhad, Iran in 2012. *Journal of Midwifery & Reproductive Health.* 2013;2(1):50-59.
27. Puszczak K, Fronczyk A. Task force on quality of BCS data Analysis of sample size in consumer surveys theoretical considerations and factors determining minimum necessary sample sizes, link between country size and sample size (impact of larger structural heterogeneity), gross versus effective sample size (i.e. volatility and possibly bias); 2013.
28. Taber KS. The use of cronbach's alpha when developing and reporting research instruments in science education; 2016. Available: <https://doi.org/10.1007/s11165-016-9602-2>
29. Yuri NE, Tronchin R. Quality of maternal-child health care at a university hospital, according to nurses' perspective. *Rev Esc Enferm USP.* 2010;44(2):329–336. Available: www.ee.usp.br/reeusp/
30. Yaqoob SH. Nurses' knowledge and attitudes toward pain assessment and management for adult sickle cell disease patients during sickling crisis; 2017. Available: <https://doi.org/10.5430/cns.v3n4p36>
31. Stoverock LA Quality improvement project: Nursing knowledge of adolescents with SCD and judgment of Pain; 2014.
32. Reeves SL, Tribble AC, Madden B, Freed GL, Dombkowski KJ. Antibiotic prophylaxis for children with sickle cell anemia. *Pediatrics.* 2018;141(3). Available: <https://doi.org/10.1542/peds.2017-2182>
33. Karoline K, Diniz S, Pagano AS, Paula A, Chagas P, Reis I A, Gonc L. Knowledge of professional healthcare providers about sickle cell disease: Impact of a distance education course. *Hematology, Transfusion and Cell Therapy.* 2018;1(1): 62–68. Available: <https://doi.org/10.1016/j.htct.2018.06.004>
34. Oduro GD. Improving emergency care in Ghana. *Postgraduate Medical Journal of Ghana.* 2015;4(1):23–29.
35. Adu-Gyamfi S, Brenya E. International scholarly research notices nursing in Ghana: A search for florence nightingale in an African City; 2016.
36. Obioma C. Improving the quality of nursing documentation in home health care setting;

- 2017.
37. Foronda C, Macwilliams B, Mcarthur E. Nurse education in practice interprofessional communication in healthcare: An integrative review. Nurse Education in Practice. 2016;(19):36–40. Available:<https://doi.org/10.1016/j.nepr.2016.04.005>
38. Ameh S, Gómez-olivé FX, Kahn K, Tollman SM, Klipstein-grobusch K. Relationships between structure, process and outcome to assess quality of integrated chronic disease management in a rural South African setting: Applying a structural equation model. BMC Health Services Research. 2017;17(229): 1–15. Available:<https://doi.org/10.1186/s12913-017-2177-4>

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