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Factors influencing Quality Management of Medication by Nurses at Kenyatta National Hospital Paediatric Wards. Nairobi, Kenya.

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Abstract
The main objective of this descriptive cross-sectional survey was to determine the factors influencing quality management of medication by nurses at Kenyatta National Hospital (KNH) paediatric medical wards. The study involved 80 nurses, 180 caretakers, four nurse managers and combined both qualitative and quantitative methods. Data gathering instruments included researcher administered questionnaires to a randomly sampled group of nurses and caretakers.
Quantitative data analysis was done using descriptive and inferential statistics while qualitative data was analyzed manually. High workload (90%), language barrier (56%), absence of paediatric formulations (55%), multiple tasks (21%), lack of support (20%) and limited physical space (19%) were the main challenges that nurses encountered during drug administration. There was only one nurse (1.25%) trained in pediatric nursing. Analysis revealed an association between quality drug administration and number of years worked in paediatric wards (fisher's exact $p < 0.05$) and the attendance of continuing medical education (CME) (Fishers exact $p < 0.05$).
According to the study findings, it was concluded that there are factors that influence quality of medication management and if not addressed, these can adversely affect the patient. Study recommendations were that more nurses be trained in paediatric nursing and deployed to their area of specialization to decrease the heavy workload and ensure quality medication administration. It is further recommended that standards of quality care and procedure manuals on medication management should be developed and made available to the health care workers.
Keywords: Medication, Medication errors, Medication management, Nursing, Caregiver, Quality Medication management.

1. Introduction
Medication administration involves providing the patient with a substance prescribed and intended for the diagnosis, treatment, or prevention of a medical illness or condition (Gupta *et al.*, 2007). Medication management by nurses is the administration of medication safely and efficiently, assessing and monitoring the effects of medication, interdisciplinary collaboration, and finally evaluating the desired and undesired effects of medication (Watts, 2003).
The type and frequency of errors in the administration of drugs is a reflection of the quality of the nursing care system (Barker & Allan, 1995). Further, according to Armitage and Knapman (2003) nurses spend 40% of their time doing drug administration. In the course of carrying out drug administration procedures, nurses may be forced by some factors to ignore the set standards. These factors may be within or outside nurses' control. The findings of a study done in Singapore on quality assurance on the administration of medication by nurses in neonatal intensive care unit, showed that non compliance with the standard practice of medication administration by paediatric nurses was common (Raja *et al.*, 2009). Understanding the complexity of delivering pediatric nursing care is essential for making changes that effectively promote the health worker's environment especially in pediatric department. Attention should therefore be directed to factors that complicate or support the paediatric nursing work.
To maximize health and wellbeing is the primary goal of nursing care and hence the nurses should work towards optimizing the quality of people's lives (Wilson, 2009). This is the foundation on which the nurse quest to be able to deliver quality care to the patients should be based. Studies show that there are challenges which might jeopardize the delivery of patient care by nurses in the desired manner. Included among the challenges are aspects to do with increase in nurse patient load, bed occupancy rate, unstable patients' condition, non nursing tasks correlating positively with perceived patient outcomes as Kandari and Thomas (2009) and Dickson *et al.* (2010) found out. The problem of workload and the way it influences nurses' delivery of quality care is clearly illustrated by these studies.
Meurier *et al.* (1997), listed lack of knowledge or information, work overload, stressful atmosphere and lack of support from senior staff as the factors that contribute to medication errors. Many nurses are reluctant to admit their ignorance when it comes to understanding some aspects of paediatric nursing care. Nurses continue giving

care without getting updated on the latest trends in all aspects of nursing including medication management as this study showed. Most drug preparations are made with the adult patient in mind and so paediatric nurses are called upon to ensure they get updated on aspects to do with childrens' medication.

2. Methods

This was a descriptive cross sectional study carried out in paediatric medical wards at Kenyatta National Hospital (KNH) Nairobi, Kenya**.** Stratified random sampling method was employed to select the study participants which comprised of 260 participants (n = 80 nurses, and n = 180 caretakers). Semi structured researcher-administered questionnaires were used to collect both qualitative and quantitative data from study participants. Qualitative data was also obtained from key informants using interview guide which had open ended questions.

All qualitative interview data was coded for themes and analyzed for patterns, similarities and contrasts. Reporting was done using text narratives. Quantitative data analysis was done using descriptive and inferential statistics.

Ethical approval to conduct this study was granted by the KNH/UON Ethics and Research Committee. Participants signed informed consent after full disclosure.

3. Results

3.1 Demographic characteristics of the nurse respondents.

Demographic characteristics of the sampled study participants were summarized in table I. Out of 80 nurse participants, 70 (87.5%) were females while the rest (12.5%) were males resulting in a male-to-female ratio of 1 male: 7 female nurses. The mean age of the nurses was 39.4 years (SD +/format- 7.7). Graduate nurses (Bachelor of Science Nursing) constituted (n = 4, 11.25%) of the participants in this study while certificate and diploma nurses contribute the bulk of the nursing workforce.

3.2 Caretakers' characteristics

The demographic characteristics of the principal caretakers are presented in table 2. Majority 179 (99.4%) of the interviewees were females and only one male caretaker participated in this study. The mean age of the caretakers was 27.7 years (SD = 5.8) with a range of 18 to 47 years. Approximately half 90 (50.6%) of the caretakers had attained primary level education while a further 64 (35.6%) had secondary level education. Majority caretakers were not in employment 125(69.4%) reported that they were unemployed and 36 (20%) failing to disclose their occupation status.

3.3 Association between the scores on the medication administration case studies and participants profiles

Three case studies covering areas of acute treatment of severe malaria (case study 1), intravenous cannula care (case study 2), and nurse attitude (case study 3) were presented to the nurse participants. Fifty one (63%) of the participants responded correctly in each of the three areas.

Nurses' scores of the case studies were compared with the participants' profiles. The association between scores on the medication administration on case studies and the participants' profiles are presented in Table 3. High scores on the case studies showed statistically significant association with the number of years that a nurse had worked in the pediatric ward (Fisher's exact p = 0.018). The reported frequency of CMEs attendance was also significantly associated with the participants scores on drug administration case studies (Fisher's exact p = 0.02).

3.4 Role of caretakers in drug administration

Nurses and caretakers were asked to report on what they perceived to be the role of the caretakers in medication administration as captured in Table 4. The table also shows that there were differences in nurses' and caretakers' perceptions of the role of the caretakers during medication administration. Most 134 (74.4%) of the caretakers considered administration of drugs based on nursing instructions as their key role while majority 45 (56.3%) of nurses reported that the main role of caretakers in drug administration was encouraging the child to take medication.

3.5 Challenges in medication administration in Kenyatta National Hospital paediatric wards

Participants frequently reported encountering various challenges during drug administration (Fig.1). The most common challenge reported by the majority 72(90%) of all the participants was workload related to high number of admission in the ward followed by language barrier 45(56%) among others.

4 Discussion

The study hypothesized that quality management of medication is not related to nurses' demographic characteristics of age, experience and level of education. However, high scores on the case studies showed statistically significant association with the number of years a nurse had worked in the paediatric pediatric ward (Fisher's exact p =0.018). Among the nurses who participated in this study, one nurse (1.25%) was found to have been trained in paediatric nursing. Further, the one nurse who had been trained in paediatric nursing had

significant high score in the case studies presented in this study. The indication here is the emphasis on specialization and deployment of nurses in their area of specialization.

Reported frequency of continuous medical education (CME) attendance was also significantly associated with participants high scores on drug administration case studies (Fisher's exact p= 0.02) despite the study findings showing a moderate uptake of CMEs. These study findings emphasize the importance of refresher courses in medication administration. This finding agrees with Koren (2002), Bertshe *et al.* (2010), who reported that a combination of several initiatives including training of personnel concerned with medication reduced system and human errors that occur in the paediatric department.

The use of drug administration guidelines according to the findings of this study was moderate. This finding concurs with the report on a study conducted among neonatal nurses in West Bank Palestine where it was reported that the overall applications of standards of quality care on medication management and use were moderate among neonatal nurses (Togan and Imam, 2011).

Half of the participants rated their application of the Nursing Council of Kenya (NCK) guidelines on a scale as 'well done' with (5.3%) nurses choosing the highest score 'very well done' to the NCK drug administration guidelines. In Australia, a study done showed that nurses deviated from best practice guidelines during medication and that this was a contributing factor to medication errors(Popescu, Currey & Botti 2011). It can thus be deduced from these findings that lack of adherence to drug administration guidelines could potentially lead to medication errors in KNH paediatric wards a feature that should be investigated.

Another area of concern is the role of caretaker in medication administration procedure. Nurses commonly reported that they involved caretakers in the drug administration process mainly through instructing them on medication. The reported areas of instruction on medication administration were side effects (62.5%), drug administration (18.8) and compliance (11.3%). Findings by Latter *et al.*, (2000) differ from the findings of this study. Latter *et al.*, (2000) described medical education to patients by nurses as commonly limited to giving simple information as the name, purpose, and colour, number of tablets, time and frequency of administration. The import here is that the caretaker should be presented with information on medication management that helps to ensure that the safety of the patient is upheld.

5 Conclusion

Based on the study findings it was concluded that nurses' paediatric experience and relevant continuous medical education attended influence quality in medication administration. Nurses in KNH paediatric wards face various challenges that can affect the quality administration of medication among children which include high workload, language barrier and lack of paediatric formulations among others.

More nurses should be trained in paediatric nursing and deployed to their area of specialization. Standards of quality care and procedure manuals on medication management should be availed to staff and sensitization seminars held on importance of their usage regularly. This should also be made available for training in nursing schools.

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Table 1: Demographic characteristics of nurses in paediatric wards

	Frequency (%)
Age (in years)	
20-29	6 (7.5)
30-39	34 (42.5)
40-49	29 (36.25)
50 and above	11 (13.75)
Gender	
Female	70 (87.5)
Male	10 (12.5)
Years in nursing practice	
Less than 5 years	8 (10.0)
5 to 9 years	14 (17.5)
10 to 15 years	25 (31.25)
Above 15 years	33 (41.25)
Total	80 (100)

Table 2: Demographic characteristics of children caretakers

	Frequency (%)
Age (in years)	
15-19	7 (3.9)
20-24	44 (24.4)
25-29	63 (35)
30-34	40 (22.2)
35 and above	26 (14.4)
Gender	
Female	179 (99.4)
Male	1 (0.6)
Education level	
No formal education	2 (1.1)
Primary	91 (50.6)
Secondary	64 (35.6)
Tertiary	23 (12.8)
Employment status	
Employed	19 (10.6)
Not employed	125 (69.4)
Missing	36 (20.0)
Total	180 (100)

Table 3: Nurses' characteristics and responses to medication case studies

	High score	Low score	χ^2	Fisher'sexact p value
Age (in years)	Frequency (%)	Frequency (%)		
20-29	4 (67)	2 (33)	2.63	0.48
30-39	25 (74)	9 (26)		
40-49	17 (59)	12 (41)		
50 and above	9 (82)	2 (18)		
Gender				
Male	6 (60)	4 (40)	0.007	0.72
Female	41 (70)	29 (30)		
Professional qualification				
ECN	18 (82)	4 (18)	3.53	0.321
KRCHN	24 (60)	16 (40)		
KRN/ M	6 (67)	3 (33)		
BScN	7 (78)	2 (22)		
Pediatric nursing practice				
Less than 3 years	16 (67)	8 (33)	8.71	0.018
between 3-6 years	17 (59)	12 (41)		
6- 10 years	18 (95)	1 (5)		
More than 10 years	4 (50)	4 (50)		
CME frequency				
Monthly	4 (44)	5 (56)	7.06	0.02
Quarterly	26 (84)	5 (16)		
Not held	22 (59)	15 (41)		

Table 4: Reported roles by caretakers versus nurses perceptions on caretaker role

	Frequency as reported by:	
Caretaker's role in drug administration	Caretaker (n = 180)	Nurses (n = 80)
Administering oral drugs after instruction from nurse	134 (74.4)	19 (23.7)
Encouraging child to take medications	116 (64.4)	45 (56.3)
Keeping medication for the child	36 (20)	-
Monitoring child for side effects	3 (1.7)	14 (17.5)

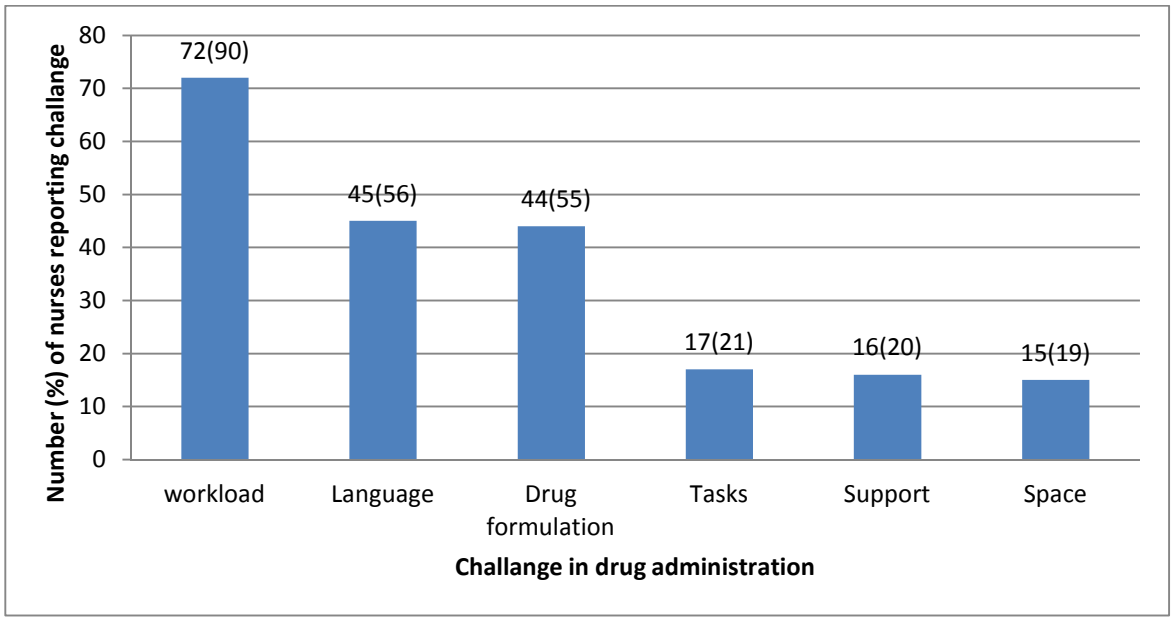

Fig 1: Challenges in drug administration reported by nurses in paediatric wards