



Nurses' Related Factors Determining Compliance of nurses to National Neonatal Resuscitation Guidelines among Nurses at Pumwani Maternity Hospital, Kenya

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ABSTRACT

The current study sought to assess nurses related factors determining compliance to National Neonatal Resuscitation Guidelines among nurses at Pumwani Maternity Hospital. A cross-sectional survey design was adopted. A semi-structured questionnaire was used to collect data. Descriptive statistics and chi-square tests were used to analyze data with the help of SPSS. The study found that 8(54.9%) of the respondents had high compliance to the National Neonatal Resuscitation. The vast majority 84(84.8%) of the respondents were female. The mean age of respondents was 36 years. On education, the findings show that slightly above half 59(59.6%) of the respondents had acquired a diploma. The findings show that 27(27.3%) of the respondents had working experience of between 16 and 20 years as a nurse. Findings showed that 51.5%(51) of the respondents had good knowledge on neonatal resuscitation. There was a statistically significant relationship ($\chi^2=11.601$, $df=3$, $p=0.009$) between level of education and compliance. Lowly educated nurses were found to be non-compliant to resuscitation guidelines. Knowledge was found to be wanting and this influenced compliance to National Neonatal Resuscitation Guidelines. The study therefore recommended that Pumwani Maternity Hospital needs to introduce a training program on neonatal resuscitation where nurses are subjected to continuous education on neonatal resuscitation.

Keywords: Neonatal Resuscitation, National Neonatal Resuscitation Guidelines, knowledge, neonatal nursing

INTRODUCTION

Each year, about 3%-6% of babies do not breathe immediately at birth, they require basic neonatal resuscitation. Bansal *et al.* (2014) indicate that birth asphyxia contributes to 19% of the 4 million neonatal deaths worldwide every year. It can also result in cognitive impairment, epilepsy, cerebral palsy, and chronic diseases in later life. Wall *et al.* (2009) estimate that approximately 3% to 6% of newborns require basic resuscitation, including stimulation at birth and assisted ventilation with bag and mask, to help them breathe. Reports from different countries attributed the improvements in neonatal mortality and morbidity over the past two decades partly to the implementation of a systematic neonatal resuscitation training programme (Lai, Ngim & Fullerton, 2012).

Neonatal resuscitation is defined as the set of interventions at the time of birth to support the establishment of breathing and circulation (Noor, Raza & Haq, 2014). The principle of resuscitation is to provide oxygen by helping breathing and metabolism with artificial respiration and to help blood circulation by giving pressure to a ventricle with chest compression (Oh & Kim, 2016). Nursing assessment of the baby at birth, help to identifying the need for resuscitation early and the skillful resuscitation of the asphyxiated new born to restore health and prevent further complications (Ezenduka, Ndie & Oburoh, 2016). Shivananda *et al.* (2017) indicate that anticipation, adequate preparation, accurate evaluation, and prompt initiation of respiratory support are critical for successful neonatal resuscitation.

WHO (2012) recommendations on basic newborn resuscitation states that: 'In neonates born through clear amniotic fluid who start breathing on their own after birth, suctioning of the mouth and nose should not be performed'. The WHO guidelines for neonatal resuscitation have been adopted by the Ministry of Health and it is recommended that all delivery room personnel complete the Newborn Resuscitation Program (NRP) training in order to improve the outcome of the resuscitation (Otido, 2013). The Ministry of Health (2010) developed national neonatal resuscitation guidelines in the form of a working aide. A visual representation of the guidelines is attached in Appendix II. In summary, the guidelines dictate that nurses should check the availability of equipment and test it, place neonate on warmer/ resuscitaire and dry neonate thoroughly and removed wet blanket. the guidelines indicate that after drying, the nurse should looked into airway, suction airway in the presence of meconium only if the neonate had not taken first breath, assess for breathing and make decision to ventilate by use of mask or call for help. The nurse should also give inflation breaths and chest rise compressions.

Skilled, guideline and timeline adhered neonatal resuscitation remains the cornerstone of advanced neonatal care ensuring a favourable outcome (Woodward *et al.*, 2015). Healthcare

organizations have an obligation to provide a high-quality resuscitation service, and to ensure that staff are trained and updated regularly to a level of proficiency appropriate to each person's expected role. However, available studies show poor compliance with resuscitation guidelines. Woodward *et al.* (2015) established a gap between guideline adherence and clinical practice. Chikuse *et al.* (2012) found that there was substandard adherence to guidelines on identification of warning signs of birth asphyxia and neonatal resuscitation. Similarly, Otido (2013) found that the basic newborn resuscitation practice according to the guidelines was poorly adhered to at 26.5% of the cases observed.

Neonatal resuscitation is effective only when health professionals have sufficient knowledge and skills. Neonatal resuscitation training is mandatory for the staff providing maternity and neonatal services in order to ensure competence during the academic period (Malekzadeh, Erfanian & Khadivzadeh, 2015). It requires that the health-care personnel especially nurses involved be abreast with the latest recommendation and should follow them in clinical practice (Suresh *et al.*, 2017). However, national surveys assessing the provision of health services in Africa and Asia have found that trained health workers and equipment for newborn resuscitation are not consistently available in all facilities (Kim *et al.* 2014). Murila, Obimbo & Musoke (2012) report that the challenges experienced by health care providers during this procedure are unique due to different causes of cardio respiratory arrest. Enweronu-Laryea *et al.* (2009) indicate that health professionals in sub-Saharan Africa feel professionally inadequate to provide neonatal resuscitation because they lack adequate knowledge, skills, and basic equipment for emergency. The current study seeks to establish the competence of nurses on resuscitation of premature babies.

Ndzima-Konzeka (2017) reports that globally neonatal deaths due to asphyxia stands at 23% and there is an increase resulting in part from intra-partum asphyxia or hypoxia related to ineffective neonatal resuscitation at birth. Sub Saharan Africa records 280,000 deaths due to asphyxia during first day of life. In Kenya, neonatal mortality has exhibited the slowest rate of decline among all early childhood mortality rates (KDHS, 2014). Kibai (2017) reports that in Kenya, 24% of neonatal deaths occur due to birth asphyxia. Pumwani maternity hospital recorded an 8.5% (2142) neonatal mortality in 2017 and 3330 in 2018. Although this is lower than the national and global average it is quite high for a hospital that is well endowed with some of the best medical resources in the country. Generally, previous studies have focused on resuscitation in adults. However, neonates differ considerably from adults as different levels of knowledge and skills are required for neonatal resuscitation.

METHODOLOGY

The study adopted a cross-sectional survey design to incorporate qualitative and quantitative research methods. The study was conducted in Pumwani maternity Hospital.

The study targeted nurses working at Pumwani Maternity Hospital. As at January, 2018, the facility had 148 nurses. Slovin's formula was used to arrive at a sample of 108 nurses. A semi-structured questionnaire with closed and open ended questions was used to collect data. Descriptive statistics such as frequencies, percentages, mean and standard deviation was used to analyze quantitative data. Qualitative data was organized into pertinent themes and then analyzed using descriptive statistics. Chi-square tests were used to establish relationships and test the study hypothesis. The above tests were conducted using SPSS version. Findings were presented in form of tables and figures.

RESULTS

A total of 99 nurses working at Pumwani Maternity Hospital participated and completed their questionnaires for the study. This represents a 92% response rate which is high enough for generalisation of findings as it is above 70% recommended by Mugenda and Mugenda (2010) for surveys.

Compliance to National Neonatal Resuscitation Guidelines

Findings in Table 1 show that the highest compliance was seen in performing chest compressions where 97% (14) of the respondents complied with recommended procedures. The lowest compliance was seen in epinephrine administration where only 36.4% (5) of the respondents were in compliance.

Table 1 Compliance to National Neonatal Resuscitation Guidelines

	Complied		Did not comply	
	N	%	n	%
Stimulation	9	58.6	6	41.4
Suctioning	6	38.4	9	61.6
Chest compressions	14	97	1	3
Provision of oxygen	7	45.5	8	54.5
Use of bag and mask	8	53.5	7	46.5
Epinephrine administration	5	36.4	10	63.6

Participants who complied to 3 or less of the items in Table 1 above were classified as having low compliance while those who complied to 4 or more of the items were classified as having high compliance. Figure 1 shows that 8(54.9%) of the respondents had high compliance to the National Neonatal Resuscitation.

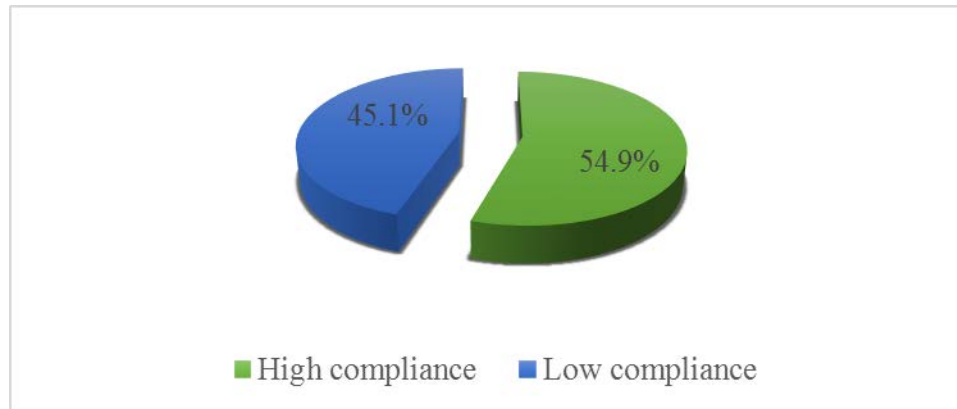


Figure 1 Compliance to National Neonatal Resuscitation Guidelines

Nurse-Related Factors

The study collected data on the gender, age, education and working experience of respondents. Findings in Table 2 show that the vast majority 84(84.8%) of the respondents were female while the male respondents accounted for 15(15.2%). The findings therefore show that there was no gender balance among nurses working at Pumwani Maternity Hospital. The findings show 37(37.4%) of the respondents were aged between 41 and 50 years while those aged 31 and 40 years accounted for 35(35.4%). The mean age of respondents was 36 years. This shows that majority of nurses working at Pumwani Maternity Hospital were middle aged. Age did not have any relationship with compliance to NNRG. On education, the findings show that slightly above half 59(59.6%) of the respondents had acquired a diploma. The findings therefore show that respondents were educated as all had acquired post-secondary education. The findings show that 27(27.3%) of the respondents had working experience of between 16 and 20 years as a nurse. The findings also show that 20(20.2%) had working experience of over 20 years while an equal number 20(20.2%) had working experience of between 6 and 10 years. Those who had worked for less than 5 years were 10(10%).

Table 2 Socio-Demographic Characteristics of Respondents

Characteristic	Category	Frequency (n=99)	Percent (%)
Gender	Male	15	15.2
	Female	84	84.8
Age	21-30	17	17.2
	31-40	35	35.4
	41-50	37	37.4
	> 51	10	10.1
Education	Certificate	16	16.2
	Diploma	59	59.6
	Higher diploma	10	10.1
	Bachelor's degree	2	2.0
	Post graduate degree	12	12.1
Working experience as a nurse (years)	<5	13	13.1
	6-10	20	20.2
	11-15	19	19.2
	16-20	27	27.3
	>20	20	20.2
Working experience in current hospital (years)	<5	66	66.7
	6-10	7	7.1
	11-15	16	16.2
	16-20	8	8.1
	>20	2	2.0

Respondents' knowledge on neonatal resuscitation was also assessed. The highest knowledge was seen in what to do with a baby born with meconium stained and not crying where 88.7% (88) were knowledgeable and what to do if baby not breathing well after drying where (87.6% (87) were knowledgeable. The lowest knowledge was witnessed in when Epinephrine should be used and Epinephrine dosage where only 4(4.1%) and 13(14.8%) were knowledgeable respectively

Table 3 Respondents' Knowledge of Neonatal Resuscitation

Knowledge on....	Correct response		Incorrect response	
	n	%	n	%
What to do with a baby born with meconium stained and not crying	88	88.7	11	11.3
Basic equipment for neonatal resuscitation	70	70.7	29	29.3
Normal respiration	63	67.7	32	32.3
What to do if baby not breathing well after drying	87	87.6	12	12.4
Rate of resuscitation	33	40.7	59	59.3
Epinephrine should be used	4	4.1	95	95.9
Epinephrine indication	13	14.8	84	85.2
Chest compressions	48	51.6	48	48.4
When to stop resuscitation	59	60.2	39	39.8

Participants who had correct responses on 4 or less of the items in Table 3 were classified as having low knowledge while those who had correct responses on 5 or more of the items were classified as having high knowledge. Findings in Figure 2 shows that 51.5%(51) of the respondents had good knowledge on neonatal resuscitation.

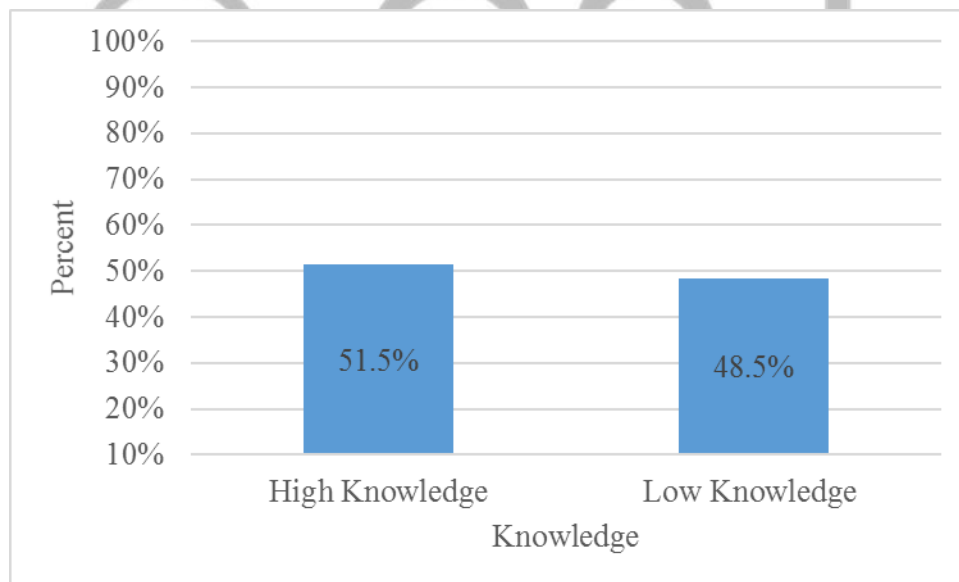


Figure 2 Respondents' Knowledge of Neonatal Resuscitation

Relationship between Nurse-Related Factors and Compliance

Chi-square tests were conducted between nurse-related factors and compliance to neonatal resuscitation guidelines. In order to conduct chi-square analysis, variables were coded into binary terms as follows. Gender was either male or female. Age was either young (below 40

years) or old (41 years and above). Level of education was either low (certificate & diploma) or high (higher diploma & degree). Working experience was coded into low (less than 10 years) and high (11 years and above). Knowledge was also coded into low (4 or less correct answers) or high (5 or more correct answers). Compliance was also coded into low or high. Findings in Table 4.11 show that there was a statistically significant relationship ($\chi^2=11.601$, $df=3$, $p=0.009$) between level of education and compliance.

Table 4 Relationship between Nurse-Related Factors and Compliance

Demographic	Category	n(%)	Relationship with compliance (p)
Gender	Male	15 (15.2%)	$\chi^2=6.425$, $df=6$, $p=0.377$
	Female	84 (84.8%)	
Age (years)	Young (<40)	52 (52.5%)	$\chi^2=11.224$, $df=9$, $p=0.261$
	Old (>40)	47 (47.5%)	
Education	Low (certificate & diploma)	75(75.8%)	$\chi^2=11.601$, $df=3$, $p=0.009***$
	High (higher diploma & degree)	24 (24.2%)	
Working experience	Low (<10)	33 (33.3%)	$\chi^2=9.385$, $df=9$, $p=0.403$
	Medium (11-20)	46 (46.5%)	
	High (>20)	20 (20.2%)	
Knowledge	High(5-9)	51 (51.5%)	$\chi^2=25.585$, $df=12$, $p=0.012***$
	Low (1-4)	49 (48.5%)	

According to the findings in Table 5, 100% of highly educated nurses (those with a higher diploma or a degree) complied with national neonatal resuscitation guidelines. Nurses with high knowledge on resuscitation were therefore more likely to be in compliance with national neonatal resuscitation guidelines.

Table 5 Cross Tabulation of Education on Compliance

		Compliance		Total	
		High Compliance	Low Compliance		
Education	Low	Count	3	7	10
		% within Education	30.0%	70.0%	100.0%
	High	Count	5	0	5
		% within Education	100.0%	0.0%	100.0%
Total	Count	8	7	15	
	% within Education	53.3%	46.7%	100.0%	

DISCUSSION

The study sought to assess nurses' related factors determining compliance to National Neonatal Resuscitation Guidelines among nurses at Pumwani Maternity Hospital. The study found that there was a statistically significant relationship ($\chi^2=11.601$, $df=3$, $p=0.009$) between level of education and compliance. Highly educated nurses were more likely to be in compliance with national neonatal resuscitation guidelines. This is similar to findings of Monebenimp *et al.* (2012) who found that low level of education was associated with poor competence on applying resuscitation tasks. Monebenimp *et al.* (2012) also found a statistically significant relationship between level of knowledge of nurses and neonatal resuscitation.

This study also concluded that there was a statistically significant relationship between knowledge and compliance to NNRG. Chi-square tests on knowledge was statistically significant ($\chi^2=25.585$, $df=12$, $p=0.012$). Nurses with high knowledge were more likely to be in compliance with National neonatal resuscitation guidelines. This finding is in agreement with findings of Reisman *et al.*, (2016) who found that knowledge and skills falloff is a significant barrier to the success of NR training programs and possibly to reducing newborn mortality in LMICs. It is also in agreement with findings of Noor *et al.* (2014) study in Pakistan showed inadequate level of knowledge on neonatal resuscitation amongst obstetrical trainees. The finding is however in disagreement with Ezenduka *et al.* (2017) finding that majority of nurses had very good knowledge of the basic skills needed for the management of birth asphyxia.

Among the nurse-related factors, level of education and knowledge of resuscitation were found to be statistically significant. Lowly educated nurses were found to be non-complaint to resuscitation guidelines. Knowledge was found to be wanting and this influenced compliance to National Neonatal Resuscitation Guidelines. Majority of nurses lacked knowledge on when epinephrine should be used and epinephrine dosage. Pumwani Maternity Hospital therefore needs to introduce a training program on neonatal resuscitation where nurses are subjected to continuous education on neonatal resuscitation. This knowledge could be provided through ongoing and on-the-job training for practicing nurses along with improving taught content within the nursing schools. Also during induction of new nurses. Such a program should emphasise compliance to neonatal resuscitation guidelines.

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