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Preventives measures of nosocomial infections in maternity in the city of Mbujimayi in the DRC

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Abstract
Introduction: The objective of this work is to analyze the main preventive measures that are applied in the maternity wards of the city of Mbujimayi in the DRC for the control of nosocomial infections.
Methods: A survey was carried out by means of a questionnaire sent to the healthcare staff between 12 April and 12 May 2016 in the 231 maternity units of the Health District of the town of MBUJIMAYI.
Results: In relation to the prevention of postpartum nosocomial endometritis, urinary infections, surgical site infections in mothers, as well as cutaneous nosocomial infections, eye infections, cord infections, meningitis and nosocomial sepsis in newborns, Out of a total of 469 nurses surveyed, only 10.4% of nurses performed hand hygiene between two mothers during care. 49% of nurses limit the number of vaginal touches to less than 5 after rupture of the membranes. 1.5% of nurses wear a surgical mask as soon as the membranes rupture for any genital gesture performed against the parturient (vaginal touch, vaginal specimen, childbirth...). 98.9% of nurses do not use multiple premises to carry out eye care for babies. 97.4% of nurses do not realize or wash their hands and do not practice hand-hydroalcoholic friction between the eyes care of 2 babies. Only 2.6% of nurses achieve hand-held hydro-alcoholic friction before manipulating newborns. 57.4% of nurses do not use multiple spaces to carry out eye care for babies.
Conclusion: Nosocomial infection constitutes a significant postpartum over-morbidity in newborns and mothers, a major risk of mortality and a cause of additional costs, linked to the prolongation of stays. The prevention of these infections requires a reorganization of the maternity units according to the norm of safe motherhood and the application of the rules of elementary hygiene.

Keywords: prevention, nosocomial infections, maternity

1. Introduction

The area of birth is considered an infectious risk zone for confinement due to urinary tract infections, surgical site infections and endometritis to which they are exposed. It is also at risk for the newborn because of exposure to ocular, cutaneous and cord infections and early bacterial infection [1]. It is for this reason that nosocomial infections in maternity are a reality concerning both mothers and newborns [2]. However, it is estimated that 5 to 10% of patients acquire infection during their hospital stay. The risk varies according to the service: 28% in intensive care, 7% in surgery or medicine, 1.6% in gynecology and obstetrics. These INs cause at least 10 000 deaths per year and increase the duration of short-stay hospitalization by 2% to 5% [3].

The nosocomial infection constitutes an important over-morbidity in neonatology, a major risk of mortality and a cause of additional costs, linked to the prolongation of stays. In addition, an estimated one million newborn deaths are associated with maternal infections before and during childbirth [4].

Rates of maternal infections range from 0.8% for low births to 2.7% for post-caesarean births. In the newborn, the infection rate is about 0.2%. NIs in maternity are serious because they cause maternal morbidity and excess neonatal mortality. Infection remains the second leading cause of maternal mortality after bleeding [4].

Nosocomial infection exists in maternity, it has a cost, can be prevented, it is not inevitable and is preventable in 30% of cases [6].

It is possible to control the infection rate of mothers and children, to improve the safety of staff by promoting epidemiological surveillance and by applying good pre- and post-delivery hygiene practices and antibiotic prophylaxis [7].

At the global level, the most common intervention to prevent morbidity and mortality from maternal infections is the use of antibiotics for prophylaxis or treatment. However, misuse of antibiotics in the treatment of these conditions and in obstetric procedures, which are believed to involve risks of maternal infections, is common in clinical practice [8].

The prevention of these infections in neonatology requires a reorganization of the service, the standards required in the national perinatal period, the fight against prematurity and the application of basic hygiene rules [4].

The objective of this work is to analyze the main preventive measures that are applied in the maternity wards of the city of Mbujimayi in the DRC for the control of nosocomial infections.

2. Material and Method

A survey was carried out between 12 April and 12 May 2016 in the 231 maternity wards of the Health District in response to a questionnaire sent to healthcare workers concerning the

application of preventive measures for nosocomial infections in childbirths and their children of the town of MBUJIMAYI. A total of 469 nurses were interviewed and 33 variables were entered and entered for this survey on an Excel program with transfer to Epi info version 3.5.1 for analysis. This analysis used the Chi square test for comparisons between two qualitative variables.

3. Results

3.1 Results of descriptive analyzes

Table 1: Distribution of respondents by socio-demographic characteristics

Characteristics	Category	n = 469	%
Gender	Male	159	34
	Female	310	66
Age	20 to 29 years	89	19
	30 to 39 years	170	36,2
	40 to 49 years	99	21,1
	50 to 59 years	60	12,8
	60 years and over	51	10,9
Qualification	Nurse A3	89	19
	Nurse A2	211	45
	Nurse A1	169	36
Seniority	0 to 4 years	199	42,4
	5 to 9 years	110	23,5
	10 to 14 years	69	14,7
	15 years and over	91	19,4
Relationship	single	189	40,3
	Married	280	59,7
Place of work of nurses according to the types of structures	Confessional and private	332	70,8
	Etate	137	29,2

Table 1 shows that female nurses were more represented than nurses, 66% versus 34%. As for age, it varies between 22 and 63 years. The average age of respondents was 40 years and the most represented age group was 30 to 39 years with 36.2%.
In all the subjects surveyed, 45% were A2 graduates, 36% were nurses or A1 (graduates) and 19% were auxiliaries or A3.
The seniority in the nursing profession of the subjects surveyed varies from 1 to 42 years. The average experience was 15 years. The group with seniority of 0 to 4 years was the most represented with 42,4%.
Regarding marital status, the majority of study subjects (59.7%) were married and 40.3% were single.
70.8% of our respondents are employed in religious and private structures, while only 29.2% are in state structures.

Table 2: Prevention of postpartum nosocomial endometritis in postpartum women

Characteristics	Category	n = 469	%
Realization of hand hygiene between two mothers during care,	Yes	49	10,4
	No	420	89,6
The number of vaginal touches limited to less than 5 after rupture of the membranes	Yes	139	29,6
	No	330	70,4
Portal of surgical mask as soon as the membranes rupture for any genital gesture	Yes	7	1,5
	No	462	98,5
Antispsy vulvo perineal before the first vaginal touch	Yes	350	74,6
	No	119	25,4
Use of sterile gloves with long cuffs during uterine revision in eutococcal delivery	Yes	456	97,2
	No	13	2,8
Protection of the uterus by sterile fields when it is externalised in case of caesarean delivery	Yes	270	57,6
	No	199	42,4
Use of antibiotic prophylaxis in cases of caesarean sections, urgent or non-urgent.	Yes	379	80,8
	No	90	9,2

Table 2 shows that only 10.4% of nurses perform hand hygiene between two women who have given birth and 90.6% do not.

- 49% of nurses limit the number of vaginal touches to less than 5 after rupture of the membranes against 51% who realize more than 5.
- 98.5% of nurses do not wear a surgical mask as soon as the membranes rupture for any genital gesture made against the parturient (vaginal touch, vaginal specimen, childbirth...), compared with 1.5% who wear it.
- 74.6% of nurses performed perineal vulvoemia before the first vaginal touch and 25.4% did not.
- 97.2% of nurses use sterile gloves with long cuffs during uterine revision in the case of eutococcal birth versus 2.8% who do not use it.
- 57.6% of nurses protect the uterus by sterile fields when it is externalised in case of delivery by Caesarean section and 42.4% do not do this. While 80.8% of these nurses use antibiotic prophylaxis in the case of caesarean sections, urgent or non-urgent, compared with 19.2% who do not.

Table 3: Prevention of urinary nosocomial infections in mothers

Characteristics	Category	n = 469	%
Limit the indications of bladder sampling in women who have given birth	Yes	453	96,6
	No	16	3,4
Use the closed drain in case the bladder sounding is imperious?	Yes	431	91,9
	No	38	8,1
Observe asepsis in case of evacuating sounding	Yes	428	91,4
	No	41	8,6
Have a habit of increasing drinks for forced diuresis in mothers	Yes	349	74,4
	No	120	25,6

Table 3 reveals that 96.6% of nurses limit the indications of bladder sampling in mothers and 3.4% of nurses do not pay attention to this state of affairs. Those of the nurses who use the closed drain in case the bladder sounding is imperious represent 91.9% against 8.1% who never think of it.

- 100% of nurses observe asepsis in the case of an evacuating poll, while only 19.4% of nurses are used to increase drinks for forced diuresis in women who have given birth to 80, 6% who do not even think about it.

Table 4: Prevention of nosocomial infections of the surgical site in mothers

Characteristics	Category	n = 469	%
To evaluate the relevance of the caesarean before deciding it in a parturient	Yes	420	89,6
	No	49	10,4
Carry out the conformal skin preparation of the parturient before the Caesarean section	Yes	450	95,9
	No	19	4,1
Use antibiotic prophylaxis to prevent infection of Caesarean wounds?	Yes	451	96,1
	No	18	3,9
Ensure the dressing with strict asepsis at each step	Yes	430	91,7
	No	39	8,3
Surveillance of surgical site infections (observe the condition of the dressing before the 5th day, press the wound during the dressing)	Yes	399	85,1
	No	70	14,9

Table 4 shows that 99.1% of nurses do not evaluate the relevance of Caesarean section before deciding it in a parturiente, and 0.9% of nurses do the assessment and discuss it with the doctor.

- 83.4% of nurses perform the conformal cutaneous preparation of the parturiente before the caesarean section compared to 16.6% which shave the operative region.
- 96.1% of nurses used antibiotic prophylaxis for prevention of Caesarean section wounds and 3.9% did not.
- 43.5% of nurses ensure the dressing with respect for strict asepsis at each stage against 56.5% who do not pay much attention.
- 88.1% of nurses supervise surgical site infections (observe the condition of the dressing before the 5th day, press the wound during the dressing) while 11.9% of nurses do not perform these procedures.

Table 5: Prevention of cutaneous nosocomial infections in Newborns

Characteristics	Category	n = 469	%
Early detection of skin infections in newborns	Yes	439	93,6
	No	30	6,4
Wash hands when caring for newborns and ensure environmental hygiene	Yes	429	91,5
	No	40	4,5
Hydroalcoholic friction of the hands before handling the newborn	Yes	11	2,6
	No	457	97,4

Table 5 shows that 93.6% of nurses are screening for newborn skin infections early, compared with only 6.4% who are considering this.

- 84% of nurses encourage hand hygiene (washing) in newborn care and environmental hygiene, compared with 16% who make no effort.
- 97.4% of nurses do not realize a hydro-alcoholic friction of the hands before handling the newborn, except 2.6% who practice this gesture.

Table 6: Prevention of Ocular Nosocomial Infections in Newborns

Characteristics	Category	n = 469	%
Use several rooms to carry out eye care for babies	Yes	200	42,6
	No	269	57,4
Wash hands or disinfect by hand friction between eye care of 2 babies	Yes	20	4,3
	No	449	95,7

Table 6 shows that 57.4% of nurses do not use multiple premises to carry out eye care for babies and 42.6% make an effort to use several premises.

- 97.4% of nurses do not realize or wash their hands and do not practice hydro-alcoholic hand friction between the eye care of 2 babies, except 2.6% who practice this gesture.

Table 7: Prevention of nosocomial cord infections in Newborns

Characteristics	Category	n = 469	%
Antisepsis the front section cord and use a new pair of sterile scissors to cut the cord	Yes	13	2,8
	No	456	97,2
Know and use the antiseptic of choice for the care of the cord	Yes	41	8,7
	No	428	91,3
Wash your hands or perform disinfection by hand friction between the care of the cord of 2 babies	Yes	11	2,6
	No	457	97,4

From Table 7, we find that 97.2% of nurses do not antisepsis the cord before its section and do not use a new pair of sterile scissors to cut the cord, but except 2.8% pose properly.

- 91.3% of nurses do not know and do not use the antiseptic of choice for cord care, but nevertheless 8.7% know this antiseptic of choice and use it.
- 97.4% of nurses do not realize, do not wash their hands and do not practice hydro-alcoholic friction of the hands between care of the cords of 2 babies, except 2.6% who practice this gesture.

Table 8: Prevention of septicemia and nosocomial meningitis in Newborns

Characteristics	Category	n = 469	%
Practice the isolation of cases of neonatal infection	Yes	328	69,9
	No	141	30,1
Ensure asepsis for other invasive procedures in newborns	Yes	456	97,2
	No	13	2,8
Opt for the promotion of vaccination of N.N against meningitis in maternity	Yes	243	51,8
	No	226	48,2

Table 8 shows that 69.9% of nurses practice the isolation of cases of neonatal infection and 30.1% of nurses do not.

- 97.2% of nurses ensure asepsis in the case of other invasive procedures in the newborn as against 2.8% who do not care for this asepsis.
- 100% of nurses do not opt for promotion of N.N vaccination against meningitis at maternity

3.2 Results of bi-varied analyzes

Table 9: Relationship between the type of the structures and certain characteristics, actions of the personnel in relation to the prevention of the nosocomial infections in the delivered ones.

Characteristics of personnel	Category	Structural Types		X^2	p	S
		Private and Conventional	Etate			
1. Socio-demographics character						
Qualification	Nurse A3, A2	180	120	19,9	0,000	S
	Nurse A1	152	17			
Seniority	less than 15	252	126	1,19	0,274	NS
	better than 15	80	11			
2. Prevention of Endometritis						
The use of antibiotic prophylaxis in cases of caesarean sections, urgent or non-urgent.	Yes	269	130	0,34	0,556	NS
	No	63	7			
Realization of hand hygiene between two mothers during care.	Yes	49	0	60,0	0,000	S
	No	283	137			
Portal of surgical mask as soon as the membranes rupture for any genital gesture	Yes	7	0	97,9	0,000	S
	No	325	137			
Antiseptic vulva perineal before the first vaginal touch	Yes	219	131	42,9	0,000	S
	No	113	6			
Use of sterile gloves with long cuffs during uterine revision in eutococcal delivery	Yes	322	134	15,4	0,000	S
	No	10	3			
Protection of the uterus by sterile fields when it is externalised in case of delivery by Caesarean section	Yes	215	55	42,6	0,000	S
	No	117	82			
The number of vaginal touches limited to less than 5 after rupture of the membranes	Yes	99	40	25,1	0,000	S
	No	233	97			
3. Prev. Inf. Surgical site						
Ensure the dressing with strict asepsis at each step	Yes	312	118	2,49	0,114	NS
	No	20	19			
Surveillance of surgical site infections (observe the condition of the dressing before the 5th day, press the wound during the dressing)	Yes	282	117	3,34	0,067	NS
	No	50	20			
Assess the relevance of the caesarean before deciding it in a parturient	Yes	312	108	11,0	0,000	S
	No	20	29			
Perform the dermal preparation of the parturiente prior to caesarean section	Yes	322	128	1,19	0,274	NS
	No	10	9			

4. Prev. Urinary tract infections						
Limit indications of bladder sampling in women who have given birth	Yes	316	137	19,9	0,000	S
	No	16	0			
Use the closed drain in case the bladder survey is imperative?	Yes	301	130	2,46	0,116	NS
	No	31	7			
Observe asepsis in the case of an evacuating sounding	Yes	312	116	2,49	0,114	NS
	No	20	21			
Have a habit of increasing drinks for forced diuresis in mothers	Yes	262	87	0,73	0,390	NS
	No	70	50			

NS: not significant S: significant

Table 9 shows that the differences between the type of the structures and some measures of prevention of hospital-acquired infections posed by staff in the women who have given birth are significant. Therefore, the type of the structures promotes the few actions taken to prevent nosocomial infections in staff. This means that a few positive gestures with an P below 0.05 in the above table are more likely to be performed by staff working in conventional maternity wards than in private and state maternity wards.

Table 10: Relationship between the type of the structures and certain characteristics, actions of personnel in relation to the prevention of nosocomial infections in Newborns.

Characteristics of personnel	Category	Structural Types		X^2	p	S
		Private and Conventional	Etate			
1. Socio-demographics character.						
Qualification	Nurse A3, A2	180	120	19,9	0,000	S
	Nurse A1	152	17			
Seniority	less than 15	252	126	1,19	0,274	NS
	better than 15	80	11			
2. Prev. Skin infections						
Early detection of skin infections in newborns	Yes	312	127	14,8	0,000	S
	No	20	10			
Wash hands when caring for newborns and ensure environmental hygiene	Yes	292	137	4,0	0,043	S
	No	40	0			
Hydroalcoholic friction of the hands before handling the newborn	Yes	8	3	13,6	0,000	S
	No	324	134			
3. Prev. Eye infections						
Use multiple spaces to carry out eye care for babies	Yes	83	117	6,8	0,008	S
	No	249	20			
Wash hands or hand rub disinfection between eye care of 2 babies	Yes	20	0	1,4	0,226	NS
	No	312	137			
Antisepsis the front section cord and use a new pair of sterile scissors to cut the cord	Yes	13	0	55,7	0,000	S
	No	319	137			
Know and use the antiseptic of choice for cord care	Yes	31	10	14,8	0,000	S
	No	301	127			
Wash hands or disinfection by hand friction between 2 baby babies	Yes	10	1	99,6	0,000	S
	No	322	136			
4. Prev. Meningitis and septicemia Practice the isolation of cases of neonatal infection	Yes	327	1	76,3	0,000	S
	No	5	136			
Ensure asepsis for other invasive procedures in newborns	Yes	319	137	0,3	0,557	NS
	No	13	0			
Opt for the promotion of immunization of N.N against meningitis at maternity	Yes	220	23	2,7	0,09	NS
	No	112	114			

NS: not significant S: significant

Table 10 also shows that the differences between the type of structures and some measures of prevention of nosocomial infections posed by staff in Newborns are significant. Therefore, the type of structures promotes the prevention of nosocomial infections in staff. This means that a few positive gestures with a P below 0.05 in the above table are more likely to be performed by staff working in conventional maternity wards than in private and state maternity wards.

4. Discussion

4.1 Of the prevention of nosocomial endometrities of the post-partum in birthdays

Out of a total of 469 nurses surveyed, only 10.4% of nurses performed hand hygiene between two nurses during care. 49% of nurses limit the number of vaginal touches to less than 5 after rupture of the membranes. 1.5% of nurses wear a surgical mask as soon as the membranes rupture for any genital gesture performed against the parturient (vaginal touch, vaginal specimen, childbirth...). Our findings corroborate the study conducted by Bianco A, Roccia S, Nobile [8] who found that endometritis during the period of delivery was the most frequent; This is explained by the presence of several risk factors during this phase: premature rupture of the pocket of the waters, the environment of care, the practices of the providers of care including the multiple vaginal examinations.

4.2 For the prevention of nosocomial infections of the situation in births

96, 6% of nurses limit the indications of bladder sampling in mothers. Nurses who use the closed drain in the event that the bladder sounding is imperious represent 91.9%, 91.4% of nurses observe asepsis in the case of an evacuating sounding and 74.4% Habit of increasing drinks for forced diuresis in mothers. These results confirm the ideas of Ayzac L, Caillat-Vallet E, Haond C *et al*. [9] which stipulates that a successful evacuating sound in low-level deliveries reduces the risk of contamination of urinary nosocomial infections.

4.3 For the prevention of nosocomial infections of the situation in births

Overall, 89.6% of nurses evaluated the appropriateness of cesarean section before deciding it in a parturiente, 95.9% of nurses performed the conformant dermal preparation before the caesarean section and 96.1% of nurses use antibiotic prophylaxis to prevent infection of cesarean wounds. These results are consistent with the idea of F. Barbut *et al*. Which [10] stipulates that continuous monitoring of the ISOs ensures awareness among healthcare providers about the risk of infection, identification of risk factors for infection and regular evaluation of practices? Such an approach contributes to the prevention of nosocomial infections. The same idea is supported by Corcoran S *et al* [11].

4.4 On the prevention of nosocomial infections in the news

93.6% of nurses do not realize a hydro-alcoholic friction of the hands before manipulating the newborn for the prevention of cutaneous infections in the newborn, or Bataillon. S [12] advocates the organization of care, screening Early and isolation of cases, hand and environmental hygiene and disinfection of equipment as the main nosocomial prevention measures in newborns.

4.5 On the prevention of eye nosocomial infections in the news

57.4% of nurses do not use multiple spaces to carry out eye care for babies. 95.7% of nurses do not realize or wash their hands and do not practice hydro-alcoholic hand friction between the eyes care of 2 babies. These findings work in tandem with the findings of N. Chabni *et al*., [13] in which the census of infections identifies the relative frequency of the different infected sites and the main risk factors associated with them. This is an essential step and a prerequisite for any preventive action. This should be organized around the prevention of infection in the newborn with the care of the caregivers of the caregivers in the foreground, the use of drugs in single dose or for individual use (antiseptics, eye drops), Disinfection of shared equipment (changing tables, baby scales);

4.6 On the prevention of nosocomial infections of the cord in the news

97.2% of nurses do not antisepsis the cord before its section and do not use a new pair of sterile scissors to cut the cord.

91.3% of nurses do not know and do not use the antiseptic of choice for cord care.

97.4% of nurses do not realize or wash their hands and do not practice hydro-alcoholic hand friction between the care of the cord of 2 babies, except 2.6% who practice this gesture. While Danzmann L, Gastmeier P, Schwab F *et al* [14] also advocates the realization of hand-held hydro-alcoholic friction on the part of nursing staff considered to be responsible for large nosocomial epidemics and this is above all a gesture of manipulation of the newborn, Antisepsis of the front cord section and use of a pair of sterile scissors to cut the cord.

4.7 Prevention of nosocomial septicemics and meningities in the news

69.9% of nurses practice the isolation of neonatal infections, 97.2% of nurses ensure asepsis for other invasive procedures in the newborn and 51.8% Nurses opt for promotion of NN vaccination against meningitis at maternity. These results are consistent with those of Ayzac L., Battagliotti P, Berland M *et al*. [15] of the published Mater report showing that the staff had a special attention for the respect of the asepsis during the invasive actions in the newborn.

5. Conclusion

The nosocomial infection constitutes a significant postpartum over-morbidity in newly-infected women and children, a major risk of mortality and a cause of additional costs linked to the prolongation of stays.

Prevention and awareness-raising actions, regularly monitored by impact surveys, are essential to combat this disease. Simple monitoring greatly decreases the IN Sécher *et al* [16].

Indeed, it has been clearly observed that the type of structures favors the implementation of the few preventive measures for nosocomial infections in staff. This means that some positive gestures with a P of less than 0.05 are more likely to be performed by staff working in conventional maternity units than in private and state-run maternity wards. We hope that information, awareness and training of staff and the reorganization of maternity homes according to the norm of safe motherhood accompanied by the application of the rules of basic hygiene can contribute effectively to the prevention of nosocomial infections.

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