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PUBLISHED BY:

Global Emerging Pathogens Treatment Consortium

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Health Professionals' Knowledge of Amniotic Membrane Banks in Côte d'Ivoire

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ABSTRACT

The amniotic membrane is a thin membrane located on the inside of the placenta. It is widely used to treat several conditions. Its therapeutic value in the biomedical field requires the creation of a biological database. The creation of this bank requires the participation of healthcare staff. This study aimed to assess the knowledge of healthcare professionals about the biobank and the conservation of amniotic membrane for use in research and therapy in Côte d'Ivoire. A cross-sectional survey was conducted among healthcare professionals. The survey included questions on participants' professional profiles, their knowledge of the biobank, its role and activities, and the use of amniotic membrane tissue in research and therapy. A total of 215 people took part in the survey, 64.2% of whom said they had never heard of a biobank before. Only 35.3% of participants were aware of the role and activities of a biobank. Regarding the storage of amniotic membrane in a biobank for diagnosis, treatment, and research, only 32.1% of respondents were aware of this. Bivariate analysis showed that function (intern: OR=1.11; 95% CI [0.26- 4.35], midwife: OR=16.2; 95% CI [6.71-45.8], trainee: OR=19.4; 95% CI [4.55 109], and length of professional experience (1 5: OR=2.01; 95% CI [1.09- 3.82], "< 1 year": OR=12.4; 95% CI [2.41- 227],) were associated with knowledge of amniotic membrane preservation and its use for research and therapy. The healthcare professionals surveyed had limited knowledge of biobanks in general and amniotic membrane preservation in particular. However, the majority had a positive attitude towards amniotic membrane donation for research and therapeutic purposes.

Keywords: Knowledge; Biobank; Amniotic Membrane; Health Professional; Ivory Coas.

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GET Journal of Biosecurity and One Health (2025) 4(1) 12-19.
DOI: 10.36108/GJOBOH/5202.40.0120

INTRODUCTION

The development of the foetus is ensured by a complex system consisting of the umbilical cord, the amniotic fluid, and the placenta. The foetal membranes are made up of two layers: an outer layer (chorion) and an inner layer called the amniotic membrane (AM). The AM is a thin membrane on the inner surface of the placenta; it surrounds the foetus and delimits the amniotic cavity, which is filled with amniotic fluid [1,2]. The many years of research into the functions, structure, and properties of AM have led to several applications in the field of regenerative medicine. At the beginning of the 20th century, AM was first used by Davis for skin transplantation [3]. Subsequently, it was widely used in the treatment of burns [4,5], for surgical dressings [6,7], for surgical reconstruction of the bladder [8], and in the treatment of several other pathologies [9-13]. In view of the therapeutic interest of AM in the biomedical field worldwide, placental membrane banks have been set up in both developed [14] and developing countries [15].

Côte d'Ivoire, a developing country, has a Biological Resource Centre (CeReB) and a cell biology laboratory hosted by the Institut Pasteur. Despite its efforts in biobanking, the country has no AM bank. Setting up such a bank requires the participation of healthcare staff and people willing to donate their placenta and associated data. This is only possible if there is a good understanding of the issues surrounding the AM bank. To date, very few studies have assessed healthcare professionals' knowledge of these issues. The main objective of this study was to assess healthcare professionals' knowledge of biobanking and amniotic membrane preservation and its use in research and therapy.

METHODOLOGY

Setting and Type of Study

This was a cross-sectional study conducted from 28 July to 05 November 2022 at the Centre Hospitalier Universitaire de Cocody (CHU). The Centre Hospitalier Universitaire de Cocody is a third-level public referral hospital inaugurated in June 1970, located in Abidjan, Côte d'Ivoire. It became a Public Industrial and Commercial Establishment (EPIC) on 6 June 1984. The mission of the CHU de Cocody is to provide curative and preventive health care, initial and continuing training for health care staff, and medical, pharmaceutical, and odontological research. The CHU de Cocody has several medical departments, including the Gynaeco obstetrics and Paediatrics Unit. This department strengthens the healthcare offer by increasing the capacity to care for women, newborns, children and adolescents. It has 228 beds, including 112 inpatient beds, 23 emergency beds, and 18 intensive care beds.

Our study population was Healthcare professionals in the gynaecology-obstetrics department of the CHU of Cocody. All staff in the gynaecology-obstetrics department of CHU de Cocody were eligible to take part in the study. All healthcare professionals (hospital interns, gynaecologists, midwives, and trainees) belonging to the gynaecology-obstetrics department of the CHU de Cocody who were present at the time of the visit and who had given their consent were included in the study.

Form and Data Collection

Sampling was opportunistic. All eligible people were contacted during normal working hours over the study period. The questionnaire was administered to staff during a brief interview on the study's purpose.

Statistical Analysis

The data were entered and analysed using EpiData 3.1 and Stata 11, respectively. Descriptive analysis (univariate, bivariate) was used. Statistical tests (Pearson's Chi-square or Fisher) were used, at the 95% confidence level, to test the existence of a statistical link between each of the professional profile variables and the following variables: "knowledge of the role of a biobank" and "knowledge of the conservation and use of the amniotic membrane". The results are presented as Odds Ratios (ORs) showing the gross effects of 'knowledge of the role of a biobank' and 'knowledge of the conservation and use of the amniotic membrane' on the professional profile variables.

Ethical Conditions

Measures were taken to ensure the study was conducted ethically. In fact, the survey only began after obtaining authorization from the director of the CHU de Cocody. In addition, the information was collected with participants' consent and in strict confidentiality, and the results were reported anonymously and coded.

RESULTS

Occupational Characteristics of Participants The occupational characteristics of participants are shown in Table 1. A total of 215 people took part in the study, of whom 79.1% were women. The majority (63.30%) were midwives. The average age of professional experience was 5.37 ± 4.13 years, with a range of 0 to 20 years. More than half (50.6%) of the participants had more than 5 years' professional experience.

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Table 1: Respondents' Occupational Profile

Characteristics	Numbers	Percentage (%)
Functions of participants		
Hospital interns	25	11.6
Gynaecologists	41	19.1
Midwives	136	63.3
Interns	13	6
Sex		
Male	45	20.9
Female	170	79.1
Duration of work experience		
<1 year	17	7.9
1- 5 years	72	33.5
>5 years	126	58.6

General Knowledge of the Biobank

Just over a third (35.8%) of participants said they had already heard of a biobank, and just over half (54.7%) had heard of it for the first time during the training courses. As regards the role and activities of a biobank, 35.3% of participants provided an exact answer: the collection, processing, preservation, and provision of samples with their associated data. However, 67.4% were unaware of the importance of sample traceability in the biobanking process.

As for the Institut Pasteur de Côte d'Ivoire biobank, only 2.3% reported being aware of its existence. As for the regional biobank of ECOWAS countries, only 1.4% were aware of its existence. The bivariate analysis (Table 3) showed that function (internist: OR=1.60; 95% CI [0.49- 5.20], midwife: OR=18.3; 95% CI [7.89-47.2], reference = "gynaecologist") and length of professional experience ([1 5[: OR=2.01; 95% CI [1.09- 3.82], '< 1 year': OR=12.4; 95% CI [2.41-227]; reference = '>= 5years') were statistically associated with knowledge of the role of a biobank.

Knowledge of Amniotic Membrane Storage and Its Use in Research and Therapy

The results (Table 4) showed that none of the participants stored amniotic membranes within their healthcare establishment. As regards knowledge of amniotic membrane storage for research, diagnosis, and treatment, 67.9% said they were unaware of it. However, the majority (84.7%) would agree to donate the placental membrane for therapy and research purposes. Of the participants who refused to donate their amniotic membrane, just under half (48.50%) explained their refusal by cultural reasons.

Bivariate analysis (Table 5) showed that function (intern: aOR=1.11; 95% CI [0.26- 4.35], midwife: aOR=16.2; 95% CI [6.71-45.8], trainee: aOR=19.4; 95% CI [4.55-109], reference = "Gynaecologist") and length of professional experience ([1 5[: aOR=2.01; 95% CI [1.09- 3.82], '< 1 year': aOR=12.4; 95% CI [2.41- 227], reference = '>= 5years') were associated with knowledge of amniotic membrane preservation and its use for research and therapy.

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Table 2: General Knowledge of Biobanking

Variables	Numbers	Percentage (%)
Have you ever heard of a biobank?		
Yes	77	35.8
No	138	64.2
If so, where have you heard of it before?		
Mass media	12	15.6
Get to work	4	5.2
During a training course	42	54.5
From a health worker	3	3.9
With a loved one	2	2.6
More than one source of information	14	18.2
Knowledge of the role and activities of a biobank		
Yes	76	35.3
No	139	64.7
In your opinion, sample traceability Does it play a role in the biobanking process?		
Yes	70	32.6
No	145	67.4
Did you know that Côte d'Ivoire has a Biobank?		
Yes	5	2.3
No	210	97.7
Did you know that the Institut Pasteur de Côte d'Ivoire houses the regional biobank for ECOWAS member countries?		
Yes	3	1.4
No	212	98.6

Table 3: Knowledge of Biobank Activities by Occupational Profile

Characteristics	Knowledge of the role and activities of a biobank			Bivariate analysis		
	Yes n (%)	No n (%)	Total n (%)	OR[2]	95% CI[2]	p-value
Function						<0.001
Gynaecologists	33 (80%)	8 (20%)	41 (100%)	—	—	
Hospital interns	18 (72%)	7 (28%)	25 (100%)	1.60	0.49- 5.20	
Midwife	25 (18%)	111 (82%)	136 (100%)	18.3	7.89-47.2	
Trainee	0 (0%)	13 (100%)	13 (100%)	7.351	0.00, NA	
Duration of the experience professional						<0.001
>= 5 years	55 (44%)	71 (56%)	126 (100%)	—	—	
[1 5[	20 (28%)	52 (72%)	72 (100%)	2.01	1.09- 3.82	
< 1 year	1 (5.9%)	16 (94%)	17 (100%)	12.4	2.41- 2.27	

1 n (%)
2 OR = Odds Ratio, CI = Confidence Interval
NA = not applicable

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Knowledge of amniotic membrane storage and its use in research and therapy

The results (Table 4) showed that none of the participants stored amniotic membranes within their healthcare establishment.

As regards knowledge of amniotic membrane storage for research, diagnosis, and treatment, 67.9% said they were unaware of it. However, the majority (84.7%) would agree to donate the placental membrane for therapy and research purposes. Of the participants who refused to donate their amniotic membrane, just under half (48.50%) explained their refusal by cultural reasons.

Bivariate analysis (Table 5) showed that function (intern: aOR=1.11; 95% CI [0.26- 4.35], midwife: aOR=16.2; 95% CI [6.71-45.8], trainee: aOR=19.4; 95% CI [4.55-109], reference = "Gynaecologist") and length of professional experience ([1 5[: aOR=2.01; 95% CI [1.09- 3.82], '< 1 year': aOR=12.4; 95% CI [2.41- 227], reference = '>= 5years') were associated with knowledge of amniotic membrane preservation and its use for research and therapy.

Table 4: Knowledge of amniotic membrane conservation and its use for research and therapy, and the perception of donating amniotic membrane samples.

Variables	Numbers	Percentage (%)
Do you store placental membrane tissue?		
Yes	0	0
No	215	100
Did you know that the placental membrane is used for research purposes?		
Yes	95	44.2
No	120	55.8
Did you know that the amniotic membrane is held in a bank for diagnosis, treatment, and research?		
Yes	69	32.1
No	146	67.9
Would you be willing to donate placental membrane samples for scientific research?		
Yes	182	84.7
No	33	15.3
If not, why don't you want to do Donation of placental membrane samples?		
Cultural Reason	16	48.5
Personal Reason	8	24.2
Religious Reason	6	18.2
Cultural and Religious Reason	3	9.1

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Table 5: Knowledge of amniotic membrane conservation and its use in research and therapy, according to professional profile

Characteristics of the participants	Knowledge of the preservation of the amniotic membrane and its use for research and therapy purposes			Bivariate Analysis		
	Yes, n (%)	No, n (%)	Total, n (%)	OR[2]	95% CI[2]	p-value
Function						<0.001
Gynaecologists	35 (85%)	6 (15%)	41 (100%)	—	—	
Hospital interns	21 (84%)	4 (16%)	25 (100%)	1.11	0.26- 4.35	
Midwife	36 (26%)	100 (74%)	136 (100%)	16.2	6.71-45.8	
Trainee	3 (23%)	10 (77%)	13 (100%)	19.4	4.55-109	
Duration of the experience professional						0,020
>= 5 years	65 (52%)	61 (48%)	126 (100%)	—	—	
[1 5[	26 (36%)	46 (64%)	72 (100%)	1.89	1.05- 3.45	
< 1 year	4 (24%)	13 (76%)	17 (100%)	3.46	1.15- 12.8	

[1] n (%)

[2] OR = Odds Ratio, CI = Confidence Interval

DISCUSSION

This cross-sectional study provides an overview of the knowledge of healthcare professionals working in obstetrics and gynaecology regarding biobanks and the use of AM in research and therapy. Only 35.5% of participants were aware of the role and activities of a biobank. Regarding the use of AM in research and therapy, only 32.1% of respondents were aware of it.

The results of this study showed that the majority of participants (64.2%) had never heard of a biobank. These results corroborate those of Kintossou [16] and Chen [17], whose studies were conducted in Côte d'Ivoire and China, respectively. The limited knowledge of the biobank in the professional environment could be explained by the fact that it is a concept that is rarely discussed during medical training courses. In fact, only 19.5% claim to have heard of biobanking in Côte d'Ivoire. In the study by Kintossou [16], some participants defined the biobank as a savings structure reserved for biologists.

Although the participants in this study knew very little about the use of AM in the health sector, the majority stated they would be willing to donate a placenta. This suggests that healthcare professionals are willing to participate in establishing an AM bank in Côte d'Ivoire. Understanding potential participants' perceptions of biological sample donation is a fundamental step for the success of any AM sample and data collection campaign. The perception among healthcare professionals who refused to donate AM indicates the presence of religious and cultural barriers. Like blood donation, AM donation is certainly associated symbolically with cultural affiliations within which it is not given to a stranger [18].

Moreover, in many cultures, the future of AM is linked to the future of the human being who has just been born [19]. The creation of an AM bank will require the participation of motivated individuals, including healthcare professionals, who are prepared to donate biological samples and offer data [20,21]. Understanding potential participants' perceptions of AM donations will be a fundamental step toward successfully creating an AM bank.

This study had a number of limitations. The people included in our sample are not representative of all healthcare professionals in Côte d'Ivoire. Consequently, these results may not be extrapolable to the entire target population. Another limitation is that we did not ask participants whether they would agree to take part in setting up an AM bank. Finally, our statistical analysis led us to calculate only crude ORs, which could be subject to confounding bias.

However, these results are of particular interest insofar as we aimed to gather information on healthcare professionals' knowledge of the conservation and use of AM for research and therapeutic purposes. Qualitative studies are needed to understand the perceptions of healthcare professionals and the general public about AM donation.

CONCLUSION

Healthcare professionals' knowledge of amniotic membrane banks and their uses in the biomedical field is limited. There are also cultural and religious barriers to amniotic membrane donation among these professionals. Setting up such a bank will require taking into account both the country's socio-cultural particularities and the legal framework in force.

ACKNOWLEDGMENTS
We would like to thank Professor Dossou Mireille, Professor of Microbiology at the UFR des Sciences Médicales of the Université Félix Houphouët Boigny and Director of the Institut Pasteur de Côte d'Ivoire, for her help in preparing and carrying out this work. We would also like to thank the Biobank and the Department of Epidemiology and Clinical Research of the Institut Pasteur de Côte d'Ivoire, as well as the health workers who took part in the study.

AUTHORS' CONTRIBUTIONS
OKA designed, performed the methodology, and data analysis. The manuscript was written and edited by OKA, KKA, and NDM. OKA, KKA, and KKM collected the data. NDM participated in the data analysis. AA and DM participated in the study design and reviewed the manuscript. All authors contributed to the article and approved the submitted version.

DECLARATION OF COMPETING INTEREST
The authors declare that they have no known competing financial interests or personal relationships that might appear to influence the work reported in this article.

LIST OF ABBREVIATIONS
CHU: Centre Hospitalier et Universitaire; AM: Amniotic membrane; CeReB: Biological Resource Centre; OR: Odds Ratio; Public Industrial and Commercial Establishment (EPIC); ECOWAS: Economic Community of West African States.

FUNDING
This research was not funded by any organization.

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