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RESEARCH ARTICLE

ASSESSMENT OF THE OBSTETRICAL AND ANTHROPOMETRIC PARAMETERS OF WOMEN IN LABOR AND THEIR NEWBORNS AT A TRIBAL HEALTH CENTER IN NORTHERN CÔTE D'IVOIRE

[1]Guehi Zagocky Euloge, [*,2]Dago Dougba Noel, [3]Tehoua Lazare and [4]Yangni-angatekoffi Hervé

[1]Unité de Formation et de Recherche (UFR) des Sciences Sociales, Département de Sociologie et d'Anthropologie, Université Peleforo Gon Coulibaly, BP1328 Korhogo, Côte d'Ivoire
[2]Unité de Formation et de Recherche (UFR) des Sciences Biologiques, Département de Biochimie-Génétique, Université Peleforo Gon Coulibaly, BP 1328 Korhogo, Côte d'Ivoire
[3]Unité de Formation et de Recherche (UFR) des Sciences Biologiques, Département de Biologie Animale, Université Peleforo Gon Coulibaly, BP 1328 Korhogo, Côte d'Ivoire
[4]Unité de Formation et de Recherche (UFR) des Sciences Médicales, Université Alassane Ouattara de Bouaké, Côte d'Ivoire

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ABSTRACT

Objective: The purpose of this study is to evaluate the correlations between obstetrical and anthropometrical parameters of women in labor and the anthropometrical features (weight, height, and cranial perimeters) of their newborns instantly after deliverance at a tribal health center in the northern Côte d'Ivoire. **Methods:** It is a descriptive prospective and analytical study carried during five months at the maternity department of the tribal health center of Tioroniaradougou in the rural area of Korhogo, including 201 women in labor and their 202 newborns. Data were collected by the help of the medical team of the maternity of the center through an anthropometrical survey with two of the subject categories and structured individual interview with the mothers. Then, collected data were submitted to a multivariate statistical analysis with the purpose to link mother obstetrical and anthropometrical features with the newborn anthropometric characteristics. **Results:** findings exhibited an apparent correlation on the one hand between (i) newborn cranial perimeters, newborn weight and mother weight as well as between (ii) mother weight and newborn weight ($p<0.1$). Results also revealed a significant correlation between mothers' age, number of living-born children and pregnancies' number ($p<0.05$). Multiple linear regression model as well as Chi squared test exhibited a significant predicting relationship between both newborn cranial perimeter and height parameters ($p<0.05$) and excluded the combination of both mother weight and height features as an acceptable factors in predicting child anthropometrical status ($p = 0.45$) as opposed to mother correct vaccine status and as well negative HIV/AID Sstatus (x-squared = 168, $p = 0.01$). **Conclusions:** as a whole, this survey suggested that maternal medical, obstetric and anthropometric parameters are reliable factors in explaining and predicting anthropometric status of newborns. Indeed, it shown that mother's age, height, weight and number of contracted pregnancies and as well correct mother vaccine status are satisfactory predictive parameters on the outcome of the pregnancy.

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INTRODUCTION

Despite a considerable endeavor and an international dynamism during these last years about maternal and child health (Lawn J, Shibuya K, Stein C, 2005), neonatal mortality still represents a significant part of the children death in sub-Saharan Africa and in many developing countries (Beck L., 2009). Neonatal mortality in those areas is one of the main challenges to take in order to achieve the Millennium Development Goals (MDGs). According to WHO (WHO, 2004 and WHO, 2005) twenty children under 5 years old die each minute. That figure approximately equals 30.000 children each day and 10.6 million children each year. The most vulnerable are the children under one month old (Lawn J, 2004). Nearly 4 million newborns among children who die each year. About 99% of deaths under 5 years old, in the world, occur in low or average income countries.

Corresponding author: Dago Dougba Noel
Unité de Formation et de Recherche (UFR) des Sciences Biologiques, Département de Biochimie-Génétique, Université Peleforo Gon Coulibaly, BP 1328 Korhogo, Côte d'Ivoire.

In sub-Saharan Africa 17.2% children die under five years old against 10.1% in South Asia and 6.2% in North Africa (Dillon, 2003). In Côte d'Ivoire, the national data deriving from demographical and sanitary surveys of 2016 show that 33/1000 newborns die before the age of one month (INS, 2017). The same data indicate that a death rate among newborns under the age of one month, especially in the north of the country is 53/1000. Accordingly, it is a legitimate worry to explain the underlying factors to that higher mortality of newborn in those countries. The most frequent determinants reported by the literature are demographic, socio-economic, sanitary (Barbieri, 1991; Beck L., 2007; Gaimard, 2008) mothers' health quality, health behavior (Dumas A. *et al*, 2014) and obstetrical antecedents (Ravaoarisoa *et al*., 2014). This study is part of the research on the informative value of mother's miscellaneous anthropometrical and obstetrical parameters in predicting pregnancy outcome and the anthropometrical features of the newborn in sub-Saharan Africa. Specifically, it aims at evaluating the correlations between obstetrical and anthropometrical parameters of women in labor and the anthropometrical features (weight, height, and cranial perimeters) of their newborns instantly after deliverance at a tribal health center in the northern Côte d'Ivoire.

MATERIALS AND METHODS

Experimental site: Participants to this study were recruited at the maternity of the Baptist hospital of Tioroniaradougou, situated in the rural area of Korhogo (northern of Côte d'Ivoire). The site is located between an average altitude of 392 meters between -5 ° 34 '31" and - 5 ° 29' 34 " West longitude and between 9 ° 31 '23" and 9 ° 31' 32 " latitude North and 5°38' 83.2" at an average altitude and is at 10 Km from Korhogo. The Hospital Baptist is a tribal health center covering 40 villages of Korhogocountryside's of Tioroniaradougou and Dassoungboho. These villages are mainly populated by farmers' ethno-linguistic group named Sénoufo. Speakers of Sénoufo live in West-Africa, particularly in Burkina Faso, in the southern Mali (in Sikasso), in the northern Côte d'Ivoire around the cities of Boundiali, Tingréla and Korhogo.

Sample Population: The population of this study was constituted of women in labor originated from Senoufo farming communities of Tioroniaradougou and Dassoungbohoat the maternity of Baptist hospital of Tioroniaradougou and their new born recruited instantly after deliverance. The main criteria of participants' selection for this study were mothers' consent and possession of a medical file at the department of prenatal care. On that basis, we recruited 201 women in labor and 202 newborns.

Data pooling: The study lasted from December 01st 2016 to May 31st 2017. Data collection was done in many steps: (i) examining of the medical form of the women in labor; (ii) a structured individual interview with the women in labor; and (iii) finally the physical examination of the new born. Medical files and a questionnaire guide allowed to inform several anthropometrical variables of the women in labor (i.e. height, weight), the medical antecedents, surgical and obstetrical of the mother (i.e. age, pregnancy numbers, number of premature childbirth, alive children number, twins). Anthropometrical data of newborn (weight, cranial perimeter and height) were collected by the medical team.

Statistical analysis

Data pre-processing: Microsoft Office Excel 2007software was used for collected data pre-treatment. Next data were processed for statistical survey via R software version (version 3.5.1), since providing innovative scripts and/or function for descriptive and as well analytical statistic survey (R. Core Team, 2017).

Descriptive and analytical statistic: qualitative (i.e. women in labor vaccine and HIV/AIDS status, conjunctivitis, newborn sex, pregnancy outcome) and quantitative (i.e. mothers and newborns weight and height, newborns cranial perimeter, mothers age, pregnancy numbers, number of premature childbirth, alive children number) data were handled for both descriptive (Pearson correlation survey) and analytical statistics (Chi-squared test). Also, performed chi-squared test has been integrated by an odds ratio survey.

Quantitative data standardization procedure: presently considered quantitative data (mother and newborn weight and height, newborn cranial perimeter, mother age, pregnancy numbers, number of premature childbirth, alive children number) were submitted to a standardization procedure because of their heterogeneity. Here, we used 0-1 scaling standardization procedure. Each variable in the data set is recalculated as (V - min V)/(max V - min V), where V represents the value of the variable in the original data set. This method allows variables to have differing means and standard deviations but equal ranges. In this case, there is at least one observed value at the 0 and 1 endpoints (Milligan *et al*, 1988).Data standardization aligns heterogeneous distributions into a normal distribution (Daumas, 1982; Dago *et al*., 2015). It consists in looking for the adapted transformation through which the data will follow a normal law. Standard normalizing transformations have the important property of reducing the heterogeneity of the data, that is, of stabilizing their variance (Daniel Borcard, 1998).

Data clustering analysis: we performed a clustering analysis based on R software (R Core Team, 2017) functionpvclust, by assessing the uncertainty in hierarchical cluster analysis. For each cluster in hierarchical clustering, quantities called p-values are calculated via multiscale bootstrap resampling. P-value of a cluster is a value between 0 and 1, which indicates how strong the cluster is supported by data. Pvclust provides two types of p-values; (i) approximately unbiased (AU) and bootstrap probability (BP). AU p-value, which is computed by multiscale bootstrap resampling, is a better approximation to unbiased p-value than BP value computed by normal bootstrap resampling. Pvclust performs hierarchical cluster analysis via function hclust and automatically computes p-values for all clusters contained in the clustering of original data.

PCA and multiple regression analysis: we performed both multiple linear regression (MLR) and as well multivariate statistical survey based on a principal component analysis (PCA) with the purpose to assess interdependence relationship between mothers and newborns obstetrical, clinical and anthropometrical features by biplot graphic. Also, stepwise model comparison survey by processing Akaike's Information Criterion (AIC)of R function step(lm)have been performed with the purpose to decide what variable to include in MLR model.

RESULTS

Descriptive Statistic Assessing Mother Medical and Obstetrical and Clinical Parameters and Newborns Health Status in the Early Life Period: First, we assessed a descriptive analysis (frequency) with regard mother medical, surgical and obstetrical history including vaccine state, HIV/AIDS status and number of pregnancies (Table 1) and as well number of premature deliveries, twins and number of living children as well as conjunctivitis parameters. Findings showed that 101 of processed mothers were negative to HIV/AIDS, while 25 were identified as positive HIV/AIDA. Further, the present descriptive analysis displayed 75 mothers with non-available (NA) HIV/AIDA status. Also, 112 processed mothers have been recorded as exhibiting a correct vaccine status as opposite to 66 and 8 mothers with incomplete and no-vaccine status respectively. Our analysis revealed a high proportion of correct pregnancy term as well as a reduce number of surgery practice in deliverances patterns, suggesting, globally a good course of mother gravidness (Table 1). Next, we performed descriptive survey concerning new born health status in their early life period. This analysis referred to 202 newborns including 99 females and 103 males. Our analysis revealed 14 newborns as exhibiting small weight instantly after deliverance (weight < 2500g) and 2 newborns out them displayed very small weight (<1500g). However, findings suggested a high proportion normal deliverance (term deliverance), while only nine (9) and one (1) deliverances were premature and post-term respectively. It is noteworthy to underline that 43 newborns were declared HIV/AIDS positives and 23 newborns were recorded as exhibiting a pale conjunctivitis features. Results also revealed 3 cases of respiratory distress and one (1) case of pulmonary hemorrhage. Also, two (2) newborns who participated in the survey unfortunately died some hours after birth. After a week, 16 of total processed newborns were hospitalized for several health concerns. Indeed, 6 were suffered jaundice, while 8 had neonatal meningitis and 2 had pulmonary infections.

Clustering and Relationship Survey between Mother and Child Anthropological and Obstetrical Features: Pearson correlation analysis (Table 2) suggested a discrete agreement between (i) child cranial perimeter and child weight (R^2=0.18; p=0.09, with 95 percent confidence interval from -0.03 to 0.38) and between (ii) child cranial perimeter and mother weight (R^2=0.2; p=0.07, with 95 percent confidence interval from -0.01 to 0.39) and as well between (iii) child cranial perimeter and mother height(R^2=0.17;p=0.12, with 95 percent confidence interval from -0.04 to 0.36). Pearson correlation survey suggested a statistically significant correlation between child weight parameter and (i) mother weight and alive born child's and pregnancy number (R^2=0.27; p=0.01, with 95 percent confidence interval from 0.06 to 0.46) and as well (ii) mother age (R^2=0.27; p=0.05, with 95 percent confidence interval from 0.00 to 0.40). The same analysis exhibited high and statistically significant correlation between (i) alive born child number and (ii) pregnancy number (R^2=0.84; p=0.00, with 95 percent confidence interval from 0.76 to 0.89) as well as mother age (R^2=0.46; p=0.00, with 95 percent confidence interval from 0.29 to 0.61) features. Cluster p-value analysis mainly confirmed Pearson correlation survey results by clustering (i) child cranial perimeter, (ii) child weight and (iii) mother height parameters together with an AU p-value >0.8 (Figure 1).The same clustering analysis associated (i) mother age and (ii) deliverance number and as well (iii) alive born child's number parameters with a high AU p-value > 0.95 (Figure 1A).Also, clustering as well as Pearson correlation analysis showed twin parameter as not inclined to any parameters (Table 2 and Figure 1), whereas early childbirth features appeared to be relatively influenced by child weight (Table 2). Also, the clustering survey indicated an adequate relationship between mothers' age and child born alive and between newborns cranial perimeter, newborns height and newborns weight features and both mothers' weight and height parameters with AU p-value ≥0.95 (Figure 1).For a cluster with AU p-value > 0.95, the hypothesis that the cluster does not exist is rejected with significance level 0.05; roughly speaking, we can think that these highlighted clusters does not only seem to exist caused by sampling error, but may stably be observed if we increase the number of observation. However, the AU p-values themselves include sampling error, since they are also computed by a limited number of bootstrap samples (Figure 1B).

Multiple linear regression model assessing the link between newborns head perimeter and both child and mother height features by stepwise model comparison survey: Here, we developed a multiple linear regression model with the purpose to estimate the mathematical link between newborns height and cranial perimeter and as well mother weight and height parameters. Newborns cranial perimeter (NHC) was considered as response variable for the present developed statistical model, while both mother and child weight and/or height (MH and CH respectively) features, were referred to as predictive variables. Developed multiple linear regression model equation (*E*) was as following: $NHC= 0.27 + 0.13MH + 0.28CH$. Next, inference statistical analysis as regards this model, according to Fisher exact test exhibited the following results: F = 8.66 with p=0.00, indicated that should be rejected the null hypothesis that variables mother weight/height (MH) and child height (CH) collectively have no effect on newborn cranial perimeter (NHC) parameter. However, our finding showed that variable mother height (p-value=0.45) is not significantly controlled by child weight/height (CH) variable, as is newborn cranial perimeter (NHC) controlling for the variable child weight/height (p<<0.05).

Results of the partial Fisher test results are as following: F = 0.56 with p=0.45 for mother height (MH) feature. Hence, we cannot reject the null hypothesis (β_1= 0) at the 5% level of significance. It seems that the variables MH do not provide significant information to NHC once the variable CH is taken into consideration. The stability of the present developed multiple linear regression model, predicting newborns cranial perimeter (NHC) by mother and child height (MH and CH) parameters is supported by a low residual value (meaning of residual sum squares=0.00) suggesting the stability of presently developed statistical model (Figure 2). Finally, Stepwise model comparison survey, starting with AIC coefficient = -472.08, confirmed child high (CH) with AIC coefficient = -473.26 and child weight (CW) with an AIC

Table 1. Descriptive statistic (frequency) analysis of processed mother's population medical, obstetrical and surgical parameters

	Surgery Number			HIV/AIDS			Vaccine Status			Pregnancy Term			
	0	1	NA	Positive	Negative	NA	Correct	Incomplete	NA	Term	Post-term	Premature	NA
Frequency	6	134	61	25	101	75	112	66	23	179	1	9	13
Frequency (%)	2.91	65.04	32.05	12.44	50.25	37.31	55.72	32.84	11.44	88.61	0.50	4.46	6.44

NA: Not Available

Table 2. Pearson correlation analysis evaluating the relationship between analyzed mother and born child anthropomorphic and obstetric parameters

	1	2	3	4	5	6	7	8	9	10
Child cranial perimeter (1)	1									
Child height (2)	0.13^{NS}	1								
Child weight (3)	0.18^{**}	0.24^{***}	1							
Mother height (4)	0.17^{**}	0.11	0.11	1						
Mother weight (5)	0.20^{**}	-0.04	0.27^{***}	0.06	1					
Early childbirth (6)	0.00	0.04	0.18^{**}	-0.05	0.02	1				
Born Child Number (7)	-0.06	0.07	0.27^{***}	-0.09	0.10^{NS}	-0.07	1			
Twins (8)	0.00^{NS}	0.02^{NS}	-0.11^{NS}	-0.07^{NS}	-0.13^{NS}	-0.02^{NS}	0.09^{NS}	1		
Pregnancy Number (9)	0.05	0.10	0.27^{***}	-0.14	0.13^{NS}	0.10^{NS}	0.84^{***}	0.05	1	
Mother Age (10)	0.09	0.07	0.21^{***}	-0.04	0.28^{***}	0.02	0.46^{***}	0.08	0.57^{***}	1

$^{***}p \leq 0.05$ and $^{**}0.05<p<0.1$ and ^{NS} Non-Significant ($p \geq 0.1$)

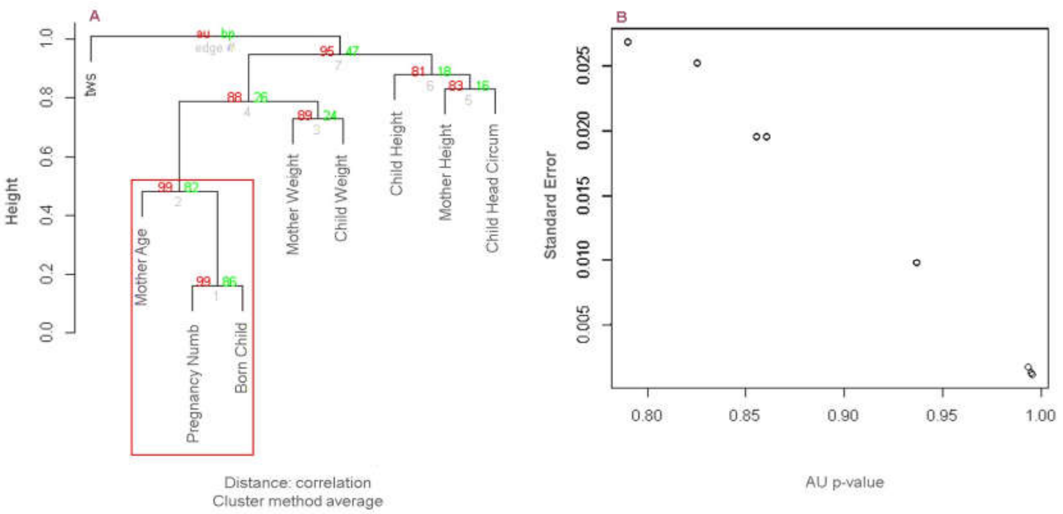

Figure 1. (A): R *pvclust* clustering survey providing two types of p-values; AU (Approximately unbiased) p-value and BP (Bootstrap probability); cluster dendrogram with AU/BP values (%) and (B): p-value vs. standard error plot analyzing paired mother and child obstetrical and anthropological features.

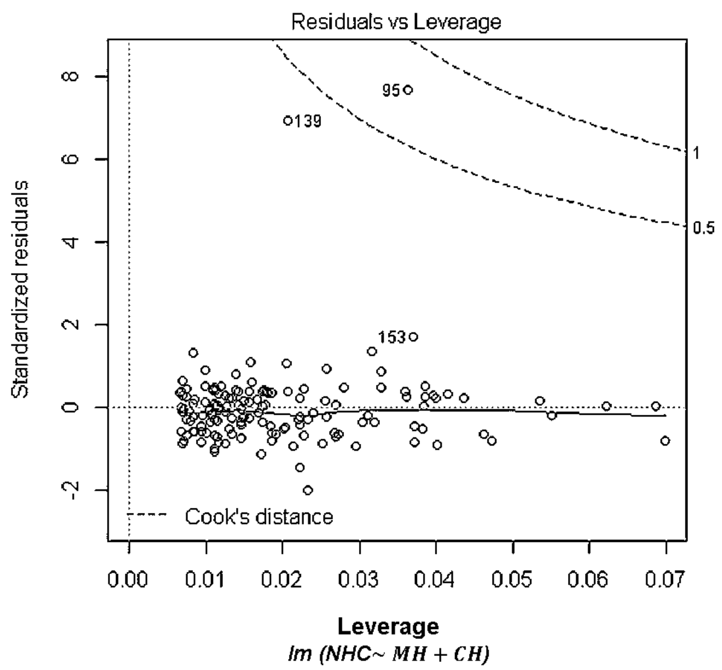

Figure 2. Residual and leverage graphic (standardized residual), monitoring the residual value of present developed multiple linear regression model (*E*) linking newborn head circumference (NHC) and both mother and their child height (MH and CH) parameters

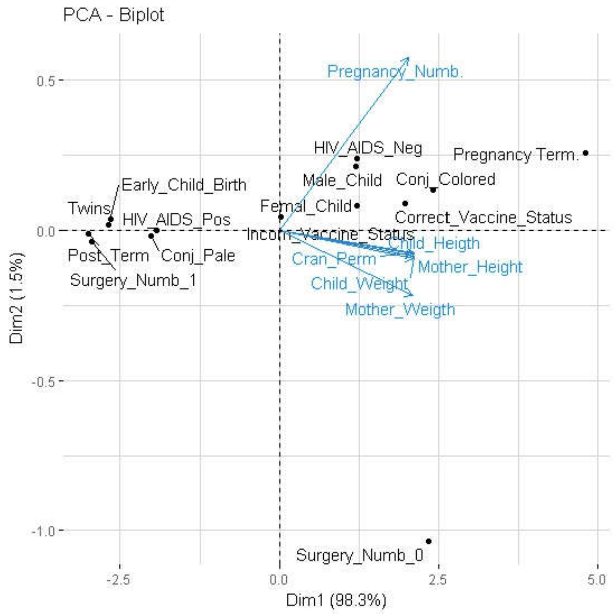

Figure 3. Biplot principal component analysis (PCA) weighing the link between both mother and their newborn medical, obstetrical and anthropological features

coefficient = -473.89 as good factors characterizing new born cranial perimeter (NHC) parameter as oppose to mother height and weight.

Multivariate statistical survey assessing the interaction between mothers and their newborns anthropomorphic and obstetrical and medical features: The main objective of this analysis was to assess the impact of mother's medical status (i.e. vaccination status, HIV/AIDS test, conjunctivitis) on their newborns anthropomorphic and obstetric parameters (i.e. height, weight and cranial perimeter parameters).

The principal component analysis (PCA) by it first dimension component (Dim 1), that explains 98.3% of data variability, suggested a good concordance between (i) mother pregnancy number (born child), child and mother height and weight and as well child cranial perimeter and (ii) mothers HIV/AIDS negative status, pregnancy term, colored conjunctivitis status and as well correct vaccine status (Figure 3). In other words, the present findings suggested mothers' immunization status as an important parameter for guarantying the pregnancy good process. So, mother correct immunization may contribute to a correct development with regard newborn anthropological parameters by increasing pregnancies term number (Figure 3). As expected, principal component survey by it first dimension (Dim 1) suggested a negative impact of both (i) early child born and (ii) mother HIV/AIDS positive status parameters on the correct development of newborns anthropological performances (Figure 3). Further, chi-square test supported an interdependence interaction between both (i) mother pregnancy number (born child's), child height and weight and cranial perimeter and as well mother height and weight and (ii) mother correct vaccine status, pregnancy term, mother negative HIV status as well as colored conjunctivitis qualitative features (X-squared = 168, p= 0.01). Further, odd value of pregnancy term in mother obstetrical group is 0.52, while odd value of pregnancy term in new born anthropomorphic group is 0.54. The odds ratio of the new born anthropomorphic parameter relative to mother obstetrical features = 0.54/0.52 = 1.04, meaning that newborn was about 1.04 times more likely to born (pregnancy term) by monitoring child anthropomorphic parameters rather than mother obstetrical features. If we took the ratio the other way around, as 0.52/0.54 = 0.96, we would say that odds of pregnancy term are 96% as high if we are considering new born anthropomorphic parameters than if we consider mother obstetrical features. Considering as a whole, this study evoked a strong influence of child anthropomorphic features on mother pregnancy term occurrence (Figure 3).

DISCUSSION AND CONCLUSION

Considering the fact that neonatal mortality still represents a significant part of the sub-Saharan African children death (Beck, 2009), the present study planned to assess the impact of clinical, medical, chirurgical and obstetrical features of pregnant women and/or mother on new born anthropometrical features. Studies have suspected a substantial correlation between mothers' obstetrical, medical parameters and child right development (Abrams, 1995; Goma I.E. Tchibindat F.L., 1989). However, a medical control as regards pregnant women, represents an indefectible asset in monitoring pregnancy progression as well as newborn health state. So, the present survey by assessing mother medical, surgical and obstetrical history revealed a high proportion of processed mothers as HIV/AIDS free as well as with a correct vaccine status. Also, our findings suggested a weak proportion of mother that were not submitted to both HIV/AIDS and vaccine status check-up. According to these observations the present study revealed a high proportion of pregnancy term and suggested a good course of mothers' gravidness. Our study recorded 1% of newborns death instantly after deliverance. However, this death rate result to be under newborns early death proportion suggested by the national data of 2006 and 2016.Findings, also exhibited heterogenic health dynamism with regard processed newborns population after one week life resulting in serious pathologies contracting. Performed p-value clustering survey as well as Pearson correlation analysis revealed a relative relationship (i) between child cranial perimeter and child height and as well mother height ($p<0.1$) as well as between (ii) mother's weight just after giving birth and newborn weight ($p<0.1$).

The same analysis evoked a statistically significant high correlation between the mother's age, born alive child's number and pregnancy number (R^2=0.46-086; $p<0.05$ and with p-values referred to approximately unbiased >95) (Figure 1). It is conventionally reported in the scientific literature that the birth weight of the newborn is strongly correlated with the initial weight of his or her mother, the weight gained by the pregnant woman, as well as that in the first trimester of pregnancy (Setondji, 2014; Abrams, 1995; Goma I.E. Tchibindat, 1989). According to the literature, the birth weight of the child increases with that of his mother during the first trimester of the pregnancy (Abrams, 1995; Goma I.E. Tchibindat, 1989). The novelty with the results of this study is that the displayed correlation between the weight of a newborn and his mother is about that (weight) of woman in labor and the weight of the child. Many studies have shown a correlation between the birth weight, the age and height of the mother (Goma, I.E. Tchibindat, 1989; Camara, 1996; Luhete K.P., Mukuku O., Kayamba, 2015; Khoshnood *et al*., 2008). However, the present study underlines a correlation between height, cranial perimeter of child and mother height. It is also shown that the birth weight of child increases with the age of his mother and the number of children alive (Goma I.E. Tchibindat, 1989; Camara, 1996; Luhete K.P., Mukuku O., Kayamba, 2015). Many studies in Congo and Cameroun (Kabamba Nzaji *et al*., 2014; Piechulek H., Mendoza, 1996) have shown for example that with teenagers and thirty years old mothers and more, the risk to give birth to a weak weight child is 33 time superior with mothers of 18 years old. These results seem to be in agreement with those obtained in the present study which established a correlation between mother age, pregnancies number and as well child born alive amount (Figure 1). Also, our findings based on p-value clustering survey, highlighted the relationship between newborn cranial perimeter (NHC), new born height (CH) and mother height (MH) features (Figure 1). Interestingly, developed multiple linear regression model linked significantly newborn head circumference (NHC) to child height (CH) parameters ($p<0.05$), and excluded mother height (MH) as an acceptable factor in predicting child anthropometrical status ($p=0.45$).Excitingly, stepwise model comparison survey confirmed child high (CH) with AIC coefficient = -473.26 and then child weight (CW) with an AIC coefficient = -473.89 as good factors respectively for characterizing new born cranial perimeter (NHC) parameter as oppose to mother height and weight features. Also, performed multivariate analysis and as well chi-square test ($p<0.05$) clearly demonstrated the influence of the mother's medical parameters and/or health status (i.e. correct vaccine status, negative HIV status) on new born anthropomorphic features (i.e. newborn head perimeter, newborn height and weight). Next, processed odd ratio analysis showed that odds of pregnancy term are 96% as high if we are considering new born anthropomorphic parameters than if we consider mother obstetrical features, evoking a strong influence of child anthropomorphic features on mother pregnancy term occurrence (Figure 3).The main lesson to draw from this study is the predictive value of anthropometrical and obstetrical parameters including the age, the number of pregnancies contracted, the height and the weight of women in labor and the newborn anthropomorphic conditions and/or features. A right control and/or management of these parameters can strongly contribute in reducing and/or preventing pregnancies complications by an anticipation of medical expense of the newborn. We must alert medical team of the department involved about the importance of observing those parameters (obstetrical and/or anthropological parameters) of the mother with the purpose to improve newborns' clinical status.

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REFERENCES

Abrams, B. 1995. Maternal weight gain patern and birth weight. Obstetrics and gynecology. 86(2), 163-169.

Barbieri, M. 1991. Les déterminants de la mortalité des enfants dans le Tiers-Monde. Paris : Centre français sur la Population et le Développement.

Beck, L. 2007. Contexte de paupérisation et mortalité des enfants en milieu rural rwandais (1980-1994). Paris : Édition L'Harmattan, collection Populations.

Beck, L. 2009. La santé des nouveau-nés au Rwanda. Évolution des facteurs associés aux tendances de la mortalité néonatale, Santé Publique 2(21), 159-172.

Borcard, D. 1998. Transformation de données : normalisation, stabilisation des variances. Montréal : Legendre & Legendre 1998, Université de Montréal.

Camara, B. 1996. Les faibles poids de naissance : Fréquence et facteurs de risque dans le district de Guediawaye (banlieue de Dakar-Senegal), Médecine d'Afrique Noire, 43(5), 260-265.

Dago, D. N., Lallié D. N. M., Diarrassouba N., Silué S. and Giovanni M., (2015). Correlation between accuracy sensitivity specificity and positive predictive value parameters in detecting differentially expressed genes. *International Journal of Development Research*. 5(3), 3734-3739.

Dillon, J.C. 2003. Evolution de la santé des enfants dans le monde au cours de la période1990-2000, Med-Trop, 63, 407-412.

Dumas, A. *et al*. 2014. Tabac, alcool et cannabis pendant la grossesse: qui sont les femmes à risque ?, Santé Publique. 5(26), 603-612.

Daumas, F. 1982. Méthode de normalisation des données. Revue de statistique appliquée, 30(4), 23-38.

Gaimard, M. 2008. Santé, morbidité et mortalité des populations en développement, Mondes en développement. 142(2), 23-38.

Goma, I.E. and Tchibindat, F.L. 1989. Etude de quelques caractéristiques maternelles en relation avec le poids à la naissance de l'enfant à Brazzaville. In : SalemGérard (ed.), Jeannée Emile (ed.).Urbanisation et santé dans le Tiers Monde : transition épidémiologique, changement social et soins de santé primaires. Paris, ORSTOM, 141-145.

Institut National de la Statistique (INS). (2017). Enquête par grappes à indicateurs multiples, 2016, Rapport des Résultats clés, Abidjan, Côte d'Ivoire

Khoshnood, B., Bouvier-Colle, M.H., Leridon, H. and Blondel B. 2008. Impact of advance maternal age on fecundity and of women's and children's health, Journal de gynécologieobstétrique et biologie de la reproduction, 37, 733-747.

Lawn, J. 2004. Why are 4 million newborn badie dying each year? Lancet, 364, 399-401.

Lawn, J, Shibuya, K. and Stein C. 2005. No cry at birth: global estimates of intrapartum stillbirths and intrapartum-related neonatal deaths. Bull World Health Organ. 83(6), 409-417.

Luhete, K.P., Mukuku, O. and Kayamba M.K.P. 2015. Etude du faible poids de naissance associé à l'âge maternel et la parité dans une population couple mère-enfant suivi à Lubumbashi, The Pan AfricanMedical Journal, 20, 24-26.

Michel Kabamba Nzaji *et al*., 2014. Influence de l'âge et de la parité de la mère sur le poids de naissance (cas du centre de santé Shungu en RDC), Heath Sci.Dis, 15(2), 1-4.

Milligan, GW. and Cooper, MC. 1988. A study of standardization of variables in cluster analysis. Journal of Classification, 5, 181-204.

Ministère de la Santé et de la Lutte Contre le Sida (MSLS) et l'Institut National de la Statistique (INS) et ICF International. (2013). Enquête Démographique et de Santé et à Indicateurs Multiples du Côte d'Ivoire 2011-2012 : Rapport de synthèse. Calverton, Maryland, USA: MSLS, INS et ICF International.

OMS. 2004. Maternal mortality in 200 estimates develped by who, UNICEF and UMFPA. Genève, Organisation mondiale de la santé.

OMS, 2005. Rapport sur la santé dans le monde, Genève, organisation mondiale de la santé.

Piechulek, H. and Mendoza Aldama, 1996. les enfants de poids insuffisant à la naissance : les exigences d'un programme de surveillance nutritionnelle : l'exemple de la zone rurale de la province du littoral (Cameroun), médecine d'Afrique noire, 43(2), 67-70.

Ravaoarisoa, *et al*., 2014. Déterminants de la mortalité néonatale précoce dans la maternité de Befelatanana, Antananarivo, Rev. Anesth.réanim.med urgence, 6(1), 1-4.

Core Team, R. 2017. R: A Language and Environment for Statistical Computing. https://www.R-project.org/

Setondji Geraud and Romeo Padonou, 2014. Faible poids de naissance, prématurité et retard de croissance intra utérin : facteurs de risque et conséquences sur la croissance de la naissance à 18 mois de vie chez des nouveau-nés béninois. Thèse de Doctorat, Santé publique et épidémiologie. Université Pierre et Marie Curie Paris VI.

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