OPEN ACCESS
Scholars International Journal of Traditional and Complementary Medicine
Abbreviated Key Title: Sch Int J Tradit Complement Med
ISSN 2616-8634 (Print) |ISSN 2617-3891 (Online)
Scholars Middle East Publishers, Dubai, United Arab Emirates
Journal homepage: https://saudijournals.com

Original Research Article

New Low Birth Weight: Risk Factors and Prognosis in African Environments (Segou Hospital in Mali)

T. Traoré[1*], C. Sylla[3], K. Sidibé[1], B. Taoré[1], A. Maiga[1], A. Sanogo[1], S.Z. Dao[5] S. A. Beye[1], F. Kané[6], S. Boiré[7], B. Traoré[8], D. Fomba[9], S. Dougnon[10], T. A. Thera[2], Y. Traoré[3], I. Téguété[3], N. Mounkoro[3], S. Diakité[3], S. Aïssata[5], K. Chaka[1], A. Diakité[3], M. Touré[4]

[1]Nianankoro Fomba Hospital in Ségou, Mali
[2]Point G University Hospital, Bamako Mali
[3]Gabriel TOURE University Hospital Center, Bamako Mali
[4]University Hospital Center of the Mali Hospital, Bamako Mali
[5]Common Reference Health Centre II, Bamako Mal
[6]Bla Reference Health Centre, Mali
[7]Niono Reference Health Centre, Mali
[8]San Reference Health Centre, Mali
[9]MarkalaReference Health Centre, Mali
[10]Gavardo Ségou Hospital, Mali

DOI: 10.36348/sijtcm.2021.v04i06.009 | **Received:** 22.04.2021 | **Accepted:** 30.05.2021 | **Published:** 17.06.2021

***Corresponding author:** T. Traoré

Abstract

Objective: The aim was to assess the risk factors and prognosis of low birth weight at nianankoro Fomba Hospital in Ségou, Mali. ***Materials and Methods:*** This is a prospective control case study from January 1, 2011 to December 31, 2011. ***Results:*** We recorded 160 infants of low birth weight out of a total of 2353 births or 6.8%. Adolescent girls were the most affected with 35% of cases compared to 16.9% for witnesses. Brides were the most affected in 80.6% of cases compared to 92.2% among witnesses. The main reasons for consultation were uterine contractions in 43.8%; metrorragia on pregnancy in 12.5% of cases and premature rupture of membranes in 10% of cases. Low birth weights were observed in discharged parturients in 35% of cases were compared to 8.1% of controls 36.25% of pregnant women who performed only one antenatal consultation (CP NV) had given birth to a low birth weight compared to 12.3% in controls and 60.63% of cases had not performed any NPCs compared to 4.3% in controls. Instrumental extraction was performed in 43% of cases compared to 15.6% in controls, and caesarean section in 26% of cases versus 5.9% in controls. It appears that both sexes were affected by low birth weight with a predominance of the male sex (56.9%) compared to women (43.1%). The main causes of neonatal death were among others: Respiratory distress with 62.22% and neonatal infections in 26.66%. ***Conclusion:*** Infants of low birth weight are a public health problem because of their high prevalence and the resulting adverse consequences.

Keywords: Low birth weight; risk factors; fetal prognosis, Segou, Mali.

Copyright © 2021 The Author(s): This is an open-access article distributed under the terms of the Creative Commons Attribution **4.0 International License (CC BY-NC 4.0)** which permits unrestricted use, distribution, and reproduction in any medium for non-commercial use provided the original author and source are credited.

INTRODUCTION

The birth of low-weight children is a public health problem because of their high prevalence and the resulting neonatal consequences. These are newborns whose birth weight is less than the 10th percentile on the Lubchenco weight curve, i.e. those whose birth weight is less than 2500 grams. A term born child weighs 2,750 grams plus or minus 500 grams. This birth weight can decrease from 5% to 10% on the firstday and then returns to its original value around the 8th and 10th days. For a long time birth weight was considered an indicator of the term of pregnancy. But these days, this is no longer the case because it is now known that a full-term child can have a small birth weight and that a premature baby may have a higher weight compared to the age of pregnancy.

WHO estimates that around 17% of children of low birth weight (NPPs) worldwide, most of them in developing countries, especially in African countries, vary from country to country: 11.3% in Senegal [1],15% in the city of Cotonou in Benin [2]; 8.9% at the

Maternity of Tunis [3]; 6.8% at the reference health centre in Bamako commune V [4]. The causes of birth of low-weight infants do not appear to be clear: A low weight in newborns contributes significantly to perinatal diseases and deaths. It is associated with a higher rate of long-term health problems, including disabilities such as cerebral palsy and learning disabilities. The hospitalization rate for infants with low birth weight is much higher than for normal-weight infants. This gap continues as these children age. Few studies have been carried out on newborns of low birth weight at nianankoro Fomba Hospital in Ségou, which justifies this work whose objectives were to:

OBJECTIVE

To assess risk factors and the prognosis of low birth weights at Nianankoro Fomba Hospital in Ségou, Mali.

MATERIALS AND METHODS

This was a cross-sectional analytical cross-section of The Cas/Witnesses with a prospective collection of data from January1 to December 31, 2011 at nianankoro Fomba Hospital in Ségou, Mali.

Sampling

We have two different statistical units consisting on the one hand by cases of low birth weight and on the other hand the controls represented by newborns of normal weight. Thus we selected 160 cases for 320 witnesses.

Inclusion hearts for cases

Any live birth performed in the service during the study period with weight between 1000g and 2499g. For Witnesses: any live birth weighing between 2500g and 3999g.

Non-inclusionhearts

Any living or stillborn fresh small weights performed outside the structure; cases of macerated deaths, abortion cases, macrosomia cases.

Matching criteria

We took a case of birth with a weight of between 1000 and 2499 g for two cases of birth weight between 2500 and 3999 g that occurred immediately before and after the case (1 vs. 2).

The variables studied were

socio-demographic characteristics (age, occupation, residence, marital status, level of schooling); Reason for consultation; The circumstances of admission; Patients' history Risk factors anthropometric data of newborns.

Data collection

Data were collected from pre-established individual survey sheets; collection media were: partograms; operating protocols and obstetric records.

Data entry and analysis

Data entry and analysis was done using EPI-INFO 2005 version 3.3.2. The statistical tests used were those of the Chi^{2}test. A value of $P < 0.05$ was considered statistically significant.

RESULTS

Frequency

We recorded 160 newborns of low birth weight out of a total of 2353 births or a frequency of 6.8%. 73% of these PPNs were premature babies and 27% of hypotrophs. Table 1 summarizes the frequency of low birth weights by trimester and Figure 1 shows the type of low birth weight.

Table 1: The frequency of low birth weight infants at the Ségou Hospital in Mali in 2011

Quarters	PPN number	Birth number	Proportion of PPN
1st quarter	35	435	8%
2nd quarter	60	638	9%
3rd quarter	40	656	6%
4th quarter	25	624	4%
total	**160**	**2353**	**6,8%**

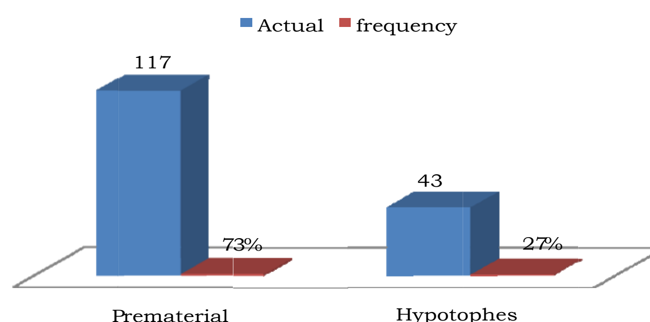
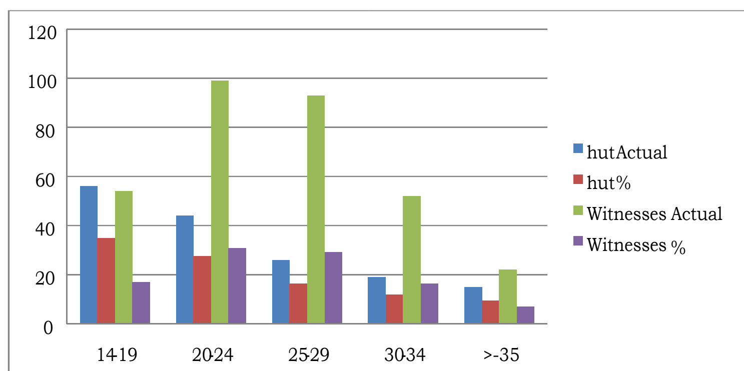


Fig1: Breakdown by type of low birth weight.

Socio-democratic characteristics of mothers

Teenage girls were the most affected with 35% of cases compared to 16.9% for witnesses. Brides were the most affected in 80.6% of cases compared to 92.2% among witnesses. Socio-demographic characteristics are presented in Figure 2 and Table 2.



P- 0.00005

Fig-2: Age-based distribution of mothers of low birth weights at the Ségou Hospital in Mali in 2011.

Table-2: Distribution of mothers of low birth weight by marital status and residence at the Ségou Hospital in Mali in 2011

Marital status	**case**				**P**
	actual	**%**	**%**	**actual**	**P-0,0002**
Bachelor	30	18,8	25	7,8	
Divorcee	1	0,6	0	0	
Bride	129	80,6	295	92,2	
Residence					**P-0.0000**
Out of Segou	46	28,8	21	6,6	
City of Ségou	114	71,3	299	93,4	

Clinical features

Reasons and Mode of Admission

The main reasons for consultation were uterine contractions in 43.8%; metrorragia on pregnancy in 12.5% and premature rupture of membranes in 10%. PPN was most often observed in parturients with 35% of cases compared to 8.1% of controls. The reasons for admission and the mode are shown in Table 3.

Table-3: Distribution of mothers of low birth weight by reason of admission and method of admission to the hospital in Ségou, Mali in 2011

Reason for admission	**case**		**witness**		**P**
	actual	**%**	**actual**	**%**	**0,001**
CUD on pregnancy	70	43,8	295	92,2	
Metrorragie on Pregnancy	20	12,5	-	-	
Rpm	16	10	-	-	
Other	54	33,8	25	7,8	
How to admit					
Coming from herself	104	65	294	91,9	
Evacuated	56	35	26	8,1	

Obstetric history

Primipares were affected in 41.3% of cases compared to 27.8% of witnesses. The inter-reproductive interval was less than 2 years in 65. 6% in cases while the rate was only 30.6% for controls. The risk of giving birth to a low-weight newborn was twice as high when the reproductive interval was less than 2 years. It should be noted that among the cases we recorded 1 case of diabetes on pregnancy, 1 case of kidney failure, 1 case of sickle cell disease; 1 case of heart failure versus 1 case of diabetes and 1 case of sickle cell disease in controls.

Table-4: Distribution of mothers of NPPs by medical history, gestity, parity, intergesic interval (IIG) and history of prematurity at Ségou Hospital in Mali in 2011

	case		witness		probability
ATCD MEDICAUX	actual	%	actual	%	
none	151		94 ,4	315	
HTA	5		3,1	3	
Others	4		2,5	2	
ATCD OBSTETRICS					
Multigeste ≥ 4	35	21,9	76	23,8	
Pauci gesture (2-3)	60	37,5	163	50,9	**P-0.0019**
Primigeste (1)	65	40,6	81	25,3	
Primipare (1)	66	41,4	89	27,8	
Paucipare (2-3)	54	33,7	135	42,2	**P-0.012**
Multipare (≤4)	40	25	96	30	
IIG < 2 years old	105	65,6	98	30,6	
IIG > 2 years old	55	34,4	222	69,4	**P-0.001**
ATCD DE PREMATURITE					
No	131	81,9	303	94,7	
Yes	29	18,1	17	5,3	**P-0.0000**

Pathologies during pregnancy:

Pathologies during pregnancy are summarized in Table 5. Malaria, HTA, anemia, urinary tract infections were the main causes of low birth weight with respectively (37.50%, 26.88%, 15.60%, 9.37%).

Table 5: Distribution of mothers of low birth weight newborns based on the existence of pregnancy-associated pathology at the Ségou Hospital in Mali in 2011

Related Pathologies	**case**		**Witnesses**	
	actual	**%**	**actual**	**%**
malaria	60	37,5	180	56,25
HTA	43	26,88	100	31,25
anaemia	25	15,60	16	5
Urinary tract infection	15	9,37	4	1,25
Uterine cervico beat	5	3,13	0	0
diabetes	1	0,63	1	0,31
sickle-cell anemia	1	0,63	1	0,31
Kidney insufficiency	1	0,63	0	0
heart failure	1	0,63	0	0
No	8	5	18	5,63
total	**160**	**100**	**320**	**100**

Prenatal follow-up and childbirth

The number of antenatal consultations (NPCs)

We found that 36.25% of pregnant women who performed a single antenatal consultation had a low birth weight compared to 12.3% in controls and 60.63% of cases had not performed any NPCs compared to 4.3% of controls.

The delivery route

Instrumental extraction (FORCEPS) was performed in 43% of cases compared to 15.6% in controls, and caesarean section in 26% of cases versus 5.9% in controls.

© 2021 | Published by Scholars Middle East Publishers, Dubai, United Arab Emirates

Table-6: Distribution of mothers of low birth weight by number of NPCs performed, gestational age, type of presentation, delivery pathway at the Ségou Hospital in Mali in 2011

	case		**Witnesses**		**P**
Number of NPCs	**actual**	**%**	**actual**	**%**	
0	97	60,63	14	4, 3	**P-0.001**
1 – 3	58	36,25	39	12,3	
≥ 4	5	3,12	267	83,4	
Gestational age					
28-36 SA 6d	**117**	**73**			
37-42 SA	**43**	**27**			
Delivery lane					
caesarean section	42	26	19	5,9	**P-0.002**
Spontaneous low track	49	31	251	78,4	
Instrumental bass track	69	43	50	15,6	

Newborn settings

Parmi low birth weight we recorded 71.2% of cases of preterm and 28.8% of cases of hypotrophy. The male sex pred comparatively with 56.9% of cases It appears from our study that 71.2% of small birth weights were less than 47cm in size and 53.8% had a weight between 2000 and 2499g. Newborn parameters are shown in Table 7.

Table 7: Distribution of PPN newborns according to THE APGAR at the first minute, at the fifth minute the cranial perimeter, height, sex and weight at the Hospital of Ségou in Mali in 2011

APGAR 1st minute	**case**		**Witnesses**		P	
	actual	**%**	**actual**	%		
0-3	60	37,5	6	1,88	**P-0.0000**	
4-7	44	27,5	20	6,25		
8-10	56	35,0	294	91,87		
APGAR 5th minute						
0-3	20	13	2	0,63	**P-0.0000**	
4-7	60	37	4	1,25		
8-10	80	50	314	98,12		
Cranial perimeter						
20-25 cm	7	4,4	0	0,0		
26-30 cm	112	70,0	72	22,5		
> 30 cm	41	25,6	248	77,5		
waist	**Hypotrophics**		**premature**			
	actual	**%**	**actual**	**%**		
< 47 cm	0	0	117	100		
> 47 cm	43	100	0	0		
sex					**P-0.0000**	
feminine	69	43,1	199	62,2		
masculine	91	56,9	121	37,8		
weight	**Hypotrophics**		**premature**		**total**	
	actual	**%**	**actual**	**%**	**actual**	**%**
1000 -1499	2	4,65	25	21,36	27	16,9
1500 -1999	11	25,58	49	41,88	60	37,5
2000 - 2499	30	69,77	43	36,75	73	45,6
total	**43**	**100**	**117**	**100**	**160**	**100**

Prognosis

Our study involved 160 newborns of low birth weight including 117 cases of prematurity 43 cases of hypotrophy. It should be noted that premature babies, especially premature infants, are less resistant than hypotrophs. Thus, in the first week of life we recorded 11.6% of deaths from hypotrophs compared to 21.4% of premature.

In the second week, however, the two groups had comparable resistance (Table 8; P 0,000). All these newborns were seen and followed in neonatology at nianankoro Fomba Hospital in Ségou. The main causes of neonatal death were among others: respiratory distress with 62.22% of cases, neonatal infections in 26.66% of cases. Newborns benefited from vitamin K1, antibiotic eye drops. The KANGOUROU method has

© 2021 | Published by Scholars Middle East Publishers, Dubai, United Arab Emirates

been used in premature infants. The prognosis elements are summarized in Table 8.

Table-8: follow-up, prognosis of newborns from J0 to J7, from J7 to J30 and the cause of death of hypotrophs and premature babies at the Ségou Hospital in Mali in 2011

Tracking the Nné de j0 a j7	Hypotrophic		premature		probability	
	actual	**%**	**actual**	**%**		
Healthy newborns	32	74,4	64	54,7	P-0,000	
Neonatal infection	4	9	20	17,1		
Newborns who have died	**5**	**11,6**	**25**	**21,4**		
Newborns lost in sight	2	5	8	6,8		
Tracking the Nné de j7a j30						
Healthy newborns	30	83,33	76	69,1	**P-0,000**	
Neonatal infection	2		5,55	14		
Newborns who have died	**3**		**8,33**	**12**		
Newborns lost in sight	1		2,78	8		
Causes of neonatal deaths	**actual**	**%**	**actual**	**%**	**average**	probability
Respiratory distress	5	62,5	23	62,16	62,22	**P-0.0000**
Neonatal infections	2	25	10	27,03	26,66	
Undetermined causes	1	12,5	4	10,81	11,11	
total	8	100	37	100	100	

DISCUSSION

The frequency of PPNs vary according to the authors. Our frequency of 6.8% was lower than those of other Malian studies such as: Diarra A. [3] ; Cissé A.I. [6]; Diarra I. [7] who yielded 8.8% respectively; 11,31% ; 7.99%. Our rate was similar to the rate of Diakité N. [4] which reported 6.83% of cases and that ofEurope withabout 6% according to the WHO [8]. In Africa this frequency is also variable: In Senegal: N'diaye O; et al. found 12% [1], Camara et al. reported 10.70% of cases [9]. In Benin Fourn et al reported 15% of low birth weight [10]. In Tunisia in the maternity ward of Tunis, Ben Belcher et al. recorded prevalence of 8.88% of cases [11]. In France F Gold [10] found a prevalence of 7% in 2005.

Socio-democratic characteristics

Age

In our series, teenage girls were the most affected with 35% of cases compared to 16.9% for controls. There is a statistically significant link between maternal age and low birth weight (Figure 2; P-0.00005). This observation was made by other authors in Mali: Diakité N. [4] reported a predominance in the age group [14-19 years]; Diarra A. [3] reported 27.9% of cases in the age group [14-19] versus 16.8% among controls. Unlike our series Cissé A. I. [6] found 50.79% of cases between 20 and 29 years. Adolescent girls with less experience with pregnancy would be less diligent in attending CPN centres, with a higher frequency of illegitimate and unwanted pregnancies thus exposing them to low birth weight births.

Marital status

Married women were most affected in 80.6% of cases compared to 92.2% of controls. Our rate is close to that of Cissé A. I. [6] and Diarra I. [7] who reported 79.4% and 82.2% respectively of cases of low birth weight among brides. We recorded 19.4% of cases among singles compared to 7.8% among controls. This rate is higher than that reported in 2011 by Diarra A. [3] which had found 11.8% of cases versus 6.5% among controls; it is close to that reported by Diakité N. [4] with 17.7% of low birth weight among singles. This high frequency of low birth weight among singles may be explained by the fact that singles pay a heavy price for prematurity related to lack or late use of health care. Celibacy is a risk factor for low birth weights (P-0.001).

Clinical features

Reasons and Mode of Admission

Low birth weights were most often observed in evacuated parturients (35% of cases evacuated versus 8.1% of controls). Evacuations are the result of a maternal or fetal pathology that may be responsible for a low birth weight; this may explain the existence of a statistically significant link between evacuation and low birth weight (Table 3; P-0.001).

Obstetric history

Gestity-Parity

Primipares were affected in 41.3% of cases versus 27.8% of controls the same is reported by Diarra A. [3] with 33.6% of cases in primiparous versus 16% in controls. This could be explained by a low attendance of health facilities by the primipares. There is a statistically significant link between primiparity and the occurrence of low birth weights (P-0.012).

Inters reproductive interval

The intergesical interval was less than 2 years in 65, 6% in cases while this rate was only 30.6% for controls. The risk of giving birth to a newborn baby was

© 2021 | Published by Scholars Middle East Publishers, Dubai, United Arab Emirates

two times higher each time the parturient had an intergenesic interval of less than 2 years. (Table 4; P-0.001).

Pregnancy monitoring

Number of NPCs

Study found that 36.25% of patients who performed a single antenatal consultation had a low birth weight compared to 12.3% in controls and 60.63% of cases had not performed any NPCs compared to 4.3% in controls. Diarra I. [7] had found 38.16% of patients with only one NPC and the absence of NPCs in 61.84% of cases. This low rate of prenatal follow-up in developing countries can be explained by the low socio-economic level. Prenatal counseling is a medical procedure that aims to detect and prevent pregnancy complications in order to reduce maternal and perinatal morbidity and mortality [11]**.** Its absence or inadequacy is said to be a factor of small weights (Table 6; P-0.001).

Pathologies during pregnancy

Malaria, HTA, anemia, urinary tract infections were the main causes of low birth weight with respectively (37.50%, 26.88%, 15.60%, 9.37%) the same pathologies have been reported by Malian authors: Diarra A. with 23% of malaria cases respectively; 11.5% of HTA cases; 2.7% of anaemia, 1.9% of cases of urinary tract infections, 1.5% of HIV [3]. Cissé A. I. found 26.2% of malaria cases, 13.5% of urinary tract infections, 9.4% of cases of anaemia [6]. The prevalence of malaria in our series could be explained by the geographical location of the region, which is a high malaria-endemic area.

The path of delivery

Instrumental extraction was performed in 43% of cases compared to 15.6% in controls, and caesarean section in 26% of cases versus 5.9% in controls. Our caesarean section rate was higher than Diakité N. [4]; Diarra A. [3]; Cissé A. I. [6] who yielded 10.11% respectively; 17,3% ; 19.05% while Diarra I. [7] reported 100% vaginal delivery with episiotomy performed in 32.4%. Our high frequency of caesarean section compared to these studies is explained by our preference for caesarean section or forceps in the case of low birth weight.

Newborn settings

Among the low birth weight 71.2% were premature babies and 28.8% were hypotrophs. **Sex:** Males dominated the series with 56.9% of low birth weight. This rate is comparable to those reported by Cissé A. I. [6] (59.86%), Diakité N. [4] (50.72%). 53.8% of newborns were weighted between 2000 and 2499g. This rate is lower than those of Diakité N. [4] and Diarra A. [4] who reported 83% and 71.4% of cases respectively and 71.2% had a size less than 47cm.

Prognosis of PPN:

Premature infants, especially premature babies, are less resistant than hypotrophs (**P- 0.000**). All these newborns were seen and followed in neonatology at nianankoro Fomba Hospital in Ségou. The main causes of neonatal death were among others: respiratory distress with 62.22% of cases, neonatal infections in 26.66% of cases. Diarra A. reported 13 cases of death [3]. In the series of Cissé A. I. found respiratory distress was responsible for 80% of deaths and neonatal infection in 20% of cases [6]. Newborns benefited from vitamin K1, antibiotic eye drops. The KANGOUROU method has been used in premature infants.

CONCLUSION

Low birth weight infants are a major health problem in the segou hospital because of their high prevalence, costly management and the resulting risk of morbi mortality.

REFERENCES

1. N'DiayeO. and Coll. (2004). Etiological factors of prematurity at the Regional Hospital in Ziguinchor, Senegal in 2004, Thesis of Medicine.
2. Fourn L.; Zohoun T. (1990). Statistical study of small weight and newborn height in Cotonou. Afr. Med., 268 :50509.
3. Diakité N. (2008). Low birth weight: etiological factors and fetal prognosis in the reference health centre of commune V, 08-M-158, Thesis of Medicine.
4. Diarra A. (2011). Living infants of low birth weight, etiological factors and immediate fetal prognosis at the Reference Health Centre of Commune I of Bamako District, No.11-M-209, Thesis of Medicine.
5. Ben Belcher S., Debtoide A., Ftouri, Ben Miled S., Khrouf, Ann. (1994). Pediatrics RCIU in Tunisia, Epidemio, Etiology-(Paris), No.9:573-7.
6. Cissé A. I. (2011). Newborns of low birth weight: risk factors and neonatal prognosis at Sikasso Hospital; No.11-M-176, Thesis of Medicine.
7. Diarra I. (2010). Low birth weight, etiological factors, immediate fetal prognosis at the Banconi Community Health Centre in Commune I of Bamako District, 10-M151, Thesis of Medicine,
8. WHO. (1992). Low birth weight tabulation of available information who/Nott, 2:1-13.
9. Camara B., Diak B., Diouf S. and Coll. (1995). Low birth weight: frequency and risk factors in guediawaye district, Suburb Dakar-Senegal Dakar Medical, 40(2) :213-9.
10. GOLD F. (2007). Intrauterine Prematurity and Growth Delay (ICU) risk factors and prevention, Preterm delivery (Updated in January 2007).
11. Kuwait I G. (2017). Impact of the number of antenatal consultations on the future of pregnancies, case of the Maroua Health District II. The Journal of Medicine and Health Sciences.

© 2021 | Published by Scholars Middle East Publishers, Dubai, United Arab Emirates