

**Institute of Quality Assurance in Obstetrics  
Kano State and Kaduna State, Nigeria**

**Maternal and Child Health  
Hospital – Report 2010**



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“Quality improvement is the effort to improve the level of performance of a key process. It involves measuring the level of current performance, finding ways to improve the performance, and implementing new and better methods”.

Berwick DM, Godfrey AB, Roessner J. “Curing Health Care”: New Strategies Quality Improvement, San Francisco: Jossey-Bass Publishers, 1990

## **Imprint**

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**As of September , 2011**

**Content:**

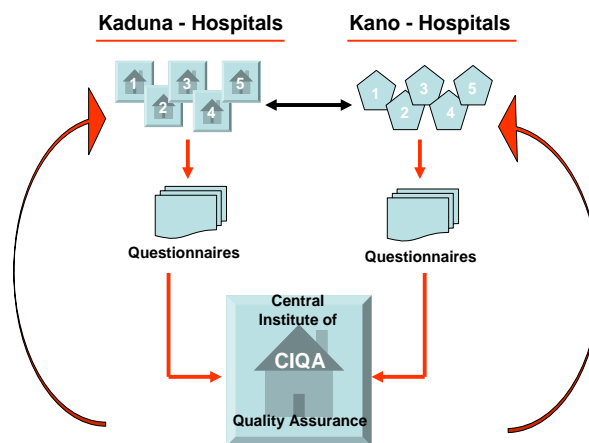
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## I. Organization

### 1. The Institute of Quality Assurance: Data collection and evaluation

The Institute is located at the Aminu Kano Teaching Hospital (AKTH) in Kano. Questionnaires with obstetrical data are routinely collected by the chief midwife Zainab M.S Pawa and evaluated according to defined principles by the statistician Sadiq Abdul-Mumin. The data evaluation is supervised by Dr. Hadiza Galadanci and Dr. Oladapo Shittu. The data are regularly presented to the participating hospitals at half year meetings alternating between the Aminu Kano Teaching Hospital in Kano and Amadu Bello University Teaching Hospital Zaria.

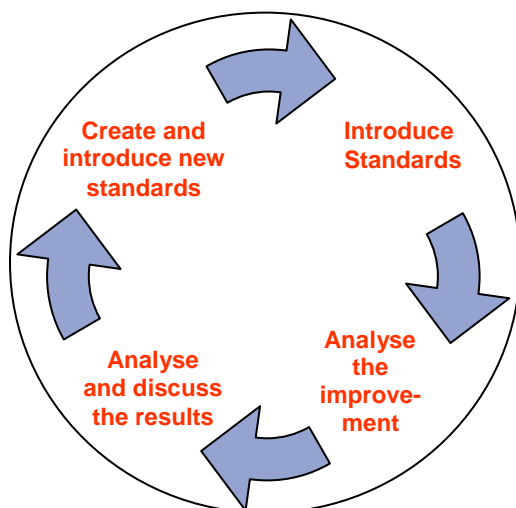
The data flow takes place according to the graph below:



### 2. Principles of Quality Assurance

Basic principles of Quality Assurance in a hospital are based on three parameters: 1. Quality of infrastructure, 2. Quality of process and 3. Quality of outcome. All three parameters are interdependent and closely connected. *Quality of infrastructure* comprises the condition of the hospital building: water supply, power supply, hygienic conditions, number of staff and the equipment available. The *quality of process* is predominantly dependent on a sufficient structure, but also on trained and well functioning experienced personnel and on professional performance. This can be achieved by a continuing evaluation of the results and by benchmarking. The necessary interventions will lead to a spiral of reduction of maternal and infant morbidity and mortality and consequently improvement of *quality outcome*.

### 3. Circle of continuous quality improvements (Quality circle)



**Quality Circle:** Introduction of standards and the continuous analysis of progress will improve the outcome and lead to the definition of new standards

#### 4. Hospitals participating in Quality Assurance in obstetrics



Ten hospitals, five from Kano State and five from Kaduna State participate since 2008 in the data collection and quality assurance in obstetrics (red circles). Federal capital territory (FCT) (green circles) joined in late 2010 and will be added into the data collection and quality assurance in 2011. Ondo State and Bauchi State (grey circles) have shown interest..

### **Kaduna State Hospitals:**

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*Amadu Bello University Teaching Hospital (ABUTH), Zaria*

General Hospital Birnin Gwari  
General Hospital Yusuf Dantoshu Kaduna  
General Hospital Kafanchan  
General Hospital Saminaka  
Gambo Sawaba Hospital Kofan Gaya Zaria

### **Kano State Hospitals**

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*Aminu Kano Teaching Hospital (AKTH), Kano*

General Hospital Gaya  
General Hospital Sheik Jiddah Kano  
General Hospital Sumaila  
General Hospital Takai  
General Hospital Wudil

### **FCT Abuja**

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*University Teaching Hospital  
NN*

Abaji General Hospital  
Kwali General Hospital  
Kuje General Hospital  
Karshi General Hospital  
Kubwa General Hospital

### **Ondo State and Bauchi State**

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*showed interest to participating in the quality assurance system in obstetrics in 2012.*

## II. Quality Assurance in obstetrics

### 1. Instruments for data collection

In consideration of the high maternal and infant mortality it was not advisable to use a difficult and comprehensive questionnaire for data collection. The present questionnaire was combined with the introduction of a maternity record book with simple indicators of maternal and child health. The data are routinely collected every month by the chief midwife. The questionnaire comprises the following data:

Monthly Maternity statistics																	
Hospital: Kano State					2nd Quarter								Year: June, 2008				
Hospital code	ANC		abortion		Deliveries					M.M	Fetal outcome		Eklampsia		retained Placent a PPH	VVF	
	new	Follow up	MVA	D/C	Total No. of deliveries	No. of Twin deliv.	No. of breech deliv	No. of vacu deliv	C/S	No. of maternal death	alive	Dead	fits	No fits			
22	369	151	11	0	132	2	0	0	4	3	126	11	8	2	14	0	
23	770	1275	13	1	160	4	1	0	10	3	137	9	4	0	3	0	
24	286	241	5	3	44	1	0	0	3	3	33	10	3	1	9	0	
25	357	386	10	0	41	0	2	0	8	2	29	12	19	9	5	2	
26	773	1682	0	6	162	0	0	0	6	3	159	18	10	0	17	0	

Information regarding number of antenatal clinic (ANC) visits (new cases and follow up) and abortions. Further information is provided by important indicators of maternal and child health: maternal death and infant death, and eclampsia and postpartum haemorrhage. All these indicators will be related to the total number of deliveries which allows comparison of the management and outcome among the hospitals.

### 2. Obstetrical management in 2008, 2009 and 2010

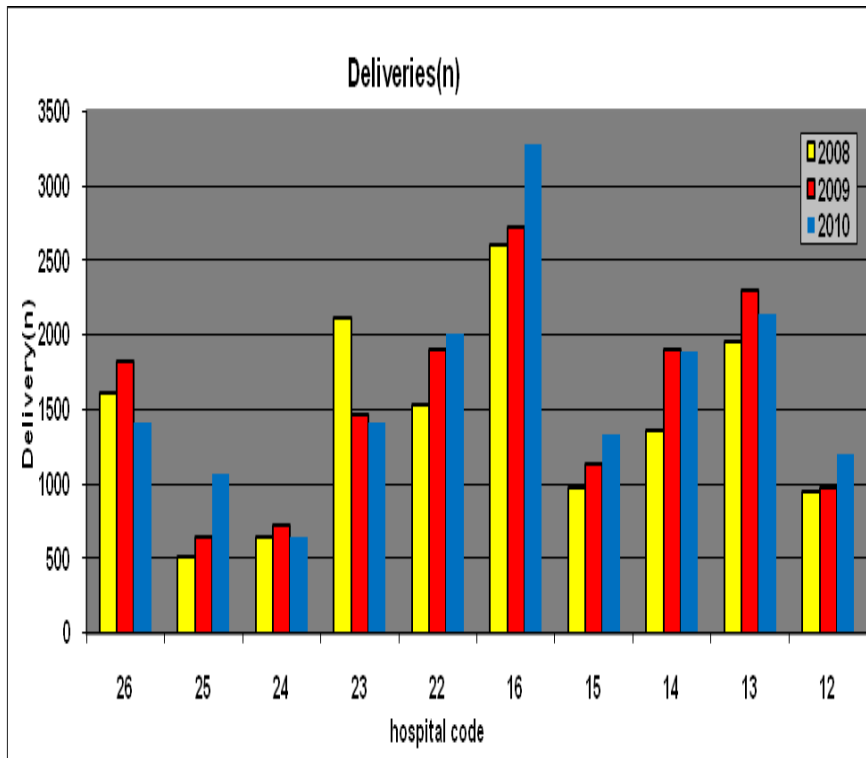
	Deliveries	CS	MMR	FMR	Eclampsia	PPH
	N	n (%)	n (%)	n (%)	n (%)	n (%)
January –June 2008	6.878	494 (7,18)	123 (1.79)	584 (8.49)	484 (7.04)	301 (4.38)
July-December 2008	7.369	451 (6,12)	120 (1.63)	653 (8.86)	490 (6.65)	333 (4.52)
January - June 2009	7.695	457 (5,94)	106 (1.38)	750 (9,75)	779 (10.12)	255 (3,31)
July-December 2009	7.891	369 (4,68)	74 (0,94)	659 (8,35)	776 (9,83)	394 (4,99)
January –June 2010	7.761	557 (7,18)	61 (0,79)	649 (8,36)	988 (12,73)	370 (4,77)
July-December 2010	8.615	508 (5,90)	61 (0,71)	616 (7,15)	862 (10,01)	304 (3,53)
<b>Total</b>	<b>46.209</b>	<b>2.836</b>	<b>545 (1.18)</b>	<b>3.911</b>	<b>4.379</b>	<b>1.957</b>

CS Caesarean section, MMR Maternal Mortality Ratio, FMR Fetal Mortality Ratio, PPH Post partum hemorrhage

The table above shows the results of the key quality indicators for 2008, 2009 and 2010. MMR shows a continuous fall from 2008 to 2010. More information can be obtained by looking at the graphs of individual hospitals.

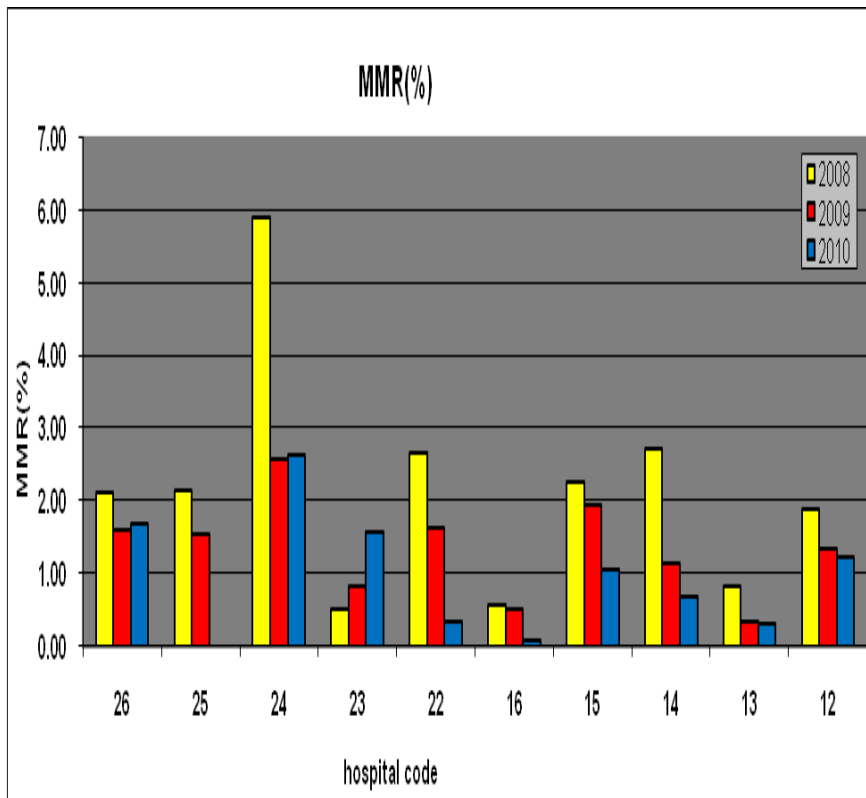


### 3. Incidence of maternal and fetal mortality of the ten hospitals



**Fig 1: Number of deliveries in Kaduna and Kano hospitals in 2008, 2009 and 2010**

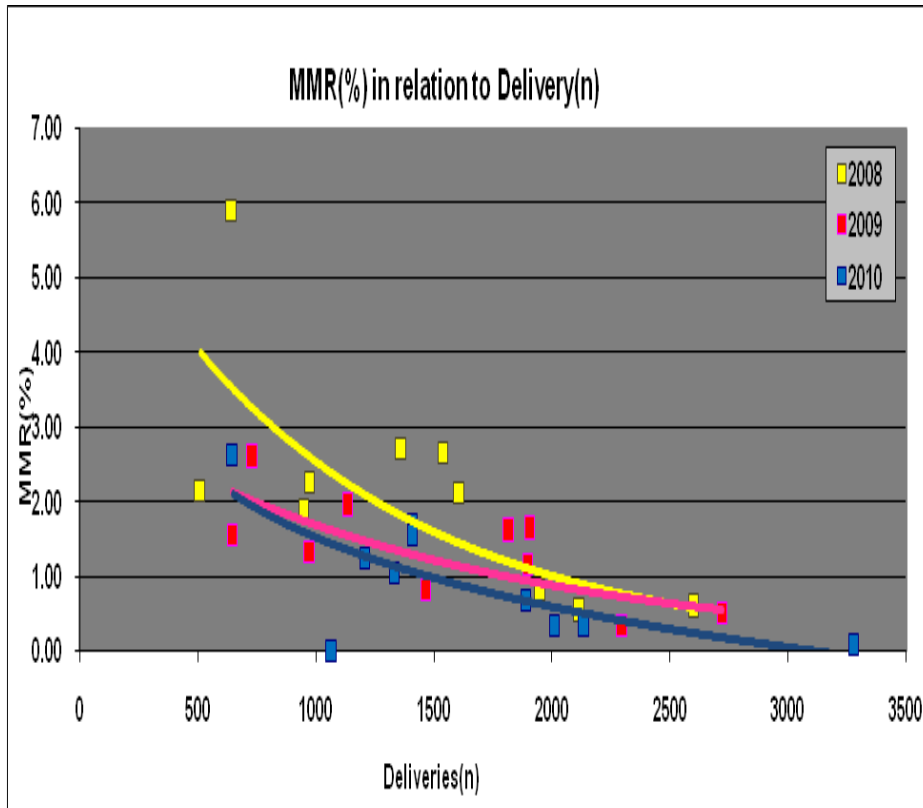
The yellow columns indicate the year 2008, followed by red for 2009, and blue for 2010. The hospitals show a considerable variation in the number of deliveries. The hospital code represents the various hospitals and guarantees confidentiality of the data collection.



**Fig. 2: Maternal mortality ratio (MMR x 1000/100 000 life birth) in 2008 to 2010**

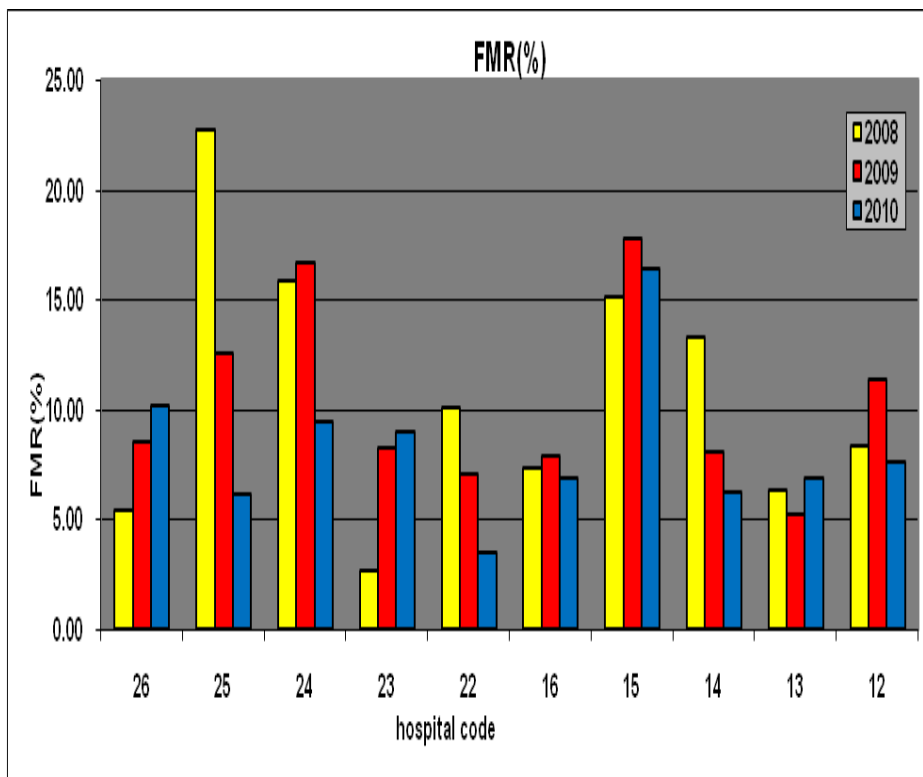
There is a consistent reduction of MMR in all the hospitals from 2008 to 2010 except one. The hospital code represents the various hospitals and guarantees confidentiality of the data collection.





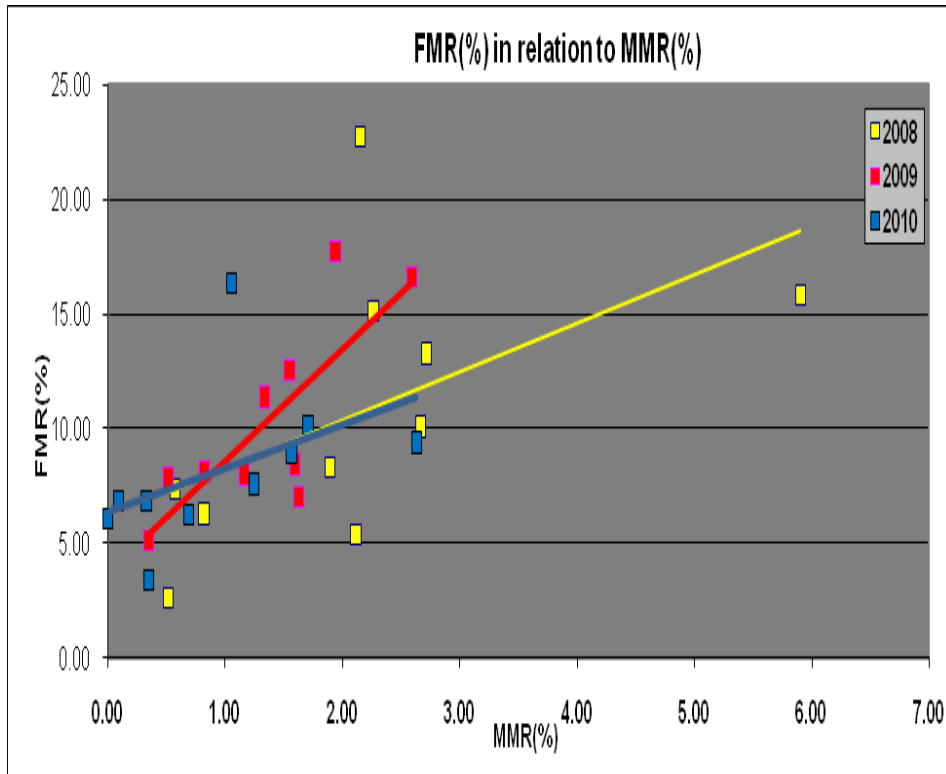
**Fig. 3: Maternal Mortality Ratio (x1000/100 000 live birth) in relation to the number of deliveries in Kaduna and Kano State hospitals.**

It is of significance to recognize that hospitals with low delivery rates have higher MMR



**Fig. 4: Fetal Mortality Ratio (%) in 2008, 2009 and 2010 .**

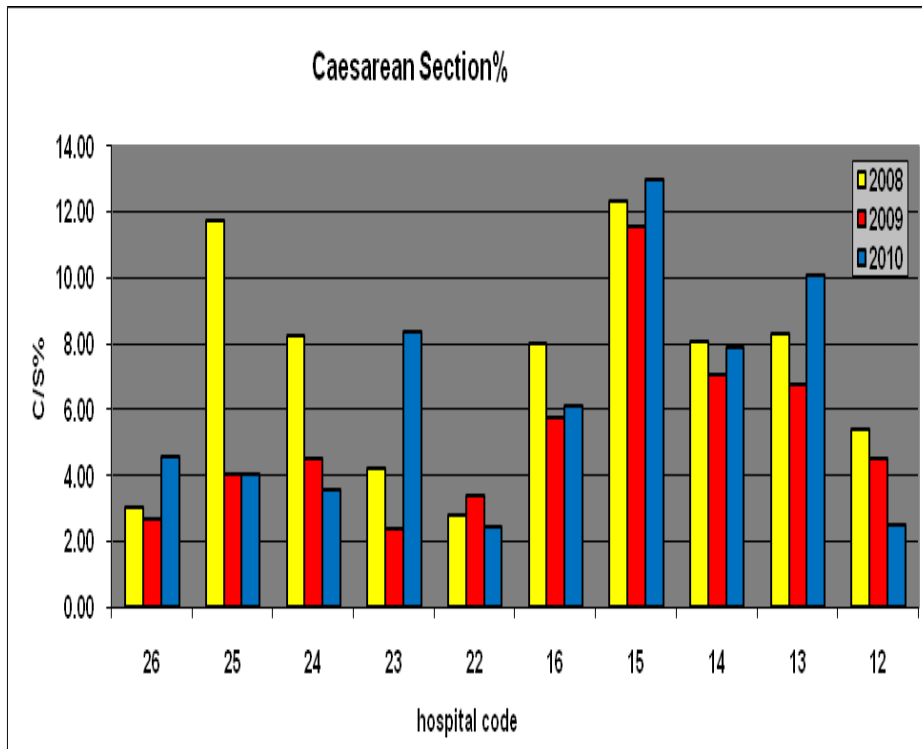
There is a considerable variation of fetal mortality ratio (FMR) over the past three years. In four hospitals there was a reduction of FMR whereas in the remaining hospitals no change or even an increase (26,23) could be observed was observed.



**Fig. 5: Fetal mortality ratio (FMR %) in relation to maternal mortality (MMR x1000 /100 000 life birth) in 2008 to 2010.**

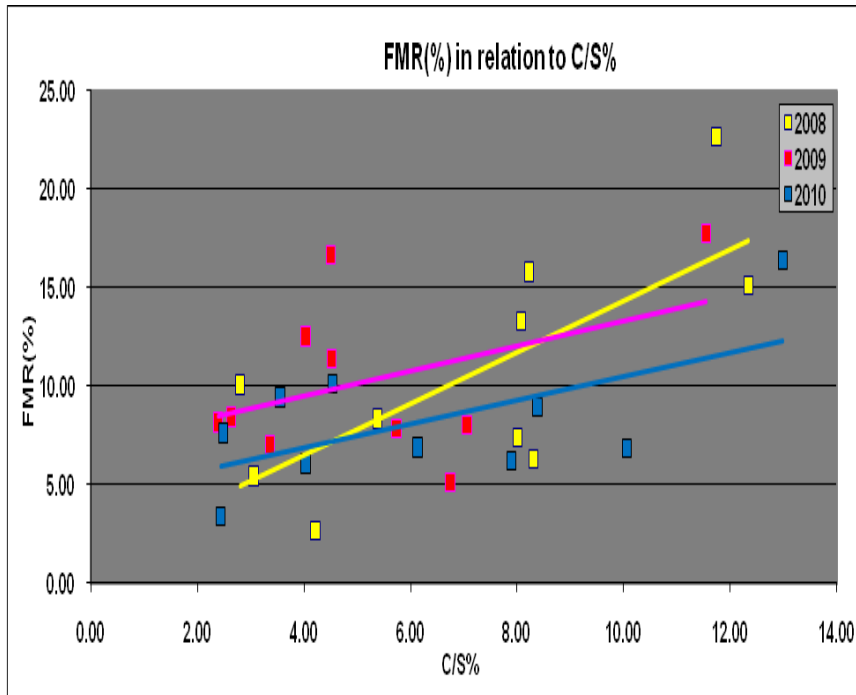
There is a strong relationship between the MMR and the FMR showing that high MMR is associated with elevated FMR.

#### 4. Influence of interventions on fetal mortality



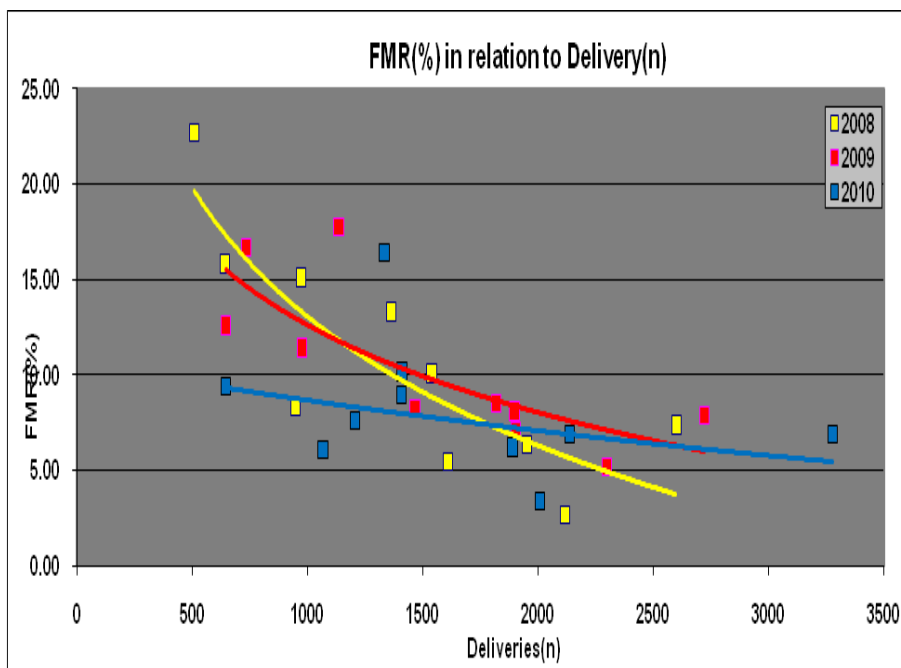
**Fig. 6: Caesarean section rate (%) in Kaduna and Kano hospitals.**

As shown in this figure there is considerable variation in the CS rates in the different hospitals and there is no clear pattern over the three years.



**Fig. 7: The relationship between CS-rate and fetal mortality ratio in 2008 to 2010.**

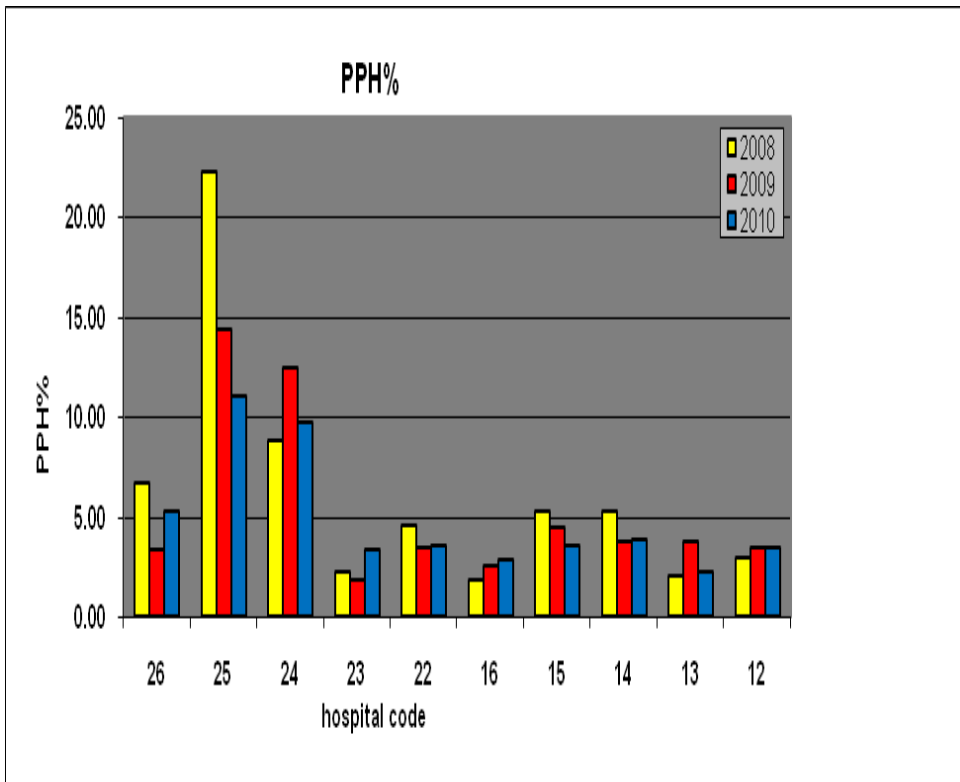
There exists the paradoxical observation of increasing FMR with rising CS-rates. It is assumed that in cases of severe complication to the mother a CS is conducted to save the life of the mother although the fetus is already dead.



**Fig.8: The relationship between the number of deliveries in a hospital and fetal mortality.**

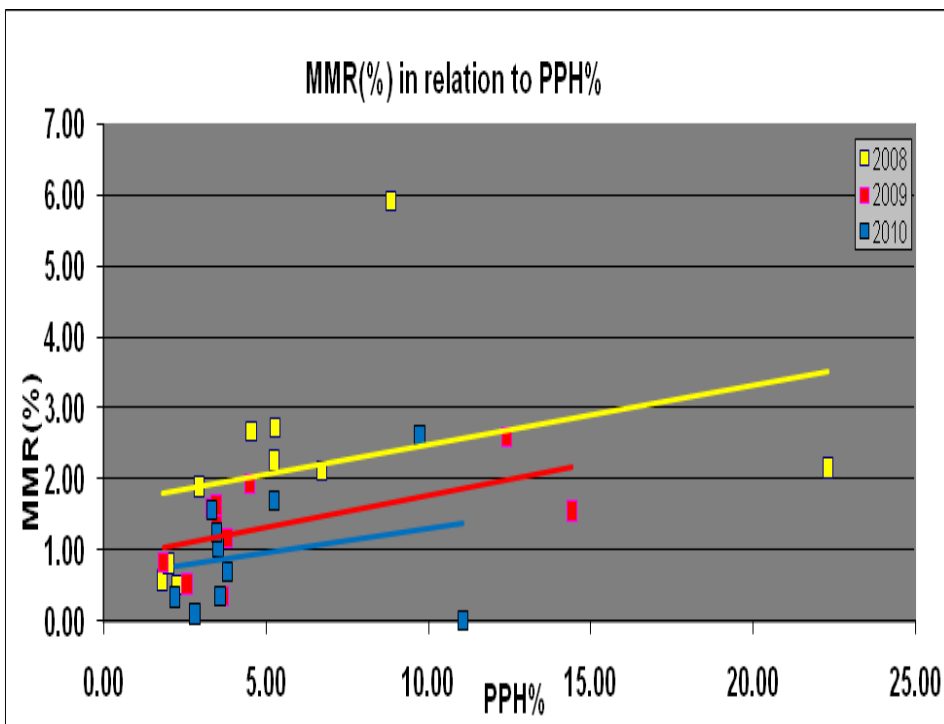
It is evident that smaller hospitals with low number of deliveries have the highest frequency of fetal mortality. There has been a slight change over the past three years, i.e. FMR fell in hospitals with lower number of deliveries. (see correlation curve blue 2010)

**5. Associations between post partum haemorrhage, preeclampsia/eclampsia, the number of deliveries and maternal mortality**



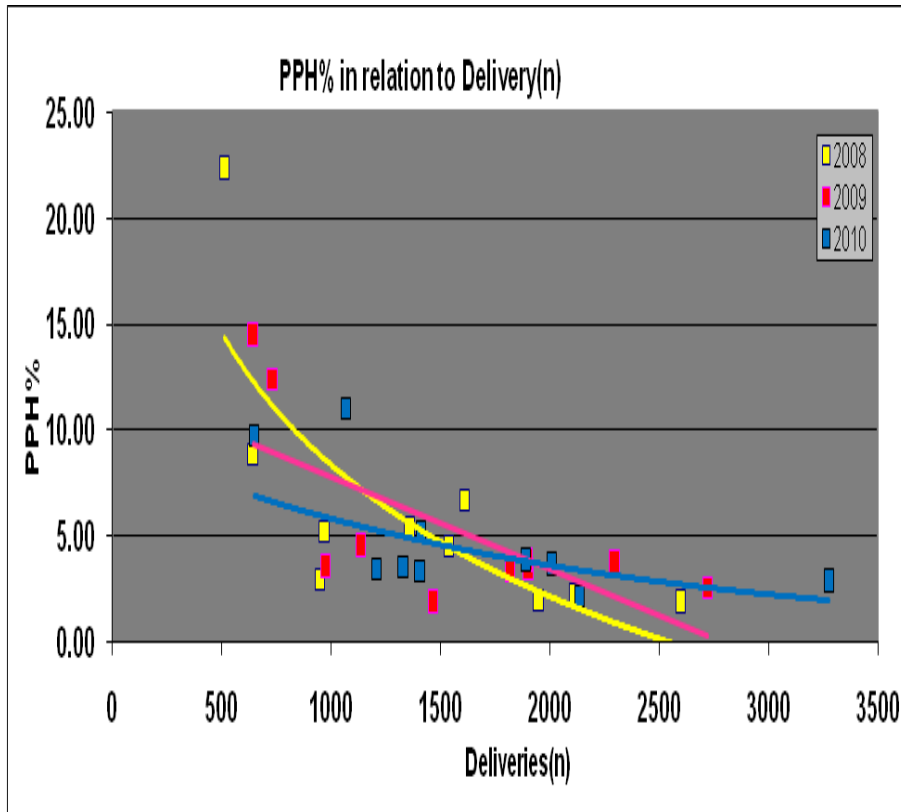
**Fig. 9: The incidence of post partum hemorrhage (PPH) in Kaduna and Kano State hospitals.**

There exists a tremendous variation among the hospitals, especially in hospitals 25 and 24. Further investigations have to clarify this observation. However in 7 hospitals there are fewer cases of PPH in 2010 as compared to 2008 and 2009



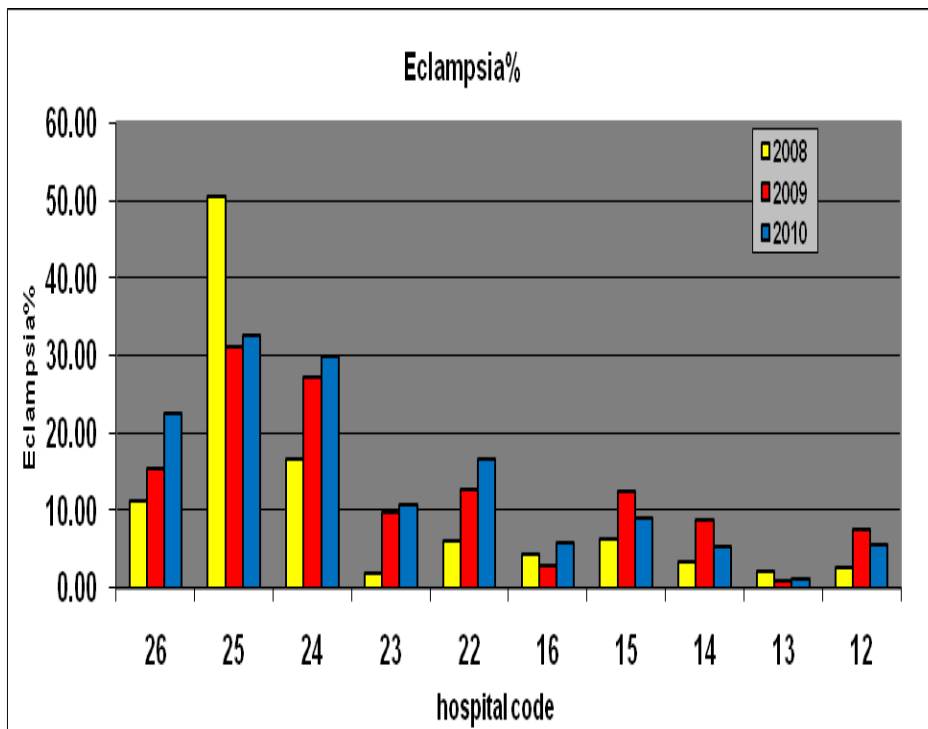
**Fig. 10: The relation between post partum hemorrhage and maternal mortality.**

There exists a weak relationship between the rate of PPH (%) and MMR. This needs further investigation.



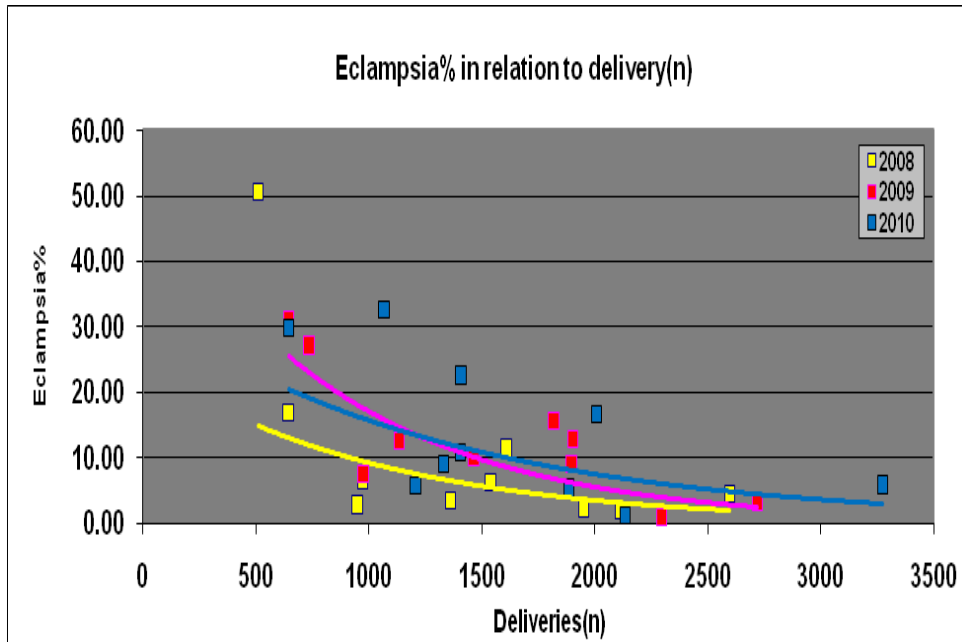
**Fig. 11: Post partum hemorrhage (PPH%) in relation to the number of deliveries in the hospitals in 2008 to 2010.**

PPH was highest in hospitals with low delivery rates in 2008 (yellow line). In 2010 the incidence of PPH in relation to the number of deliveries fell. Further investigation have to resolve the causes and problems behind this observation.



**Fig. 12: Incidence of eclampsia and pre-eclampsia in Kano and Kaduna hospitals in 2008 , 2009 and 2010.**

The different incidence in the various hospitals is remarkable. Further analysis shows that those hospitals with high PPH also have high eclampsia rates and high MMR.



**Fig. 13: The incidence of eclampsia in relation to the number of deliveries in Kaduna and Kano hospitals in 2008 to 2010.**

The graph demonstrates the close relationship of eclampsia to the number of deliveries, e.g. the size of the hospital. This interesting observation needs further investigations to find out, why the incidence of eclampsia is elevated in smaller hospitals..



Checking the maternity record book by the chief midwife

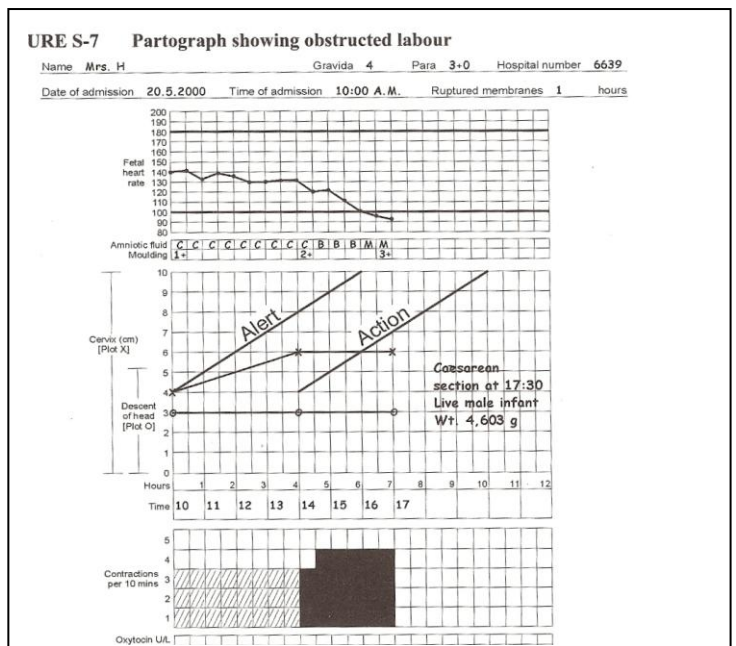
## 6. Instruments to tackle the problem of high fetal mortality

**Fig. 14 : Partograph and Fetal Heart Rate Doppler:**

are mandatory instruments to reduce the death of the fetus before and during labor and also in the neonatal period.



Demonstration of the application of the “Pocket Fetal Doppler” during a “Review meeting”.





### III. Audit of hospitals

#### 1. Evaluation:

For the evaluation “**Score criteria for general status**” and “**Score criteria for hygiene condition**” have been used. Each of the five items:

1. **Operating theatre**
2. **Delivery room**
3. **Neonatal unit**
4. **Delivery ward/Antenatal clinic**
5. **General Conditions**

have been valued from one (excellent) to six (very poor) (see table 2 Instrument for auditing). The total score ranged according to the points given for each subdivision from minimum five points to maximum thirty points for general status and from five to thirty points for hygiene condition, in total from ten to sixty. The score points were used to correlate a relationship between maternal mortality as the worst outcome of facility management and the score for each hospital.(see Fig. 15 and Fig 16)

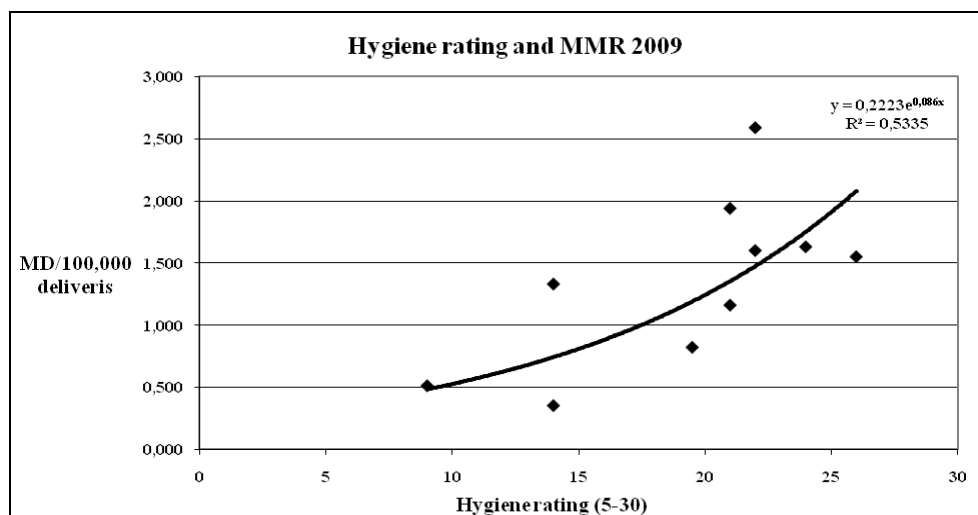
#### 2. Instrument for auditing

<b>Score criteria for general status:</b>	<b>Score criteria for hygiene condition:</b>
<b>Operating theatre:</b>	
• Anesthesia Apparatus	• Condition of the floor
• Operating table	• Cleanness of sink
• Resuscitation equipment	• Cleanness of apparatus
• Instruments for operations	• Dust distribution
• Intubation set	• Blood stained equipment
• Suction machine	• Cleanness of resuscitation equipment
• Anti shock garments	• Filled suction machines
• Oxygen availability	• Sterilizing condition
• Ambu bags	• Blood stained walls
• Caesarian section set	• Availability of operating shoes
• Theatre lamp	• Unorganized storage of material
• Sterilizer	• Cleanliness of record books
<b>Delivery room</b>	
• Delivery beds	• Dust distribution
• Delivery instruments	• Blood stained delivery beds
• Specula	• Rusted instruments
• Vacuum extractor	• Rusted delivery beds
• Episiotomy set	• Conditions in bowls for sterilizing
• Delivery set	• Condition of mattresses
• Baby scale	• Hand disinfection
• Gloves	• Resuscitation units for newborns
<b>Neonatal unit:</b>	
• Incubator	• Dust distribution
• Instruments for intubation + resuscitation	• Rusted instruments
• Baby scale	• Condition of mattresses

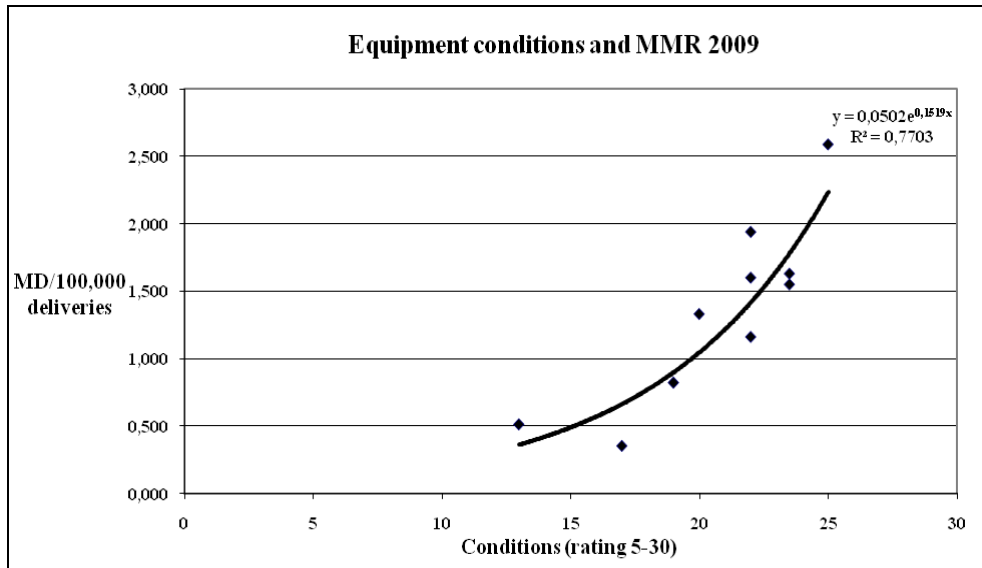
<b>Delivery ward/Antenatal clinic:</b>	
• Number of beds	• Conditions of beds
• Drip system	• Dust stained mattresses
• Mosquito nets	• Condition of the floor
• Maternity record book	• Availability of mosquito nets
• Ultrasound scanning room	• Cleanness of ultrasound probes
• Mother scales	• Dust stained instruments
• Sphygmomanometer	
<b>General Conditions:</b>	
• Water supply, bore hole	• Hygiene of sinks
• Electricity (power supply)	• Hygiene of toilets
• Window form and good seal	• Cobwebs
• Generator	• Gloves
• Refrigerator	• Aprons
• MG-Sulfate	• Masks
• Blood bank availability	

### 3. Audit of Kaduna State and Kano State hospitals regarding the condition of equipment in the facilities and the hygienic condition in relation to MMR

**Fig. 15: Relationship between hygienic rating and maternal mortality ratio (%).** The hospitals were evaluated according to the hygienic state of the operating theatre, delivery room, neonatal unit, obstetrical ward/antenatal clinic and variable factors, such as water supply and others. Each unit was evaluated by a score from 1 (best result) and 6 (worst result). A score of 5 was equal with excellent conditions, and 30 was equal to worst conditions for both hygienic conditions. Hospitals with the lowest score of 5 – 20 had in three out of four cases the lowest MMR of lower than 10 maternal death / 100 000 deliveries and hospitals with the highest score of about 20-30 had the highest MMR in the year 2009.



**Fig 16: Relationship between the state of the hospital equipment in the obstetrical facility and MMR.** The hygienic conditions are not taken into consideration. A good rating of the equipment is closely related to a low MMR of about 500 maternal death per 100 000 deliveries, whereas high ratings are associated with a high MMR.



Example of a well equipped and functional, clean operating theatre

#### IV. Clinical profile 2010

	Median	Range (min – max)	Reference Hospital *
Number of deliveries (n)	1408	(647 - 3275)	2008
Caesarean section (%)	5.34	(2.44 – 12.99)	2.44
Retained placenta (%)	1.90	(0.43 – 8.34)	4.88
Eclampsia/Preeclampsia (%)	9.94	(1.17 – 32.61)	16.63
Post partum haemorrhage (%)	3.56	(2.20 – 11.06)	3.59
Maternal mortality (%)	0.87	(0.00 – 2.63)	0.35
Fetal Mortality (%)	7.26	(3.44 – 16.37)	3.44

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\*The hospital with the lowest MMR and lowest FMR was selected as reference hospital

### Half yearly Checklist

#### Items to be checked

	<u>1</u> Exc.	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u> poor	
<b>1. Delivery ward</b>							
Maternity record book							
Delivery beds							
Availability Oxytocin							
Availability Ergometrin							
Availability Prostaglandines							
Long elbow gloves available							
Cleanness of Ambu bags							
Ultrasound machine (functioning)							
Fetal doppler (functioning) – filled batteries							
<b>2. Neonatal unit</b>							
Baby scale (functioning)							
Resuscitating equipments							
<b>3. Operating theatre</b>							
Blood stained equipment							
Cleanness of suction machine							
Cleanness of operating theatre							
Anaesthesia apparatus (functioning)							
Cleanness of operating table							
Dust – cleanness of the floor							
Theatre lamp working							
Resuscitating equipments							
Autoclave (functioning)							
Cobwebs							
<b>4. Ante and postnatal clinic</b>							
Availability MG-Sulfate							
Anti shock garments available							
Mosquito nets in use							
<b>5. Neonatal unit</b>							
Resuscitating equipments							
Incubator							
<b>6. General conditions</b>							
Water supply (bore hole, water tank)							
Power supply, Generator							

## **V. Activities**

### **1. References, Abstracts**

Zinser, R.: Rotary Project to reduce maternal Mortality.

Women deliver Conference, Ministers' Forum, October 18-20, London 2007.

Künzel, W., H. Galadanci, D. Shittu, M. Gruhl, R. Zinser: A model to reduce maternal mortality and fetal mortality in ten hospitals in Kaduna and Kano State, Nigeria – Continuously conducted quality assurance in obstetrics.(Abstract).

International Stillbirth Conference (ISC/NPF) November 5-7, Oslo 2008

Galadanci H, W. Künzel, D. Shittu, M. Gruhl, R. Zinser:

Quality Assurance in Obstetrics: A Model to reduce maternal and fetal Mortality and Morbidity in 10 Hospitals in Kano and Kaduna State, Nigeria (Abstract)

FIGO World Congress Cape Town , South Africa , October 2009

Shittu, Dolapo, W. Künzel, H. Galadanci, M. Gruhl, R. Zinser, St, Adams.

Prevention of obstetric fistula by quality assurance in obstetrics – a model of improved obstetrical service in Kano and Kaduna State (Abstract)

ISOFS Conference on obstetric fistula, November 25-27, Nairobi 2009

Künzel, W. Quality assurance and audit in obstetric care in Nigeria – a model to guarantee sustainability. RCOG International Newsletter 3, (2010) 16-19

Galadanci , H. W. Künzel, D. Shittu, M. Gruhl, R. Zinser, St. Adams , Obstetric quality assurance to reduce maternal and fetal mortality in Kano and Kaduna State hospitals in Nigeria. Intern. J. Gynecol. Obstetrics 114 (2011) 23-28

### **2. Meetings on Maternal and Perinatal audit**

- I. Perinatal Conference Zaria August 2008
- II. Perinatal Conference Kano February 2009
- Maternal and Child Health Hospital – Report 2008  
Institute of Quality Assurance in Obstetrics Kano State and Kaduna State, Nigeria III.Perinatal Conference in Zaria September 2009
- IV. Perinatal Conference Kano February 2010
- Maternal and Child Health Hospital – Report 2009  
Institute of Quality Assurance in Obstetrics Kano State and Kaduna State, Nigeria
- V. Perinatal conference in Kaduna February 2010
- VI. Perinatal conference in Kaduna November 2010
- VII Perinatal conference Kaduna March 2011

### **3. Reports in Media and Press**

Rotary maternal health project receives royal recognition  
Matthias Schütt, Rotary International News -- 29 August 2008

Keeping mothers healthy keeps kids healthy too  
Diana Schoberg, The Rotarian -- December 2008

Rotary's Großprojekt in Nigeria - keine Zukunft ohne gesunde Mütter  
Matthias Schütt, Rotary Magazin 1 | 2008

Warum die Familie Kande verstieß... Preis für frühe Geburten: Gynäkologische  
Fisteln –  
Prof. Künzel informierte sich über Hilfsprojekt in Nigeria  
Giessener Allgemeine, 2008-02-11

“Minütlich stirbt eine Frau im Kindbett”  
Frankfurter Allgemeine Zeitung 2009, C.P. Müller von der Grün

Rotary Project MG 53403 - A model to reduce maternal and fetal mortality and  
morbidity in 10 hospitals in Kano and Kaduna State, Nigeria  
Robert Zinser, PDG D1860 (Germany), RI-UN Day 2009

Versorgung braucht Qualität  
Rotary Magazin Distrikt 1820 Juli 2009 Seite 70

Sterben ohne gelebt zu haben – Das Risiko Schwangerschaft in Nigeria  
Thomas Kruchem 29.12.2009 Journal Panorama

Putting children first, Rotary's special emphasis for 2008-09 ties in with major UN  
goals and reinforces work Rotarians are already doing– Brad Webber, Global  
outlook, A Rotary World Magazine Press supplement

Dying without having lived Thomas Kruchem, Rotary Magazine 4/2010



#### 4. Community dialogue

### Conducted Community Dialogues in the villages adjacent to the ten selected hospitals in the states of Kano and Kaduna



#### KANO STATE

NAMES OF FACILITIES	NAMES OF VILLAGES
1. GAYA GEN. HOSPITAL	KAWARI ANGUWAR DAWA.
2. WUDIL GEN. HOSPITAL	DAN KAZA AJIKA.
3. TAKAI NYSC HOSPITAL	DURBUNDAI FAJEW.
4. SUMAILA GEN.HOSPITAL	MAGAMA GALA.
5. SHIEKH JIDDA	SARINA RIMIN DADA

#### KADUNA STATE

NAMES OF FACILITIES	NAMES OF VILLAGES
1. GAMBO SAWABA ZANA	DUTSEN ABBA DAKACE
2. KAFANCHAN GEN. HOSPITAL.	TAKAN GINDA DANGOMA.
3. BIRNIN GWARIGEN.HOSPITAL.	KUYELLO GAYAM.
4. YUSUF DANTSOHO.	MAKERA KADUNA SOUTH.
5. SAMINAKA GEN. HOSPITAL.	KAYARDA DUTSEN ALHAJI.

