

EDITORIAL

The Initiative of the University of Gezira for Safe Motherhood and Childhood-Gezira State Sudan 2005-2011.

Ismail Hassan Hussien, Ahmed El Bashir Abdella, Ali Babikr Habour, Omer Ahmed Mirghani, Mohamed El Sanousi, El Fadil Eisa, Somaya Khalafalla, Ibtisam Mohamed El Bashir, Osman Taha Mohamed Osman, Osman Khalafalla Saied

1. Introduction:

The initiative was released by the vice chancellor of the University of Gezira in Feb 2004. Its main objective was to reduce the maternal mortality rate (MMR) and the newborn mortality rate (NMR) in the Gezira state by at least 50% within 5 years. The justifications, specific objectives, process of project design, strategies, implementation and methods of evaluation were described in the editorial article in the GJHS. Dec. 2006 Vol. (2) No (2).⁽¹⁾ The main objectives were upgrading of ante-natal care, intrapartum care, puerperal care and care of the newborn; with emphasis on the intrapartum care. The main strategies were strong political commitment and full partnership with the ministry of health (MOH) at all stages. By the end of 2011 and despite considerable challenges, objectives have been exceeded; the MMR dropped from 469 to 151/100,000 live births and the NMR dropped from 43 to 12/1000 live births. Although the reduction in mortality was mainly due to the combined efforts of the initiative and the MOH, other effective factors- namely the overall socioeconomic development in the state must have contributed to that reduction.

The main future plans of the initiative are: continue working on its objectives, conduct a comprehensive programme evaluation of the project and transfer the experience to other states in the Sudan.

This article describes the main achievements of the initiative during the period 2005-2011: the implementation process, rural hospital development, upgrading of the village midwife (VMW), training, books issued by the initiative, information, evaluation and the future prospective.

2. Achievements 2005-2011

2.1. Implementation process.

The initiative has been fully committed to its approved process of implementation. Relationships with the Gezira State governor and his government, MOH, professional societies, organizations and community at large continued to be reinforced. The committee of the initiative held regular meetings twice per year- a total of 18 meetings. Each year a detailed plan of action was set and the achievements of that plan and the constraints which faced it were discussed with transparency in the annual meetings which were attended by most stakeholders. A core committee of 10 members was responsible of the follow-up of the plan of action. The evaluation system introduced by the initiative is functioning and nearly all deaths have been reported and audited. The initiative is now fully established in an equipped office in the Faculty of Medicine- Wad Medani

2.2. The rural hospital (43)

It is obvious that the whole system of effective maternity care capable of reducing maternal mortality and newborn mortality has to be built around ante-natal care (ANC) and the first referral level of care- the rural hospital. The upgrading of the rural hospital to an optimum standard which permits provision of safe management of obstetric emergencies is a fundamental strategy of the initiative. The upgrading includes: rehabilitation of the premises, provision of essential equipment and instruments, posting of adequate

EDITORIAL

number of health professionals-especially consultants and improving the hospital management. The initiative adopted a clear process to attain those objectives. Early in the project the resources and manpower situation in all the hospitals were assessed by direct observational visits and the deficiencies were identified-base line data.² Then the MOH set practical plans to rectify those deficiencies in phases and the initiative conducted supervisory visits to monitor the development in the hospitals. During the period 2005 -2010 the core group of the initiative visited (15) hospitals and in April 2011 all the hospitals were visited by multidisciplinary teams. The main purposes of those supervisory visits were to : assess the overall performance of the hospitals, evaluate the professional and administrative abilities of health professionals, estimate the deficiencies and create linkages between the hospitals and Wad Medani referral hospitals. The visiting teams collected a wealth of information through a standard format which was analyzed and the results were reported to the MOH. Considerable progress has been made, however much remains to achieve all the objectives. Following is a summary of the main achievements during the period 2005-20011 (Table 1.).

- Approximately 57.6% of the objectives were achieved
- The number of hospitals in which a caesarean section could be performed safely increased by 75%, from 16 hospitals in 2004² to 28 hospital in 2011 (65% of the hospitals can perform caesarean section safely).
- The number of hospitals and their geographical distribution is adequate, however 31 hospitals need rehabilitation and 12 need rebuilding.
- Remarkable improvements in the operating theatres; 20 new theatres were built and the condition of 70% (30/43) of all theaters is satisfactory
- The situation of all health professionals is excellent, 16 obstetricians and 11 pediatricians were posted .
- Unfortunately the anaesthetic services are still below the optimum standard.
- The labour rooms are deficient in equipment and instruments; most of them could be easily provided by the hospital itself .
- 17 hospitals lack ambulances (40.7) and the standard of the doctors' houses is poor.
- The management of all hospitals need to be strengthened.

2.3. The village midwife (VMW)

The ability to reduce maternal and newborn mortality is heavily dependent on the VMWs who are responsible for approximately 80% of all deliveries and hence the initiative focused on upgrading them. Unfortunately 43% of all villages in the Gezira state lack VMWs (total number of villages=2787; total number of VMW =1583, coverage=75%)⁽³⁾ and the basic training has been stumbling for the last few years. In 2011 the MOH founded 3 midwifery schools to rectify the shortage.

The initiative had a significant contribution in upgrading the VMWs through support, supervision and training. The issue of the appalling economic status of the VMW has been addressed several times during the annual meetings of the initiative calling the policy makers attention to it. The initiative struggled at all levels to post VMWs in permanent paid governmental jobs and eventually succeeded; the Gezira State posted 1000 VMWs and promised to post the rest. That was a major and historical support to VMWs initiated by the initiative and there is evidence that other states are following.

The initiative established the in –service training course for the VMWs which is considered as the most effective intervention for improving midwifery services.

EDITORIAL

Table 1: Resources and manpower in rural hospitals in the years 2004 and 2011 and achievements of provision during 2005-2011

No	Item	No of hospitals item available	No of hospitals item not available	No of hospitals item available	No of hospitals in which item was provided	Achievement of provision %
		2004	2004	2011	2005-2011	
1.	Delivery table	36	7	41	5	71.4
2.	Autoclave	20	23	31	11	47.8
3.	Hot oven	15	28	35	20	75
4.	Water Boiler large	-	43	31	31	72.1
5.	Operating table	15	28	37	22	78.6
6.	Anaesthetic machine	7	36	27	20	58.3
7.	Oxygen cylinder	10	33	25	15	45.5
8.	Nitrous oxide cylinder	2	41	22	20	51.2
9.	Monitor Intraoperative	-	43	18	18	41.9
10.	Delivery set	16	27	31	15	55.6
11.	Major operation instruments set	25	18	35	10	61.1
12.	Minor operation instruments set	27	16	37	10	68.8
13.	Evacuation operation set	24	19	40	16	84.2
14.	Safe Blood Transfusion*	14	29	40	26	89.7
15.	Sucker machine	13	30	30	17	54.9
16.	U/S machine	-	43	33	33	76.7
17.	Washing machine	-	43	17	17	39.5
18.	Electricity Generator	28	15	35	7	46.7
19.	Water well +Tank	-	43	30	30	72.1
20.	Obstetrician	4	39	20	16	41.0
21.	Paediatrician	-	43	11	11	25.6
22.	Anaesthetist	-	43	3	3	7.0
23.	Midwife (hospital midwife +VMW)	43	-	43	-	-
24.	Hospital midwife	26	17	38	12	70.6
25.	Lab. technician	17	26	42	25	96.1
26.	Theater attendance	17	26	36	19	73.1
27.	Anaesthetic	00	43	20	20	48.8

EDITORIAL

	technician					
28	Neonate resuscitation	4	39	27	23	58.9
	* Safe blood transfusion: refrigerator, anti sera, blood bags, HIV+HCV + HBV testing and lab. Technician					

Approximately 57.6% of the objectives were achieved.

2.4 Training:

Capacity building in training and education and continuous medical education are vital for the initiative to achieve its objectives and hence the initiative focused on providing training to health professionals to improve the quality of care of women. The initiative participated in the basic training and in-service training of health professionals involved in obstetric services. By the end of Dec 2011, 44 courses were organized and a total of 1264 professionals had in service training (Table 2).

2.4.1. Village midwife basic training

The initiative contributed in the development of a new Diploma curriculum for midwives in the Sudan which has been approved by a national workshop organized by the Educational Development Center (EDC) in 2005 (4). Graduates are trained to work as VMWs and hospital midwives. The curriculum is now adopted by the University of Gezira and by most midwifery schools in the country.

2.4.2. Basic training of doctors

Members of the initiative participated actively in the revision and development of the curricula of the Faculty of Medicine, the Faculty of Applied Medical Sciences, the MD in Obstetrics and Gynaecology and the Master in Family Medicine programmes. They managed to introduce the concepts of safe motherhood and childhood adopted by the initiative in those curricula.

2.4.3. In service training course for VMWs (5 days -50 contact hours)

In spite of the major advancements in midwifery and the emergence of new reproductive health problems, all the VMWs in the Gezira state did not have any formal in-service training to expose them to those changes. This course has been designed, implemented and evaluated by the initiative. It aims to upgrade the VMW knowledge, skills and attitudes.

The main contents of the course include: the basic skills of management of normal and abnormal labour and new skills which have been introduced for the first time (measuring blood pressure, intravenous canula, giving intravenous fluids, sterilization techniques, using sterile gloves and resuscitation of the newborn.)

The course contents are learnt mainly through practical demonstrations on models and video; lectures and discussions are also used. The team of trainers includes: an obstetrician, a paediatrician a community physician and teachers from VMW schools. The course is normally organized in a rural hospital after obtaining permission from the locality. 30-40 VMWs are chosen from the villages in the catchment area of the hospital. By the end of the course the trainees are evaluated by a practical examination and those who pass are awarded a certificate from the EDC UOG .

The course has achieved tremendous results. By the end of Dec. 2011 the total number of courses organized were 26 and the total number of VMWs trained were 795. The outcomes and impact of the course have been evaluated and following is a summary of the results:

EDITORIAL

- A senior consultant obstetrician and a senior midwife from Norfolk and Norwich university hospitals attended one of the courses and commented: (the contents are up –to-date, the instructional methods are effective, the trainers are skillful and the standard of the trainees is excellent)
- The performance of the trained VMW has improved significantly and improvements of quality of care of women and their newborns have been observed at all levels of service and referral facilities through application of skills and knowledge which they have acquired in the course.
- The delivery kits of all trained VMWs have been completed with new instruments and consumables (sphygmomanometer, intravenous canulae , sterile gloves, local anaesthetics, antiseptic solutions, sterilization containers, essential drugs).
- Remarkably the catchment area of the hospital has been adequately mobilized and their awareness about the magnitude of maternal and newborn mortalities has been raised. More over they became aware of their role in the prevention of those deaths. All the local communities accepted the course and participated in it by providing transport, lodging and feeding to both the trainers and trainees
- The organization of the courses in rural areas contributed in publicizing the initiative .

2.4.4 Advanced Life Support in Obstetrics (ALSO) 3 days-30 contact hours.

This course has been introduced for the first time in March 2007 and ever since it has been regularly organized by the providers, the department of Obstetrics and Gynaecology U. of G. and the initiative. Most of the courses have been sponsored by the initiative and few by the MOH. A total of 6 courses were organized and a total of 166 doctors (consultants, registrars, medical officers and house officers) were trained 2007-2011 (table 2).

The course aims to train doctors in management of obstetric emergencies with emphasis on intra- partum care (normal and dysfunction labour, intrapartum fetal surveillance, preeclampsia and eclampsia, antepartum haemorrhage, post partum haemorrhage, venous thrombosis, maternal resuscitation and trauma, cord prolapsed, safety in maternal care, bleeding in early pregnancy, neonatal resuscitation, shoulder dystocia, monitoring labour, forceps and ventouse, malpresentation and caesarean section). The contents are learnt through well structured and effective methods- Mega delivery, lectures and discussions. The trainees are evaluated by a written and a practical examination and certificates are awarded for those who pass.

2.4.5. Perineal repair and third and fourth degree perineal repair.

This is a one day course (10 contact hours) organized 6 times; 3 courses in English for doctors and 3 courses in Arabic for midwives. By the end of Dec 2011 64 doctors and 100 midwives were trained (table 2). The courses were organized jointly by the initiative, MOH and the department of Obstetrics and Gynaecology. All the courses were sponsored by the initiative.

The main contents of the course are: anatomy of the perineum, suturing episiotomy, diagnosis and repair of perineal tears. The main instructional methods are practical demonstrations on models and video.

2.4.6. Training course on delivery care and neonatal care in rural hospital-Gezira state Sudan ⁽⁵⁾

This course was designed jointly by the MOH and the initiative and was fully sponsored by the MOH. It aims to upgrade the obstetrical competencies of medical officers working in rural hospitals. Trainees were attached to consultants' units as residents for two weeks and participated in all activities of the units; they assisted in surgical procedures and did few of them under observation. The course also included a number

EDITORIAL

of lectures and discussions.

Three courses were organized and 45 doctors were trained (table 2). The MOH reports showed that trained doctors were able to perform caesarean section safely in rural hospitals.

2.4.7 Course on cardiocography (CTG) and ventouse: One day course (10 contact hours) .

This course was designed, organized and sponsored by the initiative. Registrars and house officers were trained in the labour room on the practical applications of the CTG and ventouse - 31 doctors were trained.

2.4.8. Infection control and neonatal care for health professionals.

This course was designed and implemented jointly by the initiative and Norfolk and Norwich university hospitals. 63 health professionals from Wad Medani and El Managil Hospitals were trained on the standard methods and procedures of infection control and neonatal care.

2.4.9. Courses designed, implemented and sponsored by the MOH and DKT.

The inputs of the initiative in these courses were not significant, however they were all relevant to the objectives of the initiative

- Post abortion care course for doctors total approximately 300 DKT.
- Training of trainers – health visitors working as teachers in VMW schools (MOH)-9 trainees
- Supervision: health visitors 45 trainees (MOH)
- Obstetric emergencies in areas of disasters and floods medical assistants and health visitors (15)- MOH
- Medical records- health visitors (30) MOH

Table 2 Training: Doctors and health professionals 2005-Dec 20011

	Course	Number of Courses	Doctors: consultants, Reg. MO.HO	Village Midwives	Health Professional
1	In-service training course VMW	26	-	795	-
2	ALSO	6	166	-	-
3	Perineal Repair (English)	3	64	-	-
4	Perineal repair Arabic	3	-	50	50
5	Medical officers	3	45	-	-
6	CTG course	1	31	-	-
7	Infection control	2	-	-	63
	Total	44	306	845	113

Total = 1264

2.5 Books:

The Initiative issued three books; distributed free to health professionals concerned and to stakeholders of the initiative.

2.5.1 The Initiative of the University of Gezira-safe Motherhood and Childhood-Gezira State 2005-

EDITORIAL

2010.

This book was issued in two versions-English (2004) and Arabic (2010). It comprises detailed description of the evolution of the initiative since 2004 when it was first released. The contents of the book include: the main objective of the initiative, justifications based on the results of situation analysis of maternal services, general and specific objectives, standard lists of resources and man power in hospitals and primary care units, models of antenatal care and referral system and health education and neonatal care, strategies of implementation, the process of designing the project, methods of evaluation of the programme and a detailed budget for the whole project. The book also includes preliminary achievements of the initiative. The book is used as a reference for the initiative and copies were distributed to all stakeholders-local, national and international.

2.5.2. Guidelines to the management of obstetric complications and resuscitation of the newborn First Edition (in English) July 2011.

The variety of emergencies which can present the obstetrician is vast and includes, medical, surgical and obstetrical conditions. These guidelines help doctors and midwives to manage those emergencies systematically and in the acute condition and hence minimize the risks and consequences of those life threatening conditions.

The process of preparation of the guidelines continued for 18 months. The drafts of the guidelines were written by obstetricians and paediatricians and further reviewed intensively in two workshops which were attended by a large number of consultants of all relevant disciplines. The final version is based on the consensus of all participants in those workshops. and was approved by the annual general meeting of initiative. The meeting recommended that all doctors and midwives should follow the guidelines and that the hospitals' managers and MOH are responsible for the implementation of the guidelines. The initiative shall issue the Arabic version soon.

2.5.3. Training of Village midwife book

(First Edition –Arabic 2009)

This book has been issued by the initiative to help midwives practice midwifery safely at all levels of services. It is therefore recommended reading for all midwives and their instructors. It has been written by a group of obstetricians paediatricians, community physicians and senior sister midwives. It contains 11 chapters including concepts of reproduction and maternal mortality, normal and abnormal labour, antenatal care, puerperium, indications of referral, care of the newborn, family planning and sexually transmitted diseases.

The book has been reviewed by two external assessors. Copies have already been distributed to the midwives trained in the in-service training course of VMWs and instructors are now using it and there is good evidence that they are benefiting from it.

2.5.4. Video: Demonstration of normal labour on a model (zarifa)

This 2 hours video has been written and produced by a group of obstetricians and VMW teachers. The video contains all the steps of normal childbirth on a model: preparations for delivery, short history and general examination, obstetrical and vaginal examination, diagnosis of labour, washing hands and cleaning the vulva and perineum, sterilization of instruments and gauze, techniques of child birth and care of the

EDITORIAL

newborn. The procedures are performed by a VMW teacher and a student midwife and the running commentary by an obstetrician. This video is now used as an educational material in the in-service training course of VMW and also used for demonstration of normal delivery techniques for medical students.

2.6. Information:

Dissemination of information about the initiative is one of its main strategies adopted in implementation and evaluation. That was done through meetings, workshops, conferences, presentations, public media, publications and recently through the internet. All the stakeholders have been well informed about the initiative; they became fully aware of the magnitude of the problems of maternal and newborn mortality and motivated enough to participate in the initiative. During the period 2005-2011 the initiative has been presented to the following national and international bodies concerned with maternal and newborn mortalities: The governor and the council of ministers of the Gezira State, all the faculties of University of Gezira, the obstetrical and gynaecological society the Sudan, Sudanese societies of pediatricians and community physicians, UNFPA, WHO, UNICEF, the governments of Kasalla and Northern states, the British council, DelpHE, Norfolk and Norwich university hospitals, group of Sub-Saharan Medical Schools Survey, Faculty of Medicine Walter Sisulu South Africa, Rabat, Uganda, Radio and television of Wad Medani, the Network TUFH, Federal Ministry of Health- Sudan, the international day of midwifery Khartoum, regional conference of MCH and other NGOs like Albir wa Altawasol, SPS and PPG of America.

The initiative benefited from the above mentioned presentations. It had a substantial support from the Gezira State government, moral support and encouragement from all concerned bodies and financial support of 60,000 pounds from Delfi. Also those presentations paved the way in front of the initiative to develop linkages with those concerned. The initiative also published 3 articles in the GJHS (1,2,3).

2.7. Evaluation – Maternal and newborn mortality

A structured model of estimating and auditing the deaths is an integral component of the initiative. In 2005 the initiative designed 4 charts in Arabic; 2 for reporting maternal deaths (hospital and home) and 2 for reporting the deaths of the newborn babies (hospital and home) and ever since they have been used properly by the MOH, thanks to the tireless follow-up of the core of the initiative. Each chart includes comprehensive data about the death; demographic, dates and times, reasons for referral, management, level of attendant, delays and cause of death. The hospital charts are completed by doctors and the home charts by health visitors. Then the deaths are audited to identify the avoidable factors, the risk factors and cause of death. This system is now well established and almost all the deaths are now reported through those charts.

The mortality rates have been dropping steadily and the main objective- reduction by 50% has already been exceeded (Table 3, Fig1 & Fig2). Audit of the deaths showed that the main avoidable and risk factors and main causes of deaths were similar during the years 2005-2011. The main avoidable factors were: delay at home by the VMW and delay at the rural hospital, suboptimal management at the rural hospital and even in the tertiary hospital, delay and inadequate blood transfusion, use of syntocinon by the VMW at home resulting in ruptured uterus. The main risk factors were; illiteracy, poor environmental health, lack of antenatal care, shortage of VMWs and inability of rural hospitals to treat obstetrical complications due to shortage in resources and trained doctors.

In 2011 94 maternal deaths were reported (151/100,000 live births). Table 3 shows the main causes of

EDITORIAL

deaths during that year. 6 deaths occurred at home and 88 at hospital.

In 2011 608 newborn babies died and the main causes were: intrapartum asphyxia, prematurity, RDS and sepsis.

Table 3. Causes maternal deaths 2011

	Cause of death	Number	%
1.	Postpartum haemorrhage	10	20.2
2.	Sepsis	13	13.8
3.	Viral hepatitis	13	13.8
4.	Eclampsia	11	11.7
5.	Ruptured uterus	9	9.5
6.	Abortion	5	5.3
7.	Pulmonary embolism	5	5.3
8.	Malaria	4	3.2
9.	Anaesthesia	3	3.2
10.	Anaemia	3	3.2
11.	Diabetes mellitus	2	2.1
12.	Cancer liver, epilepsy, encephalitis fever of unknown origin, psychosis	5	5.3
13.	Unknown causes	2	2.1
	Total	94	100%

2.8. Hospital management reform

During the supervisory visits inefficient management of hospitals has been identified as one of the weaknesses contributing to mortalities. Based on the information obtained from those visits the initiative set practical proposals to reinforce the hospitals' management. The proposals emphasize the role of the hospital director (consultant or medical officer) in how to maximize the use of available resources and manpower. They include brief description of the jobs of health professionals in the hospitals and how to coordinate the work among them, and how to maintain all the hospital properties. The proposals stressed the importance of punctuality and discipline and that should be supervised directly or indirectly by the hospital director. Consultants are instructed to budget their time and have a written weekly schedule of their activities; private work should start well after finishing all hospital duties. The proposals include guidelines on how to develop the hospital by close follow-up with the MOH and activation of the committee of the Development of the hospital.

The proposals have been approved by the MOH and hospitals are strongly advised to conform to them.

3. The future of the initiative

The future plans include: strengthening the partnership with the MOH, creating linkages with all organizations concerned, working on the objectives using the same strategies, posting obstetricians and pediatricians to all hospitals, conduct programme evaluation and identify areas of research, conduct relevant research (service and biomedical) and transfer the experience of the initiative to other states.

Table (3):

EDITORIAL

Progressive Reduction of M & N Mortality		
Year	MM\ 100 000	NM\ 1000
2005	469	43
2006	355	22
2007	297	17
2008	187	13.2
2009	186	12.1
2010	185.5	12.1
2011	151	10.2

Figure 1.

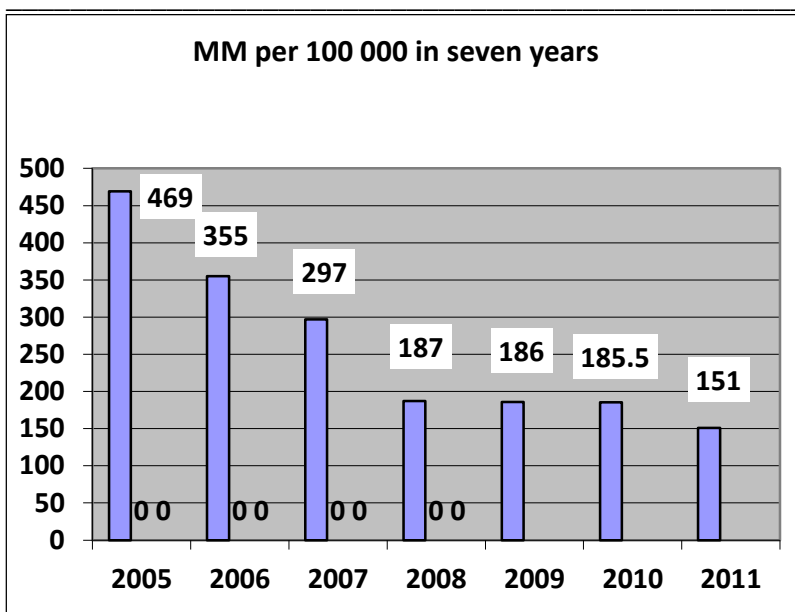
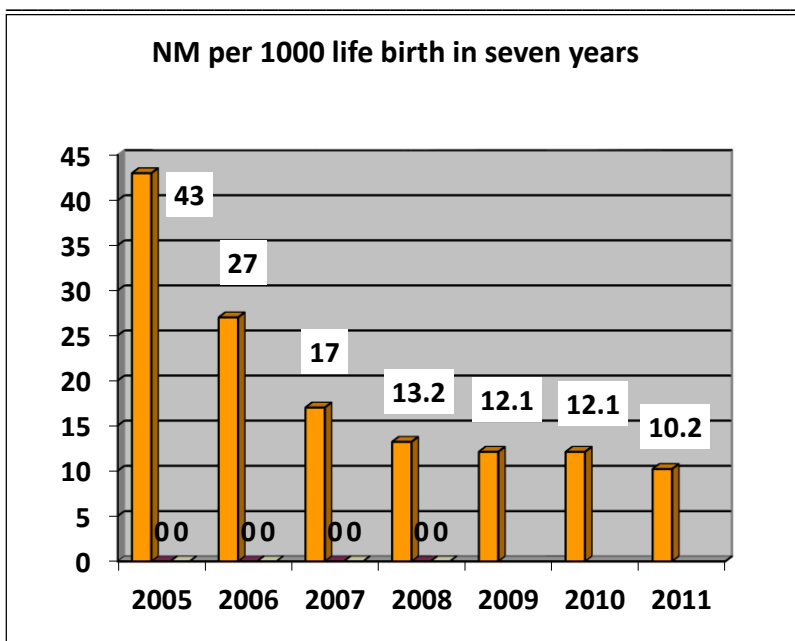


Figure 2.



EDITORIAL

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