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## AVERTING MATERNAL DEATH AND DISABILITY

## An evaluation of a national intervention to improve the postabortion care content of midwifery education in Nigeria

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## ABSTRACT

**Objective:** To examine the impact of a national intervention to improve the postabortion care (PAC) content of midwifery education in Nigeria. **Methods:** A 3-part quantitative assessment was carried out during and post-intervention. The first baseline component developed and examined the intervention to improve teaching capacity and improve the PAC curriculum among 6 midwifery schools that were to become regional training centers. The second survey was a pre- and post-assessment conducted among midwifery instructors from all schools of midwifery in the country. In the third component, 149 midwives graduating from the 6 regional midwifery schools were interviewed once 3–9 months after graduation to evaluate whether the intervention had improved their knowledge of PAC and clinical practice, and the likelihood that they would provide PAC after graduation. **Results:** Data from 6 schools of midwifery in 2003 showed that none offered PAC or had educators trained in PAC prior to the intervention. Incorporation of PAC content and teaching capacity increased in all 6 study schools during the 3 years after a national intervention. Midwifery instructors demonstrated statistically significant improvements in knowledge of and exposure to PAC and manual vacuum aspiration (MVA) after the intervention. A follow-up interview with 149 student midwives post graduation showed increased knowledge, exposure to, and use of MVA in the workplace. **Conclusion:** Significant changes in graduate midwives' exposure, practice, and provision of PAC services resulted from a national intervention to improve the training environment and skills of midwifery instructors and students in the 6 schools of midwifery selected for evaluation.

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## 1. Introduction

As many as 25% of pregnancies in Nigeria are unplanned, leaving women with difficult decisions regarding how to meet their desired family sizes [1,2]. These pregnancies resulted in an estimated 760 000 induced abortions in Nigeria in 2006 even though abortion is permitted only to save the life of the pregnant woman [1]. As a result of restricted access to safe abortion care, one national study in 1997 estimated that more than 75% of the abortions performed that year were unsafe and were performed by unskilled practitioners with unsafe methods or in an unhygienic environment, resulting in substantial maternal morbidity and even mortality [3]. Hospital-based studies suggest that 25% of women who have an abortion in Nigeria will have serious complications [4], causing 12%–40% of the country's maternal deaths [2,5–9]. Although home to less than 2% of the world's

population, Nigerian women account for 10% of the world's maternal deaths [10].

Abortion complications are second only to delivery as the most common reason for hospital stays in most hospitals in low-resource countries [11]. Due in part to the restrictive legal environment for abortion in Nigeria, treatment of complications of spontaneous and induced abortion is one of the most frequent obstetric emergencies in the country [4,7]. The deaths and morbidity from unsafe abortion, however, are deaths that can be prevented easily with timely treatment, skills, medicine, or technology [8,12]. Postabortion care (PAC) is a technologically simple intervention package for treating complications of unsafe abortion and spontaneous abortion with manual vacuum aspiration (MVA) or medical abortion, provision of contraceptives and counseling to prevent future unintended pregnancies, and linking women to additional reproductive health services they may need. The PAC concept was developed in the 1990s to address the disproportionate burden of maternal mortality and morbidity in countries with restrictive abortion laws [13]. The global success of the PAC intervention is well documented [12–14]. In Nigeria, however, many healthcare providers lack information,

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equipment, or authority to provide PAC services, leaving women's lives in danger [2–4,7,10,15].

The PAC training model developed for the present study focused on improving the skills and exposure of midwives and their instructors during midwifery education. A primary contributor to poor performance in health service delivery in Nigeria is the severe shortage of healthcare workers. Currently there are only 19 doctors and 52 midwives for every 100 000 Nigerians compared with 240 and 1275, respectively, in the UK—far short of what is necessary to provide adequate preventative and curative care in a low-resource country [16]. Although still not sufficient, there are more than 2.5 times as many nurses and midwives as physicians in Nigeria [16]. The PAC model promotes a shift in technology from a more uncomfortable and unsafe technology, namely sharp curettage provided only by physicians, to a woman-centered ambulatory care approach with a strong emphasis on counseling and postabortion contraception [13,14]. Studies have shown that with effective training, midwives are capable PAC providers, including performing uterine evacuations using MVA or medical abortion [17,18]. Midwives are more likely to reside in rural areas, be primary care professionals, and be responsible for maternal health services. Yet a lack of high-quality educational and training opportunities keeps many midwives from working to their full potential. As a result, demand for health care, including the reproductive health needs of women, is often unmet.

Scaling up postabortion care would save and improve many lives, yet the resources, political will, and strategy to make this happen continue to elude Nigerian and many international policymakers [10,13,19]. Although certainly not the only action necessary, training healthcare workers in the provision of PAC is considered an essential minimum element necessary to ensure providers have the knowledge and skills to provide these services. The standard training model for updating clinical skills or technology promotes in-service training (short intensive training courses often outside of the workplace) or workplace-based team training provided post graduation. Little consensus exists about how best to transfer skills and knowledge to the health workforce but, in general, in-service models have proven to be expensive and difficult to sustain in low-resource settings [20,21]. An alternative approach uses the point of entry, educational institutions, to institutionalize comprehensive and scalable skill-based learning in the health system. This basic strengthening of health education institutions, sometimes known as pre-service training, refers to the basic or postbasic training provided to health workers before they begin practicing. Pre-service training includes both didactic lectures as well as clinical skills training where providers learn to model their care-giving practices [20,21]. While only a portion of students may ultimately apply the specific skills in their future practices, this type of intervention ensures that all new providers are familiar with the basic content and thus creates a larger group of well-informed stakeholders. Pre-service training has the potential to increase the pool of skilled providers and improve access to essential health services. Many countries are exploring possibilities to invest more in pre-service education to institutionalize changes in technology, clinical practice, and positive provider behaviors.

In July 2003, Ipas, an international non-governmental organization (NGO) working in the field of reproductive health and rights, began a national project in collaboration with the Nursing and Midwifery Council of Nigeria (NMCN). The project's goal was to increase the number of skilled PAC providers through improvements in midwifery education. The present paper documents the results of an evaluation of the impact of this intervention on respondents at 3 levels: (1) midwifery training schools; (2) instructors; and (3) students. The specific objectives of the evaluation were to: (1) determine changes in knowledge and teaching capacity about PAC in midwifery schools and among midwifery faculty; and (2) assess the knowledge, practice, skills, and exposure to PAC for undergraduate midwives at 6 regional training schools before and after the intervention.

## 2. Methods

### 2.1. Stakeholder involvement in curriculum development and assessment

We describe the evaluation of a 3-year intervention that took place between July 2003 and June 2006. The project initially focused on a review and examination of the PAC content and training for national midwifery education. Project personnel documented and described existing practice and knowledge around PAC in the midwifery schools and their affiliated teaching hospitals, examining equipment, human resources, instructional materials, and supplies. Results of this rapid assessment were incorporated into 12 months of extensive discussions and working groups with policymakers and midwifery educators around the country. This process led to the adoption of a new midwifery training curriculum for the 18-month and 3-year midwifery programs in 70 midwifery schools, including instructional materials, a supply of MVA instruments, supplemental texts, and pelvic examination models to support improved training and clinical practice for their students. Six midwifery schools and their affiliated teaching hospitals, one from each of the 6 geographic zones in the country, were selected to become regional training centers for midwifery instructors as well as evaluation sites for documentation of the project performance. Over the life of the project, supervisory visits were made with staff of the NMCN that emphasized collective problem-solving, record review, and interviews with midwifery instructors to ensure that mentors were modeling high standard clinical practice in the schools and the associated clinical training facilities.

### 2.2. Midwifery faculty training

During phase 2 of the project (2003), training of trainers (TOT) courses for midwifery instructors were conducted around the country. Each of the department heads from the 70 midwifery schools in Nigeria sent 2–3 instructors for training at one of the 6 regional training centers. The purpose of the training was to improve the knowledge, skills, attitudes, and ability of the instructors to offer high-quality PAC coursework to student midwives in their respective institutions. Over a 1-month period, 169 midwifery instructors out of a total of nearly 600 in Nigeria participated in the residential TOT workshops on PAC and MVA. The TOTs included 24 hours of classroom teaching and 16 hours of clinical practice for each group of 10–14 educators. Training content for the instructors included adult learning principles; effective communication techniques; management of patients with abortion-related complications; PAC assessment and diagnosis; pain management; use of MVA; instrument processing; infection prevention; counseling; postabortion contraception; postprocedure care; screening for other reproductive health issues; and legal and ethical issues around abortion. Master trainers at the training center schools made use of structured lecture presentations, videos, practice on anatomical models, and clinical skills practice in a hospital setting. Clinical practice, patient care, role modeling, and observation sessions were held in 6 training hospitals affiliated with regional training centers so that instructors could practice the skills they had learned in classrooms.

We measured the impact of the TOT workshops on midwife educators through an anonymous pre- and post-test survey. The questionnaire was also used to collect data on exposure to PAC-related topics, training and teaching methods, basic equipment necessary for teaching PAC, human resources, availability of training and instructional materials, and supplies and applications being used by the instructors before the training.

### 2.3. Evaluation of midwifery graduates

The third phase of the project (2005/06) examined the impact of improved coursework and clinical training on the recent graduates of

the 6 regional midwifery schools selected for evaluation. Prior to graduation from their 18-month postbasic midwifery programs, 149 midwifery students (97% of all graduates and all who were in attendance on the days of enrollment) from the 6 geographically-distributed schools of midwifery consented and enrolled in the evaluation and agreed to complete a single telephone or in-person survey after graduation. At the time of the follow-up interview 3–9 months after their graduation dates, 129 midwives (87%) were located and interviewed by trained data collectors. Twenty graduates were not included in the follow-up study: 9 could not be located or met for an interview, 6 returned to school, and 5 went abroad after graduation. Graduates were asked to assess their clinical knowledge of PAC; exposure to PAC/MVA before, during, and after midwifery school; barriers to the provision of PAC services; clinical competency; and utilization of recently acquired skills.

## 2.4. Analysis

Data from midwifery instructors and students were entered and checked for consistency using Epi Info version 6.02 (CDC, Atlanta, GA, USA) and were exported to SPSS version 11 (SPSS Inc, Chicago, IL, USA) for analysis. Categorical data are presented as frequencies and percentages, while continuous data are presented as means and standard deviations. Pre- and postexposure responses from midwifery instructors were compared using the binomial test procedure for nonindependent samples because individual instructor responses were conducted anonymously and could not be matched. The single survey pre- and postexposure responses for graduate midwives were compared using McNemar tests for categorical variables. Statistical significance was reported at the  $\alpha < 0.05$  level.

## 3. Results

### 3.1. Regional training centers and curricula

Before 2003, none of the training centers incorporated any PAC content, owned MVA equipment, or had any educational materials on PAC or MVA. In 2006, when the assessment was repeated at the same 6 schools, there was improvement in all areas. All 6 schools: (1) had a training curriculum with new emphasis on PAC and MVA; (2) included PAC with MVA; (3) taught students about postabortion family planning information and methods; (4) had at least 2 instructors who had received training in PAC/MVA; and (5) had PAC teaching aids, educational materials, and MVA equipment in their institutions.

### 3.2. Midwifery faculty characteristics and experiences

At the time of the 2006 postintervention evaluation, most instructors at the Nigerian midwifery schools included in this evaluation were relatively new to teaching. Just under one-third (29%) had been teaching for 5 years, only 13% had been teaching for more than 20 years. Only 8% of the 169 instructors surveyed reported having ever attended a focused training on PAC or the use of MVA prior to the intervention. Table 1 compares instructors' pre- and post-training experiences. After the intervention, instructors reported more exposure to PAC, MVA, and knowledge of adult training techniques. More instructors reported having seen MVA kits after training than before (45% vs 94%;  $P = 0.002$ ) and more than 3 times as many instructors had observed uterine evacuation procedures with MVA ( $P < 0.001$ ). The proportion of instructors who reported that they used MVA to evacuate in their own practice was 5% before training and 49% after training ( $P < 0.001$ ).

**Table 1**

Experience of midwifery instructors before and after PAC/MVA training (reported in 2006;  $n = 169$ ).

Experience	PAC/MVA before training, No. (%)	PAC/MVA after training, No. (%)	P value <sup>a</sup>
Ever seen an MVA kit	73 (43.2)	159 (94.1)	0.002
Ever received instruction in training techniques	61 (36.1)	115 (68.0)	<0.001
Ever observed a uterine evacuation with MVA	40 (23.7)	144 (85.2)	<0.001
Ever used MVA themselves	9 (5.3)	81 (47.9)	<0.001

Abbreviation: MVA, manual vacuum aspiration.

<sup>a</sup> All  $P$  values were calculated using the nonparametric binomial test to compare the observed frequencies of a dichotomous variable to the frequency expected under a binomial distribution. Proportions reported before training were used to compute frequencies expected under a binomial distribution.

### 3.3. Evaluation of midwifery graduates

Characteristics of the 129 midwives who completed interviews after graduation are presented in Table 2. Almost three-quarters (74%) were working in hospitals and half (51%) were practicing in the private sector. Most of the graduates found work soon after completing their programs but 10% of midwives interviewed were unemployed at the time they were contacted for the postgraduation interview. At the time of the postgraduation interview 78% ( $n = 101$ ) of the former students reported that women seek care for complications of abortion in their facilities but many of them were not responsible for providing this care (Table 2). Just over half (53%) worked in a ward or unit that provided PAC services, although many did not routinely provide this care.

All of the graduate midwives said their coursework included lectures on how to perform a uterine evacuation with MVA and almost all of the graduates also reported seeing MVA in their classrooms. A majority also responded that MVA was available at their clinical training locations; almost three-quarters reported having practiced MVA on a pelvic model or observed a procedure in a hospital during clinical training practical sessions. Almost 9 of 10 midwives reported that they felt somewhat or very confident using MVA. Yet almost two-thirds of midwives stated that the training was not long enough and just over half said that they did not receive adequate clinical practice during their training. Only 32% of midwives interviewed had

**Table 2**

Characteristics of midwifery student graduates ( $n = 129$ ).<sup>a</sup>

Characteristics	
Age, y	29 ± 3.6
Marital status	
Single	68 (52.7)
Married	61 (47.3)
Level of care	
Primary health center	18 (14.0)
Secondary hospital	80 (62.0)
Tertiary hospital	15 (11.6)
Non-health facility	3 (2.3)
Unemployed	13 (10.1)
Sector	
Private	66 (51.2)
Public	47 (36.4)
Non-health facility	3 (2.3)
Unemployed	13 (10.1)
Facility provides PAC	
Works in PAC-providing facility	101 (78.3)
Works in facility that does not provide PAC or not working	28 (21.7)
Ward/unit of employment provides PAC	
Works in unit that provides PAC	68 (52.7)
Works in unit that does not provide PAC	48 (37.2)
Unemployed	13 (10.1)

Abbreviation: PAC, postabortion care.

<sup>a</sup> Values are given as mean ± SD or number (percentage).

the opportunity during their courses to practice MVA with patients (Table 3).

Exposure to PAC concepts increased after completion of the midwifery program (Table 4). The proportion of all graduate midwives who reported seeing MVA after their course was greater than those reporting exposure before the course, from 52% to 98% ( $P<0.001$ ). Among employed midwives who were working in facilities where women seek PAC ( $n=101$ ), less than half (46%) compared with almost three-quarters (72%) of midwives reported assisting other providers with uterine evacuation with MVA after their coursework ( $P=0.021$ ). Of the 101 graduates employed in PAC-providing facilities at the time of the follow-up interview, most (63%) were working at facilities with functioning MVA equipment. A small number (3%) of respondents owned their own MVA equipment (data not shown). Finally, even though almost half of the graduates reported that they did not work directly in units that provide PAC, more midwives (14%) had used MVA for uterine evacuation after their midwifery courses compared with 7% before ( $P<0.001$ ).

#### 4. Discussion

This evaluation was conducted to document the impact of improvements on the country's national midwifery program specifically pertaining to midwifery faculty and student training and provision of PAC services. Overall, the evaluation attributed significant changes at all levels of the program, including: (1) the capacity of midwifery schools to support the teaching of PAC/MVA; (2) midwifery instructors' experience with and exposure to PAC/MVA; and (3) graduate midwives' exposure to PAC and use of MVA to the intervention described in this paper. This evaluation moves beyond a mere description of the PAC curricula revision in Nigeria to address a gap in the literature and explore student behaviors after participation in the revised midwifery course.

After an initial assessment found poor results in all 6 regional training schools, all 70 schools in the country were ultimately equipped with pelvic models, teaching aids, MVA kits, and new curricula. Midwifery educators had significantly more experience and exposure to PAC and MVA after participating in the PAC training of trainers. The intervention ensured that midwifery instructors were better prepared and equipped to deliver PAC content to the 2250 annual graduates. Instructors were based in the schools and the affiliated training hospitals where students practice their skills and immediately begin to establish a pattern of using their knowledge in an actual work environment. Availability of teaching aids and educational materials at the schools of midwifery and regional training centers should contribute to sustainability and continuity of midwife training at the pre-service level.

This decentralized model of capacity building is not without weaknesses: only half of students interviewed felt that they had adequate training in PAC concepts and 12% did not feel confident using MVA after their midwifery courses. However, the intervention

**Table 4**

Graduated student midwives exposure to PAC and MVA before and after midwifery training (reported in 2006).

Exposure	Pre-midwifery schooling	Post- midwifery schooling	<i>P</i> value <sup>c</sup>
Percentage of all midwives who had seen MVA equipment <sup>a</sup>	67 (51.9)	126 (97.7)	<0.001
Assisted with a uterine evacuation <sup>b</sup>	46 (45.5)	72 (71.3)	0.021
Used MVA <sup>b</sup>	7 (6.9)	14 (13.9)	<0.001

Abbreviation: MVA, manual vacuum aspiration.

<sup>a</sup> Indicates computations among all 129 midwives post graduation.

<sup>b</sup> Computations limited to 101 graduates who worked in facilities where women seek care for abortion-related complications at the time of the interview.

<sup>c</sup> All *P* values were calculated using the McNemar test, a non-parametric statistical test used to compare paired proportions.

appears to have resulted in significant improvement in graduate midwives' exposure to and provision of PAC services in the 6 regional schools selected for evaluation. The proportion of graduates who reported seeing MVA was greater after the training than before. Significantly more graduates also reported assisting another provider with a uterine evacuation procedure and using MVA themselves. Furthermore, while many midwives did not use MVA themselves during this time period, almost three-quarters of the respondents reported they "assisted others" providing PAC. Although specific information on the type of assistance was not gathered during the interviews, in addition to MVA use, the revised curriculum included the management of patients with abortion-related complications, PAC assessment and diagnosis, pain management, MVA instrument processing, infection prevention, counseling, postabortion contraception, postprocedure care, and screening for other reproductive health issues; all essential to good-quality care.

Although the absolute percentage is small (14%), significantly more midwives had used MVA instruments in the short period since their training programs than had used MVA prior to their coursework (7%). If this 100% increase in MVA service provision was consistent across the pool of nearly 2250 annual graduates, this could result in meaningful improvements for Nigerian women suffering from abortion complications. Nigerian midwives do and will continue to provide the bulk of abortion and maternity care and influence the reproductive health of women in Nigeria. Using the educational environment to challenge norms that maintain physician authority over a simple "surgical" uterine evacuation procedure performed with MVA is key to decentralizing PAC services. It is important that midwives are equipped to address one of the most common pregnancy complications in the country and shift this burden out of overcrowded hospitals and out of the practices of overwhelmed physicians.

Participating in midwifery pre-service training in PAC did not mean that these midwives were ultimately employed in wards or facilities where they could practice these skills. Although this evaluation reported that only 14% of all graduates had provided a uterine evacuation with MVA 3–9 months post graduation, only 88% were employed as full-time healthcare providers and only 53% worked in units where they would routinely encounter abortion patients at the time of the interview. This reduces the potential for an impact in behavior change, and in fact it was relatively minor. Graduating midwives may leave their programs with a high level of competency in PAC and move into unrelated health services or management that allows for little time to maintain their skills. Those who do work in gynecology, labor, or delivery may face any number of barriers to using their skills, such as a lack of technology, unsupportive managerial or mentoring environments, or simply low demand for PAC services [12]. At a national level, however, this program may produce results undetectable now but measurable in coming decades, normalizing MVA use among midwives who see this set of PAC skills as but another piece of their routine care giving. It seems likely that some of these providers will move into management positions and

**Table 3**

PAC/MVA training exposure reported by midwifery student graduates completing interviews 3–9 months post graduation in 2006 ( $n=129$ ).

Training exposure	No. (%)
Training included lecture on uterine evacuation with MVA	129 (100)
Observed MVA in their classroom during training	126 (97.7)
Clinical training site had MVA	115 (89.1)
Feel somewhat or very confident using MVA	114 (88.4)
Practiced MVA on pelvic model	95 (73.6)
Observed MVA procedure on patients during training	90 (69.8)
Length of training was long enough	83 (64.3)
Had adequate practice during training	66 (51.2)
Practiced PAC with patients	41 (31.8)

Abbreviations: PAC, postabortion care; MVA, manual vacuum aspiration.



become stewards of their own MCH services with more awareness about the needs of women suffering from abortion complications. Some of these midwives may eventually be active as policymakers with at least a basic awareness about the importance of creating a more favorable environment for reproductive health services, PAC, and safe abortion.

However, training alone cannot change norms. In a study conducted in Nigeria among in-service PAC trainees 2–3 years following training, almost one-third said they were not allowed to provide uterine evacuation with MVA [12]. Stigma surrounding all abortion care continues to prevent institutions, health systems, and countries from engaging in efforts to change poor clinical practice [24]. National strategies, such as this intervention, need to be accompanied by other activities to change institutional and normative policies that continue to prohibit midwives from utilizing their clinical skills to their fullest potential. Improved midwifery training creates momentum for an expanding group of future providers to create a favorable environment for the sexual and reproductive health of all Nigerian women.

#### 4.1. Limitations of the study and recommendations for future research

Our evaluation had several limitations. Even though all schools in the country received support during the intervention, graduated midwives from only 6 schools of midwifery, 1 in each of Nigeria's geopolitical zones were interviewed. Although all components of the intervention were national, these 6 schools and graduates cannot be considered representative of all programs or students in the country. Also, during interviews graduates were asked to report on their exposure to concepts and practices prior to their schooling, thus introducing possible recall bias. Clinical competency was not addressed in this evaluation, with findings based on self-reported behaviors and confidence using skills. More information on the quality of the services and behaviors reported by the midwives is an important next step in assessing the impact of this type of intervention. Furthermore, the cross-sectional noncontrol group design selected for this study limits the strength of the conclusions. In Nigeria the intervention was national, incorporating the NMCN and all of the schools of midwifery and eliminating the possibility of a control group. Future research should incorporate a control or no intervention group to more precisely attribute changes to the intervention. A longitudinal design with multiple interviews would help examine the effect of time on midwives' practice, knowledge, and skill retention. A longitudinal design could also be used to examine the impact of low or high caseloads on practice and establish guidance on the frequency and content of refresher trainings.

## 5. Conclusions

Nigeria is a country of over 140 million people, 23% of whom are women of reproductive age. Increased governmental, civil society, and donor investment in maternal health is challenging but imperative. The results of this evaluation indicate that there have been improvements in midwifery students' provision of PAC services and significant changes in their exposure to MVA and PAC after their coursework. The initial investment in human capital via midwifery education, we believe, will ultimately improve the quality of midwifery practice and prevent future unintended pregnancy by promoting postabortion contraception as the standard of care. Perhaps more important, however, is the improved foundation to train and to provide high-quality PAC fostered in all of the schools of midwifery and the NMCN. Nigerian partners, including the schools of midwifery, are addressing a key aspect of national health programs often missing in the field of abortion care—a critical mass of motivated providers in the public

and private sectors willing to support women's health causes, even unpopular and stigmatized services such as treatment for unsafely induced abortions. Knowledgeable and well-trained midwives are essential in improving access to and quality of abortion care as well as disseminating the latest advances in evidence-based medicine.

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## Conflict of interest

The authors have no conflicts of interest to disclose.

## References

- [1] Sedgh G, Bankole A, Oye-Adeniran B, Adewole IF, Singh S, Hussain R. Unwanted pregnancy and associated factors among Nigerian women. *Int Fam Plann Perspect* 2006;32(4):175–84.
- [2] Henshaw SK, Adewole I, Singh S, Bankole A, Oye-Adeniran B, Hussain R. Severity and cost of unsafe abortion complications treated in Nigerian hospitals. *Int Fam Plann Perspect* 2008;34(1):40–50.
- [3] Henshaw SK, Singh S, Oye-Adeniran BA, Adewole IF, Iwere N, Cuca YP. The incidence of induced abortion in Nigeria. *Int Fam Plann Perspect* 1998;24(4):156–64.
- [4] Bankole A, Oye-Adeniran BA, Singh S, Adewole IF, Wulf D, Sedgh G, et al. Unwanted pregnancy and induced abortion in Nigeria: causes and consequences. New York: Guttmacher Institute; 2006.
- [5] Oye-Adeniran BA, Adewole IF, Umoh AV, Ekanem EE, Gbadegesin A, Iwere N. Community-based survey of unwanted pregnancy in Southwestern Nigeria. *Afr J Reprod Health* 2004;8(3):103–15.
- [6] Oye-Adeniran B, Umoh AV, Nnatu SN. Complications of unsafe abortion: A case study and the need for abortion law reform in Nigeria. *Reprod Health Matters* 2002;10(19):18–21.
- [7] Okonofua FE, Odimegwu C, Ajabor H, Daru PH, Johnson A. Assessing the prevalence and determinants of unwanted pregnancy and induced abortion in Nigeria. *Stud Fam Plann* 1999;30(1):67–77.
- [8] World Health Organization. Unsafe abortion: global and regional estimates of the incidence of unsafe abortion and associated mortality in 2000. 4th ed. Geneva: WHO; 2004.
- [9] Ujah IA, Aisien OA, Mutihir JT, Vanderjagt DJ, Glew RH, Uguru VE. Factors contributing to maternal mortality in North-Central Nigeria: a seventeen-year review. *Afr J Reprod Health* 2005;9(3):27–40.
- [10] Shiffman J, Okonofua FE. The state of political priority for safe motherhood in Nigeria. *BJOG* 2007;114(6):127–33.
- [11] Kestler E. Surgical procedures to evacuate incomplete miscarriage: RHL commentary (last revised 8 January 2002). The WHO Reproductive Health Library, Geneva: WHO; 2002.
- [12] World Health Organization. Safe abortion: technical and policy guidance for health systems. Geneva, Switzerland: WHO; 2003.
- [13] Billings DL, Crane BB, Benson J, Solo J, Fetter T. Scaling up a public health innovation: a comparative study of post-abortion care in Bolivia and Mexico. *Soc Sci Med* 2007;64(11):2210–22.
- [14] Cobb L, Putney P, Rochat R, Solo J, Buono N, Dunlop J, et al. Global evaluation of USAID's Postabortion Care Program. Washington DC: USAID; 2001.
- [15] Fetter T, Akiode A, Gomez Ponce de Leon R, Benson J. Turning training into practice: findings of an impact evaluation of postabortion care training in Nigeria. Chapel Hill, NC: Ipas; 2005.
- [16] World Health Organization: WHO global health atlas. Available at: <http://www.who.int/globalatlas/>. Accessed April 30, 2008.
- [17] Warriner IK, Meirik O, Hoffman M, Morroni C, Harries J, My Huong NT, et al. Rates of complications in first-trimester manual vacuum aspiration abortion done by doctors and mid-level providers in South Africa and Vietnam: a randomized controlled equivalence trial. *Lancet* 2006;368(9551):1965–72.
- [18] Gras C, Sadauki H, Abdullahi H, Benson J. A multi-center case series to examine provider use and acceptability of Ipas MVA Plus® Manual Vacuum Aspiration Syringe in uterine evacuation. Chapel Hill, NC: Ipas; 2006.
- [19] Chudi IP. Post-abortion care: a neglected aspect of reproductive health services in Nigeria. *Afr J Reprod Health* 2003;7(3):13–6.
- [20] Wegs C. Training that makes a difference: strategic use of training to improve reproductive health services. Chapel Hill, NC: Ipas; 2002.
- [21] Wolf M. If training is not enough, what is? A literature review on trainee retention and deployment. Chapel Hill, NC: Ipas; 2007.