

## Setting Up and Running a Successful IVF Program in Africa: Prospects and Challenges

R. K. Adageba<sup>1</sup> · E. T. Maya<sup>2</sup> · J. J. Annan<sup>1</sup> · F. J. Damalie<sup>1</sup>

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### About the Author



**Dr. Rudolph Kantum Adageba** had undergone his basic medical training at the Rostov On Don Medical University in Russia which he completed in 1996. He had worked in various capacities: medical officer, medical superintendent, and District Director of his services, before undertaking his postgraduate training at the West African College of Surgeons in 2001. He completed his fellowship in Obstetrics and Gynaecology in 2007 and was inducted as a Fellow of the West African College of Surgeons in 2008. He proceeded to Rotunda, the Centre for Human Reproduction, Mumbai, India, to pursue a Clinical Fellowship Programme in Assisted reproductive Technologies in 2011. He also completed a 3-month clinical attachment at the University of Michigan Center for Reproductive Medicine in 2011. Since 2012, he has been running successfully his own center established for assisted conception in his native country Ghana. He has contributed chapters in

textbooks on infertility and has a number of peer-reviewed publications to his credit.

### Introduction

Infertility is a serious problem in Africa with devastating social, cultural, emotional, economic, and medical consequences for affected couples [1, 2]. Even though the exact burden of subfertility in the region is not known, it is generally estimated to be about 15–20 % [3]. The causes of subfertility in this region include both male and female factors. However, in a region where sexually transmitted infections (STIs) are very common, tubal blockage remains the commonest female factor cause of infertility [1].

Globally, there is evidence of worsening semen parameters in all regions.

Subfertility from both tubal blockage and suboptimal semen parameters can potentially be effectively treated by in vitro fertilization (IVF) and intracytoplasmic sperm injection (ICSI), respectively [4]. The need therefore for efficient IVF services in the African region cannot be overemphasized.

Setting up and running such a highly specialized service in a region with serious infrastructural challenges coupled with low levels of income is a daunting task. This review seeks to highlight some of these challenges in running a successful IVF program in African and indeed other low-resource settings.

✉ R. K. Adageba  
rkadageba3147@gmail.com

<sup>1</sup> Ruma Fertility and Specialist Hospital, P. O. Box AY 254, Kumasi, Ghana

<sup>2</sup> Department of Population Family and Reproductive Health, University of Ghana School of Public Health, Accra, Ghana

### Challenges

Power outages and fluctuation is an everyday occurrence in many countries in Africa. Stable power supply is a necessary requirement to maintaining optimal conditions in the IVF

laboratory for embryo culture and development. As a result, a comprehensive and reliable power back-up system is crucial in running any successful IVF program in this region. Centers running IVF programs have different power back-up arrangements. However, these generally include having standby generators as well as powerful UPS systems. In the author's center, there are two standby generators and two 15–20 kVA UPS systems. The UPS systems are charged by car batteries, which can keep the power in the IVF laboratory and the operating theater stable for at least 4 h in case of power outage from the national grid. This allows ample time to safely switch over to the standby generators without compromising laboratory conditions. Service technicians must be readily available at hand to repair the generators in case faults develop unexpectedly. A strict, routine maintenance schedule must be followed for the standby generators, batteries and UPS systems.

Training programs for the various key personnel in an assisted conception program in the Africa region is critically lacking. Properly trained fertility specialists, embryologists, and specialist IVF nurses are hard to come by. Trained obstetricians and gynecologists resort to short training courses in India and elsewhere to acquire expertise in this field. The story is similar for clinical embryologists. The expertise acquired may not be enough to ensure complete mastery of the field before setting an IVF center. General nurses are often trained on the job to assist in IVF procedures such as patient preparation and egg retrievals.

Another area of serious constraint in running an IVF center in Africa is the lack of a reliable supply of quality drugs, consumables, and culture media. Few pharmaceutical companies deal in drugs related to IVF practice because the health priorities in most African countries do not include treatment of infertility. In Ghana with a population of about 25 million and 12 IVF centers, only two pharmaceutical companies supply drugs related to IVF practices. Drug supplies are sometimes erratic, which affects planning of cycles. Cold chain cannot be guaranteed due to unreliable power supply in the pharmaceutical companies' depots. All relevant consumables such as egg-retrieval needles, embryo transfer catheters, petri dishes, and culture media have to be imported usually from different countries. In the author's center, consumables are imported from India, Denmark, and Switzerland just to mention a few. Apart from delays in receiving all these essentials on time for treatment of patients, import duties on them are high, and contribute significantly to the cost of treatment.

The equipment for IVF and skilled personnel to set up and service the equipment regularly is another key challenge. The companies that set up IVF laboratories are often based in foreign countries. After the initial set-up, regular maintenance of the equipment becomes a problem as it is costly to bring in service engineers from abroad. This has

the potential of negatively affecting laboratory and culture conditions, and hence, IVF success rates.

IVF still remains a costly treatment modality for sub-fertility worldwide. Even though conditions in this vast African continent vary from country to country, poverty is endemic in most countries. This significantly affects the number of couples who can access IVF services. Practitioners are therefore faced with high operational costs of IVF services on one hand and a dire need to render affordable IVF services on the other. This is the paradox of the typical IVF practitioner in Africa.

## Discussion

IVF since its inception in the 1970s remains an effective treatment for certain causes of infertility worldwide [5, 6]. It has revolutionized the treatment of infertility from tubal blockage, which is the commonest female factor cause of infertility in Africa [7, 8]. ICSI has made it possible for men with severe male factor cause of infertility to be treated [9].

Africa's population is estimated to be about one billion at the moment. It has been estimated that for a population to have adequate IVF services, there should be about 1500 IVF cycles to 1 million people. Africa therefore needs about 1.5 million cycles of IVF to meet its current population demand for such services. Even though statistics are lacking regarding the number of IVF cycles done in Africa, the paucity of IVF of centers across the continent and the high cost of treatment mean there is a huge unmet need for IVF services. Countries with significant number of IVF centers include Ghana, Nigeria, South Africa, Egypt, and Kenya. Therefore, despite the massive global expansion in ART services, in Sub-Saharan Africa, ART services remain largely inaccessible [10, 11]. Most of the centers are located in the major cities of the countries where they are found serving predominantly the rich and growing middle class populations who only can afford the cost of treatment.

Despite the daunting challenges facing the practitioners in the African region, the IVF centers currently operating can boast of decent success rates comparable with centers elsewhere in the world. The absence of a registry for IVF cycles in Sub-Saharan Africa makes comparison of results in Africa to the results in other regions difficult. Work is currently ongoing to establish such a registry for Africa. Unpublished data from the author's center where about 500 IVF cycles are done in a year show pregnancy rates of approximately 55 % from 2012 to 2014 and of the take-home baby rate of about 40 %. The prospects for running a successful IVF program in Africa are therefore good, despite the serious challenges.

Africa must therefore rise to the challenge of providing effective, safe, and affordable IVF services to its

population. Innovative ways should be found to make ART services affordable in low-resource settings [12, 13].

Governments in Africa should make efforts in improving infrastructure particularly in the area of stable power supply. Public financing of IVF must be considered as infertility is a disability of the reproductive system just as diseases of other body systems. This can be done by integrating the investigation and treatment of infertility into the existing reproductive health services. Government can support the private sector firms who are currently the main providers of IVF services by way of reducing or even waiving taxes on equipment for IVF, drugs, and consumables. This could significantly reduce the cost of treatment thereby making IVF services more affordable. There is also the need for strong regulatory bodies to regulate every aspect of ART practice to make the service efficient and safe.

Established clinics providing IVF services should adopt best practices to make their services most efficient, effective, and safe. Practitioners should minimize complications such as ovarian hyperstimulation syndrome (OHSS) by adopting softer or milder stimulation protocols [14, 15]. Multiple pregnancies in a region where maternal and perinatal mortality rates are still very high should be prevented as much as possible. Centers should avoid transfer of multiple embryos and rather invest in good cryopreservation facilities so that excess embryos can be frozen for future use. Such a service will curb the temptation to transfer more embryos in a fresh IVF cycle.

To address the personnel and training needs of the region, IVF centers should seek accreditation and begin training programs for the various categories of personnel needed in this highly specialized field of medicine. African universities offering postgraduate programs in obstetrics and gynecology should consider starting subspecialty training in infertility. Collaboration with local IVF centers and foreign universities should be sought so that trainees can spend valuable time in such centers to improve their knowledge and skills in ART services.

Africa already has a high unmet need for IVF services. This already high unmet need for IVF services is likely to increase in the near future as the continent's population continues to increase. The private sector and governments must therefore make efforts to scale up IVF services in the African region.

## Conclusion

There is a great demand for ART services in the developing countries of Africa where tubal blockage resulting from STIs is still very high. Tubal factor infertility can be effectively treated by in vitro fertilization with embryo

transfer. Unfortunately, ART services are inaccessible to large sections of the population mainly due to high treatment costs. While preventive strategies will play an important role in the overall prevention of infertility, more innovative, effective, safe, and low-cost ART strategies are the need of the hour in these low-resource settings.

**Conflict of interest** The author has no conflict of interest.

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