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COST EFFECTIVENESS ANALYSIS OF FAMILY PLANNING SERVICES OFFERED BY MOBILE CLINICS VERSUS STATIC CLINICS IN ASSIUT, EGYPT

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Abstract

This study reports cost effectiveness (CE) information of family planning (FP) services gathered from the mobile clinics and a comparable number of the static clinics in Assiut Governorate. The findings of this study may guide and help policy makers at the Ministry of Health (MOH) to reallocate resources of the family planning program in a way to fulfill its maximum benefits. The data for the study was obtained through records reviews for all the mobile clinics (15 in number) that serve in Assiut Governorate and for 15 corresponding static clinics. The total costs of the mobile clinics -serving in Assiut Governorate and offering family planning / reproductive health services - were higher than the costs of a corresponding number of the static clinics. The salaries and capital costs have the major share for the total costs in the mobile clinics, as well as for the static clinics. As for effectiveness measures; the Couple Years of Protection (CYPs) were higher for the mobile clinics than for the static clinics as more IUDs were used at the mobile clinics. However, total number of family planning visits were higher for the static clinics than for the mobile clinics. The static clinics are more cost effective than the mobile clinics. The government needs to reallocate the resources in the right way that assure the continuity in providing family planning services to women living in the deprived areas on one hand and in the wise and effective use of the money spent on these services on the other hand.

JEL Classifications: H5, I1

Keywords: Health, Family Planning Services, Cost Effectiveness, Assiut, Egypt

ملخص

توضح هذه الدراسة فعالية التكاليف لخدمات تنظيم الأسرة حيث أنه تم تجميع هذه البيانات من عدد من العيادات المتنقلة وعدد مماثل من العيادات الثابتة في محافظة أسيوط. قد تساعد نتائج هذه الدراسة فى توجيه واضعي السياسات في وزارة الصحة (MOH) في إعادة توزيع الموارد من برنامج تنظيم الأسرة كوسيلة لتحقيق الفوائد القصوى. تم الحصول على البيانات للدراسة من خلال استعراض سجلات جميع العيادات المتنقلة (وعددهم 15) التي تخدم محافظة أسيوط و15 من العيادات الثابت المناظرة. إن التكاليف الإجمالية للعيادات المتنقلة التي تخدم محافظة أسيوط وتقدم خدمات تنظيم الأسرة / خدمات الصحة الإنجابية - كانت أعلى من تكاليف عدد من العيادات الثابتة. وتمثل كل من الرواتب وتكاليف رأس المال جزءا كبيار من مجموع التكاليف في العيادات المتنقلة، فضلا عن العيادات الثابتة. وفيما يتعلق بالتدابير الفعالة؛ كانت سنوات الحماية القليلة (CYPs) أعلى للعيادات متنقلة مقارنة بالعيادات الثابتة حيث تم استخدام وسائل منع الحمل بشكل اكبر في العيادات المتنقلة. ومع ذلك، كان مجموع عدد الزيارات لتنظيم الأسرة أعلى فى العيادات الثابتة عنها للعيادات المتنقلة. نخلص الى ان العيادات ثابتة هي أكثر فعالية من حيث التكلفة من العيادات المتنقلة. تحتاج الحكومة إلى إعادة تخصيص الموارد في الطريق الصحيح للتأكيد على الاستمرارية في تقديم خدمات تنظيم الأسرة للمرأة التي تعيش في المناطق المحرومة من جهة، والحكمة في الاستخدام الفعال لهذه الأموال التي تنفق على الخدمات من جهة أخرى.

1. Background and Rationale

Outreach clinical services –like mobile clinics –can play an important role by providing services to clients living in remote rural areas, with geographical difficulties and without nearby facilities (ACCP 2004; Simelela 2006; Vos et al. 1990). A mobile health unit is any form of medical care in which the services are brought to the patient rather than having the patient travel to the services. It can be as simple as a medically-trained person bringing his talent to the patient's bedroom and as complex as a 50-foot trailer with thousands of dollars worth of machinery manned by an entire medical team (Bodenheimer 1969). In Egypt, the "Mobile Clinics" project was started in 1997 to provide many services; the main and the most important service is to offer fee-waiver family planning/reproductive health services to cover the areas deprived of Ministry Of Health (MOH) services i.e. remote rural areas lying 3 kilometers from the nearest health unit (satellites) (El-Zanaty and Hamed 2001). In the Assiut governorate, there are 15 mobile clinics working since 1997 to offer family planning/ reproductive services to women living in remote underserved areas (satellites and some villages). The 15 mobile clinics are distributed to cover all the districts of the Assiut Governorate. One clinic is assigned to each district except for those with higher density e.g. Assiut, Dayerout, Al-Quoseya, and Manfalout where 2 clinics are assigned to each of these districts. Each clinic is required to complete 22 visits per month, operating from 8.00 a.m. till 4.00 p.m., and staffed with an accompanying female physician, nurse and a driver (Anwar 2010).

Within recent years, international concerns have focused attention on the cost and sustainability of family planning programs in developing countries throughout the world (El-Zanaty and Hamed 2001). Also, it is noteworthy to mention that governments around the world face budget constraints (Musgrove and Fox-Rushby 2008) and shrinkage of financial funds (Wulf 1981), which force these governments to make important decisions about how to invest these funds. Cost effectiveness analysis (CEA) can be used to make a choice among different program alternatives and allocation of the different resources accordingly (Simmons et al. 1991) thus choosing the most effective and least costly alternative (Wulf 1981), which ensures the efficient use of resources (Hughes and McGuire 1996). In addition, it allows policymakers and health planners to compare the health gains from different interventions (Hutubessy et al. 2003; Musgrove and Fox-Rushby 2008). In Egypt, resources are growing more slowly than demand for family planning services and goods (El-Zanaty and Hamed 2001). This will put more burdens on the MOH to cover the costs of family planning methods and the health care program especially with the decrease in the funding resources of international organizations (Khalifa et al 2001) and the inefficient use of scarce government resources. Two main strategies can be adopted to overcome this gap, either to increase resources or to decrease expenditure (Khalifa et al 2001). Mobile clinics cost the government a large amount of money, yet their services are not being used by the target communities; although women were expected to value these services and use the mobile clinics, a recent study in Assiut revealed surprisingly low use of mobile clinic services among those who were living at the satellites; 5.5% of contraceptive users at the time of the survey obtained their method from the mobile clinic (El-Gibaly et al. 2008). The results of that study were in agreement with EDHS, 2005 concerning the use of mobile clinics as a source of contraceptive methods.

Unfortunately, there are a limited number of cost effectiveness studies in the area of family planning, to the best of knowledge of the author and according to El-Zanaty and Hamed (2001), there was no published study concerning the cost analysis of mobile clinics in Egypt except for the one that they carried out. This study will estimate the cost effectiveness of the family planning services offered by mobile clinics in comparison with those offered by static clinics. This may guide and help policy makers at the MOH to reallocate resources of the

family planning program in a way to fulfill its maximum benefits and to decide whether to continue the Mobile clinic program as it is, or whether it needs improvement or replacement with other programs.

2. Methodology

2.1 Area/setting

Assiut Governorate is one of the Upper Egypt Governorates, which lies 375 km south to Cairo, with El-Minea Governorate is to the North, Sohag Governorate to the South, El-Wady El-Gedid Governorate to the West and the East Desert to the East. Assiut Governorate consists of 11 districts, has 235 mother villages surrounded by 911 remote underserved rural areas (satellites) (NPC 2006). The estimated number of population in the Assiut Governorate in the last census in 2006 was 3,441,597. The majority is of the population is rural representing 73.65% (n= 2,534,733) while the urban population represents 26.35% (n= 906,864) (CAPMAS, 2007).

2.2 Study design

Retrospective longitudinal study based on MOH record review and meetings with physicians, health and non-health team personnel who were working at the mobile and static clinics from the first of November 2009 to the end of October 2010.

2.3 Sample size included

All working mobile clinics from first of November 2009 to the end of October 2010; 15 mobile clinics and a corresponding number of static clinics (15 static clinics), which offer services in the same districts in which those mobile clinics serve.

2.4 Sampling technique

As for the mobile clinics: Total coverage of all working mobile clinics in the Assiut Governorate were included in the study (15 clinics offering family planning services in 11 districts in the Assiut Governorate during the period from the first of November 2009 till the end of October 2010)*

As for the static clinics: For each district of the Assiut Governorate, a list of the areas (satellites; remote rural areas and villages) served by the mobile clinics was obtained. Following this, a list of mother villages for these areas was obtained. Then, by simple random sampling technique, one mother village was chosen in districts served by one mobile clinic and two mother villages were chosen in districts served by two mobile clinics. The number of chosen mother villages was 15. Lastly, the rural health units (representing the static clinics), which lie in these mother villages, were selected (15 in number)[1] corresponding to the number of the mobile clinics. If the village does not contain a rural health unit (static clinic), the nearest health unit was selected.

2.5 Data collection

2.5.1 Preparatory phase: include the following stages

Stage I: Approvals were obtained from the MOH authorities at the central office in Cairo and from the peripheral level at the Assiut Governorate. Stage II: meetings with the Directors of Family Planning at the Assiut Governorate, at the Assiut District and with the Directors of some of the static health clinics were carried out to understand: 1- The process of service delivery at the mobile and static clinics, 2- To obtain a list of the health teams who were involved in offering family planning services and were working at the mobile and static clinics from the first of November 2009 till the end of October, 2010. Stage III: Self-administered questionnaires were distributed to the mobile and static clinic physicians who

[1] A list of the different districts of the Assiut governorate in which the selected static clinics and the mobile clinics serve is provided in the appendix, Table A.

were in charge from the first of November 2009 till the end of October 2010 to get an idea about the salaries and incentives of the health team in the mobile and static clinics. Stage IV: The author herself did a one-day observation of the process of mobile clinics maintenance. The maintenance operation is carried out once -a –month for all working mobile clinics. Meetings with the team members who are responsible for the maintenance of the clinic (engineers, carpenters, electricians, plumbers and mechanics) were carried out to obtain information on the maintenance process and determine how much it costs.

2.5.2 Data collection tools/instruments:

Data collection sheets with the following information were prepared to be used in data collection either from the members of health team ,who were working at the selected clinics during the determined study period, or from the MOH records:

- Name and job of the health team members, salary and types and values of incentives for each.
- Types, quantities and costs of supplies and materials of FP clinics.
- Types and number of contraceptive methods dispensed from the static clinics.
- Types of services and number of client visits according to each service offered, and number of new and old FP clients to each static clinic.

In addition, meetings with some persons who were working at the petrol stations as well as with all the drivers who were working at the mobile clinics from November, 2009 till October, 2010 was done. These meetings were informal and were carried out to get a proxy measure of the estimate for the amount of fuel consumed by each mobile clinic and type of oil used as the kilometers differ from one vehicle to another according to the distance, life span and type of the vehicle and the condition of the engine.

2.5.3. Data collected include:

Cost data (input measures) & Effectiveness data (output measures) (Figure 2).

2.5.4. Sources of collected data included:

2.5.4.1. Cost data

Number of contraceptive methods dispensed was obtained from the Directorate of Health Affairs at the Assiut Governorate through daily and monthly achievement reports for mobile and static clinics respectively, during the period of the first of November 2009 till the end of October 2010.

Costs of the contraceptive methods were obtained from the Director of Family Planning at the Directorate of Health Affairs at the Assiut Governorate based on telephone calls to the MOH central office at Cairo.

Salaries and incentives of the health team members were obtained from the Directorate of Health Affairs at the Assiut Governorate through daily and monthly reports of salaries and incentives

As for the operating costs: (maintenance expenses and utilities i.e. electricity, water and telephone). Monthly maintenance reports for the spare parts of the mobile clinics and their expenses were obtained. A proxy estimate of the average monthly operating costs of the static clinics was obtained from the health team members.

Amount of fuel and oil consumed by the mobile clinics were estimated based on the daily and monthly reports of the kilometers traveled by each of the mobile clinics from November 2009 till October 2010.

A proxy measure for the mean quantities of each type of supplies and materials was obtained from the nurses who were working at the mobile clinic and selected static clinic from

November, 2009 till October, 2010 assuming that patterns of use and re-supply are fairly constant throughout the year. Unit cost of each item of supplies and materials were obtained from the persons who are responsible for purchasing them at the Directorate of Health Affairs.

Capital costs of mobile clinics (costs of the mobile vehicle including equipment and furniture) and of static clinics (costs of building, equipment and furniture) were obtained from the family planning Directorate at the Assiut Governorate and some of the staff members of the static clinics.

2.5.4.2. Effectiveness data

The Couple Years of Protection and number of family planning visits were obtained from daily and monthly achievement reports for mobile and static clinics from November 2009 till October 2010.

2.6 Perspective of the study

The author conducted this cost effectiveness analysis from a **provider perspective.**

2.7 Data management and analysis plan

Following data collection, data entry and analysis were carried out using the EXCEL program.

2.8 Calculation of cost measures

2.8.1 Costs of salaries and incentives

During their daily work at the mobile and static clinics, the health team members offered many services to the clinic attendants other than family planning services; however, their salaries were allocated only to family planning services. The salaries allocation was calculated based on calculating the percent of average time spent by the health team at the clinic offering family planning services multiplied by the total salaries and incentives. Salaries allocation for clinic (a) during the study period = sum of monthly salaries and incentives of health teams working at clinic (a) from November, 2009 till October, 2010 X percent of average time (minutes) spent by the health team at the clinic offering family planning services at that clinic. The percent of average time spent was calculated via calculating the percent distribution of the different types of visit times for each clinic using the following formula: Percent distribution of visit time (minutes) for clinic (a) = total visit time (minutes) for each type of service offered at clinic (a) divided by the total number of visits at this clinic multiplied by 100. The total visit time (minutes) was calculated by multiplying the total number of visits for each service offered at that clinic by the time (in minutes) that is consumed by the health team to offer that service.

2.8.2 Costs of family planning methods for the mobile and static clinics

After obtaining the number of methods dispensed within each mobile and static clinic from November 2009 till October 2010, the total costs were calculated using the following formula:

Total costs per clinic (a)= Total number of dispensed method type at clinic (a) from November, 2009 till October, 2010 X Unit cost of that method at the same period.

The same was applied for each type of method and for each mobile and static clinic; then the grand total costs were calculated by summation of all costs of the mobile and those of static clinics.

2.8.3 Operating costs

A monthly average estimate for the maintenance costs were obtained for both the mobile and static clinics. Then this estimate was multiplied by 12 months to get the total annual costs for

each mobile and static clinic. Moreover, as for the daily fuel costs of the mobile clinics, the total number of kilometers traveled by each mobile clinic daily from November, 2009 till October, 2010 was first calculated then the cost was obtained through the following formula:

The daily cost of fuel by each mobile clinic = (Total number of kilometers X Kilometers per liter) X cost per liter traveled by each clinic, taking into consideration that the number of kilometers/ mobile clinic differ from one vehicle to another according to the distance each clinic travels while the number of kilometers per liter may differ from one vehicle to another according to the condition of the engine**. As for oil,** the number of containers consumed by each clinic from November, 2009 till October, 2010 was multiplied by the cost of the container to get the total costs for each clinic. It is noteworthy to mention that the number of oil containers is affected by the number of kilometers traveled by each clinic and by the rate of oil change (oil change per 1350 km as an average).

2.8.4 Costs for supplies and materials

The average quantities for the different supplies and materials are obtained for each type of clinic, static and mobile, per month. Then costs of each unit type was determined and then the average total costs for each type were calculated per month and multiplied by 12 months to get a proxy estimate for the annual costs of the supplies and materials.

2.8.5. Capital costs

2.8.5.1 For mobile clinics

Usually the capital cost for a vehicle is calculated using the following formula:

Capital costs = Replacement cost of the vehicle X average useful life of the vehicle

However, it is not possible to use standard estimates of useful life for vehicles because the local conditions of the vehicle will determine how long each type of vehicle lasts (Janowitz and Bratt 1944). So, the capital costs of the mobile clinic were calculated from the following formula:

Capital costs = Replacement cost of one clinic X number of clinics X depreciation rate

The replacement cost is the current cost of purchasing a similar vehicle, not the original purchase price (Janowitz and Bratt 1944). The replacement cost of one mobile clinic was obtained as a proxy estimate from the FP Director at the Assiut Governorate while the depreciation rate was based upon previous studies (El-Zanaty and Hamed 2001).

2.8.5.2 For static clinics

The annual capital costs were calculated using the following formula:

Annual capital costs per clinic = Annual rental costs (Rental costs of the clinic per month X12) X average useful life of the building

The annual rental costs were used as an estimate for the annual capital cost of the family planning clinic. As for the average useful life of the clinic, 20 years was used as a standard estimate for the useful life of buildings (Janowitz and Bratt 1994). Also, consultation with the family planning Director at the Assiut Governorate was done to make sure that this estimate is acceptable.

2.9 Calculation of effectiveness measures

2.9.1 Total CYP

Total methods per each type of method per each clinic were calculated first then CYPs were calculated for each method per each clinic and per each district

In Egypt, the MOH calculates the CYPs based on the following coefficients:

- IUD = 3.2 X number of users,
- Pills= number of pills /100,
- Condoms = number of condoms /100
- Injectables = number of injectables/4
- Norplant = number of Norplant capsules X 5 (MOHP, 2008).

2.9.2 Total visits for the mobile and static clinics

Summation of the total number of monthly family planning visits per each mobile and static clinic was carried out first (new + old attendants). Then summation of the grand total family planning visits for all mobile and static clinics separately.

2.10 Limitations of the study

2. Difficulties in obtaining the data especially those from the records as many of the records are hard copies, not electronically saved.
3. Scattering and multiplicity of the data from multiple sources (at the local and peripheral level); from records, meetings and telephone calls.
4. Resistance of some local family planning authorities to provide the cost data especially those of the salaries and incentives of the health provider teams working at the mobile clinics.
5. Different categories of the health providers and different number of employment years which made it impossible to aggregate the salaries and incentives of the similar types of employees.
6. The large number of mobile clinics (15) and static clinics (15) included in the study drew an extra effort on data collection, unification, comparison and analysis.
7. The administrative costs haven't been calculated in this study as there was a lot of overlap between administration and offering the service i.e. sometimes the supervisor on the clinic plays the role of the service provider in case of the absence of the physician who is assigned to the clinic. Thus the administrative costs of the static clinics were also ignored.

3. Results

3.1 Descriptive statistics

3.1.1 For mobile clinics

A working day in the life of a mobile clinic

The total number of working mobile clinics in the Assiut Governorate is 15 clinics (all of them were included in the study). All the mobile clinics vehicles are parked at the central parking for the Directorate of Health Affairs building (which is the representative authority of the MOH at the Governorate level) at Assiut City. Each mobile clinic works 6 days per week and takes a one-day vacation (Friday). In addition, all clinics do not work the days that are considered as national vacation days in Egypt. Each clinic has a monthly schedule of the areas that it plans to visit within that month. The main schedule for the mobile clinic must be planned for each 3 month period in the year (quarterly) in advance by the directors of family planning at the district level; each director plans the schedule for the mobile clinic(s) serving in their district authority area, and then a copy of the schedule is sent to the main office of the MOH at the central level in Cairo. Sometimes when there is a plan by the Directorate of Health Affairs at the Assiut Governorate to carry out a medical convoy[2], some of these clinics are then redirected to places on the route of the medical convoy, not the targeted villages. Concerning the areas served by the mobile clinics, usually a certain mobile clinic is assigned

[2] Where all mobile clinics (with different specialties) are sent to a certain place in or out of Assiut Governorate to offer services to all ages of population; women, children, adolescents, adults and old age men and women.

to offer services to women living at the satellites (remote rural underserved areas) of a certain district, where mobile clinics visit each area once every 2 weeks. Every morning, each clinic travels at 8:00 am from the central parking for the Directorate of Health building, to follow its schedule. The driver signs the attendance schedule before leaving the parking place. Each van (mobile clinic) has a code number.

Each mobile clinic usually has a certain health team with the same working personnel for each visit to assure the continuity of care offered to people within the same resident area in which the clinic serves. The team consists of: a physician (mostly female), a nurse, and a driver. Sometimes, a Raeeda Refeya (a community health worker) accompanies the mobile clinic team. The main job of the Raeeda Refeya is to contact the women who want or are eligible for family planning methods and to inform them about the day and time of the visit and the parking place of the mobile clinic at the village (satellites) prior to the time of the mobile clinic visit. Moreover, the Raeeda Refeya –sometimes- guides the driver to the nearest places to those targeted women. The driver drives the mobile clinic to its planned destination (a remote rural deprived area i.e. satellite) according to the proposed schedule and returns to the central parking place at 3:00 pm each day. In addition, the driver is responsible for checking on the fuel and the maintenance of the clinic everyday and for the cleanliness of the mobile clinic. The nurse is responsible for registering the women, taking vital signs, sterilizing the instruments, cleaning the inside of the examination area as well as for monitoring of the supplies, materials or the instruments and the reserve of contraceptive methods. Each mobile clinic is supplied family planning methods via the health district, where the mobile clinic serves.

When the mobile clinic reaches its destination, the driver, nurse or the physician announces the arrival of the mobile clinic and the availability of its services by via microphone. Sometimes, the Raeeda Refeyaa, who knows the destination place very well and the people living there -because she is usually one of the residents of this place or a nearby place-, steps down from the mobile clinic and goes to the houses of the women who she knows that need a family planning method and invites and guides them to the location of the mobile clinic in a nearby neighborhood. The nurse takes the patient's weight and blood pressure, organizes the records and gives injections. After listening to the patient's complaint, the physician examines the clients, advises her about the appropriate method and then gives a contraceptive method according to the need of each client.

A monthly report is prepared about the operation of the clinic during that month. This report includes information about: the number of dispensed family planning methods, other services offered (e.g. antenatal, gynecologic examination, sonar, child care & vaccination), the number of new and old clients, the destination of the clinic, the kilometers traveled, the beginning and ending time for the visit, and the names and job category for the health team members.

All of this information is registered in the daily report daily and documented by dates with final pages that summarize the operation for the whole month. A copy of the monthly report is sent to the family planning director at the Governorate level for each clinic then a collective monthly report for all clinics is sent to the central level of the MOH at Cairo.

3.1.2 For static clinics

The total number of static clinics, included in the study, was 15. Each clinic offers many services other than family planning services*. Each clinic has a team of: physician (one or more), nurse (s) and some workers. A laboratory technician and a ticket-issuing employer support these clinics. Each static clinic works 6 days per week and takes a one-day vacation (Friday). In addition, all static clinics –like the mobile clinics- do not work on the days that are considered as national vacation days in Egypt.

3.2 Costs

The total costs of the mobile clinics -serving in the Assiut Governorate and offering family planning / reproductive health services- were nearly 3.7 times higher than the costs of a corresponding number of the static clinics; the mobile clinics cost more than two million Egyptian pounds (**L.E. 2,414,033.3**) from the first of November 2009 till the end of October, 2010 (Table 3) compared to nearly more than half a million Egyptian pounds (**L.E. 651,944**) of the static clinics in the same districts where the mobile clinics serve from November, 2009 till October, 2010 (table, 4). The salaries and the capital costs are the cost items that contribute to the major share of the total costs for mobile and static clinics and which are responsible for this difference. There are many incentives that are given to the health team members who are working both at the mobile and the static clinics. Both teams share mainly most of the incentives. Although the different salaries and incentives items differ from one person to another according to the category (physician, nurse, driver, and / or worker) and according to the job rank (number of employment years from one person to the other within the same job category), however, the incentives given per each day visit of the mobile clinic are the same within the same category irrespective of the number of employment years i.e. the same incentive is given to all physicians no matter the number of employment years; the same applies for the nurses and the drivers, but of course differ from one job category to the other. The mobile clinic teams spent almost all their time, 77.2%-99.8%, offering family planning services, while 8.5% - 34.1% was the corresponding finding for the static clinic teams.

All the contraceptive methods, which are offered at the mobile clinics, are free of charge except for the pills. On the other hand, obtaining contraceptive methods from the static clinic may cost the clients some money depending on the obtained method. A list of the different types of family planning methods and the unit cost and unit price of each method offered at the mobile and static clinics is shown in Table (1). Although the unit price of the offered methods is considered low, the unit cost of each method is higher. The capsules have the highest costs and the condoms have the lowest costs.

The cost of the salaries and incentives for the health team members working at the mobile clinics is higher than those of the static clinics. However, the total costs for contraceptive methods offered by the mobile clinic (**L.E**. **97,429.8**) (Table 3) are less than those offered by the static clinics (**L.E. 154,148**) (Table 4).

The costs of the supplies and materials that were used in the family planning clinics were higher in the static clinics (L.E. 35,857) than in the mobile clinic (L.E. 28,800) (Tables 3 & 4).

The capital cost for the mobile clinics (L.E. 1,500,000) was higher than the capital costs of the static clinics (L.E. 187,200) Tables 3 & 4). The main reason for this discrepancy is the replacement costs of the mobile clinics where the replacement costs of one vehicle = L.E. 500,000. On the other hand, rental costs for the static clinics are modest because all the clinics lie in rural areas where usually the rent is not high. The rental costs were the same for all static clinics except for 2 clinics; the Dyerout Medical center and the Al-Ghanayem medical center as the rental costs of these clinics were higher than the other clinics.

The operating costs of the mobile clinics include: maintenance costs, fuel and oil costs. The maintenance for all mobile clinics is performed on a monthly basis at the central parking place of the mobile clinics at the Directorate of Health Affairs at the Assiut Governorate. The team members who are responsible for the maintenance of the clinic consist of engineers, carpenters, electricians, plumbers and mechanic. This team comes from Cairo. The MOH contracted with the maintenance companies of Nissan and Toyota to perform the maintenance for the mobile clinics according to the different models of the clinics. The total annual

operating costs for all mobile clinics = L.E. 110,101.1 (fuel + oil + maintenance) with a mean of L.E. 7,340.1 per each mobile clinic during the study period (Table 3). On the other hand, the total annual operating costs for all static clinics = L.E. 1,800 with a mean of 120 pounds per each static clinic during the study period (Table 4). Thus, the operating costs of the mobile clinics were much higher than those of the static clinics. This is expected as the costs of operating a vehicle include expenditures on fuel (L.E. 21,400.1), oil (L.E. 7,701.1) and spare parts (e.g., filters, plugs, belts) (L.E. 81,000) (Table 3). Fuel and oil are extra costs that are not applied to the static clinics, moreover, costs of the spare parts for the mobile clinics are very expensive; nevertheless, the vehicles need continuous maintenance. On the other hand, the costs of operating a facility include costs of utilities (electricity, water and telephone) and maintenance (housekeeping and cleaning) where the maintenance of static clinics does not cost a large sum of money.

3.3 Effectiveness measures

The effectiveness of family planning services was calculated using 3 effectiveness measures:

- The couple years of protection of family planning methods dispensed at the mobile clinics and the static clinics during the study period.
- Number of family planning visits to the mobile clinics and to the static clinics during the study period.

3.3.1 Couple years of protection

The total number of contraceptive methods offered to women at the mobile clinics (36,169) was less than the total number of contraceptive methods offered to women at the static clinics (44,006) (Table 2). On the other hand, the CYPs for contraceptive methods offered to women at the mobile clinics (**38,863**) (Tables 5 & 7) were higher than the CYPs for contraceptive methods offered to women at the static clinics (**12,964**) (Tables 6 & 8). The logical way of things is that the higher the number of contraceptive methods dispensed at a certain clinic, the higher the CYPs at that clinic. However, in this study, it was apparent that although the static clinics dispensed more contraceptive methods, the CYPs of the mobile clinics are higher. This can be explained by the fact that the number of the different types of dispensed contraceptive methods is not the same in both types of clinics; where IUDs and condoms are more commonly used by women attending mobile clinics while pills and injections are more commonly by women attending static clinics.

3.3.2 Family planning visits

During the year of the study period, the total number of family planning visits to the mobile clinics was **25,685** (Tables 5 & 7) and the mean number of family planning visits /mobile clinic was 1,712.3 while, the total number of family planning visits to the static clinics was **30,714** (Tables 6 & 7) and the mean number of family planning visits /static clinic was 2,047.6. So, the number of family planning visits to the static clinics is higher than the corresponding number of visits to the mobile clinics. This is in correspondence with the finding that the number of family planning methods dispensed by the static clinics is higher than that of the mobile clinics.

3.4 Cost-effectiveness ratios

Cost-effectiveness was measured for mobile clinics and static clinics and per districts via 3 measures:

1. Costs/CYPs
2. Costs/ number of family planning visits

Costs/ CYPs

- Total costs /CYPs for mobile clinics = 62.1

- Total costs /CYPs for static clinics = 50.3
- Incremental cost effectiveness for CYPs= 62.1– 50.3 = 11.8

Costs/number of family planning visits

- Total costs /FP visits for mobile clinics = 94.0
- Total costs /FP visits for static clinics = 21.2
- Incremental cost effectiveness for FP visits= 94.0 – 21.2 = 72.8

4. Discussion

In Egypt, family planning services are offered through static and mobile clinics. However, with the decrease in the funds offered by some doctors (whose pay is nearly 47% of the costs of family planning services), the Egyptian government will face financial challenges to maintain the family planning program. Public health expenditure is around 3% of the total government expenditures. It is estimated that, if the government lost the 47% paid by donors, family planning costs will increase to 10% of total government expenditures (Moreland 2000). In addition, institutional capacities in the form of trained health personnel, efficient management system based on realistic information and clinics' renovations and equipment maintenance are another challenge for Egypt. So, to ensure the sustainability of the family planning program two broad strategies can be adopted, either to increase resources or to decrease expenditures (Khalifa et al 2001). Thus plans should be made to make use of the different existing resources and to compare between the different interventions offering family planning services and thus choosing the least costly but most effective one. One of the main strategies to achieve this goal is a cost effectiveness analysis. This paper deals with the cost effectiveness of family planning services offered by the mobile versus the static clinics in Assiut (one of Upper Egypt Governorates).

Two output measures have been taken into consideration in this paper; the CYP and the number of family planning visits in both types of clinics. The CYP allows comparison of protection provided by the different contraceptive measures over a certain period in time (Hughes and McGuire 1996). The results of this study reveal that the cost effectiveness of the mobile clinics was higher than that of the static clinics. While there is a slight difference in the costs of family planning service per each CYP by the mobile clinic compared to the static clinic (62.1, 50.3 Egyptian pounds respectively). However, there is a considerable difference in the costs of family planning service per each woman's visit offered by the mobile clinic compared to the static clinic; each woman's visit to the mobile clinic costs the government 94.0 Egyptian pounds compared to 21.2 Egyptian pounds by the static clinic i.e. a woman's visit to the mobile clinic costs 4.4 times the costs of the same visit to the static clinic. The CYPs were higher for the mobile clinics than for the static clinics as more IUDs were used at the mobile clinics. However, the total number of family planning visits was higher for the static clinics than for the mobile clinics.

The total costs of the mobile and static clinics are divergent, where the total costs of the mobile clinics was higher than that of the static clinics. The main cause for the higher expenditures of the mobile clinics is mainly due to salaries, incentives and capital costs. Reducing salaries may be one strategy to improve the cost effectiveness of the mobile clinics (Coeytaux et al. 1989). In other studies, the main variation in costs between the mobile and static clinics is attributed to the training costs of traditional birth attendants (TBAs) of the mobile clinics (Fox-Rushby and Foord 1996). In Egypt, the "Raeeda Refeya" – the community health worker –works both at the mobile and static clinics. The same applies for all the health team members as they all work at the mobile and static clinics on different weekdays and they all receive the same training. Meanwhile, the mobile clinic teams spent most of their time offering family planning services while static clinic teams spent most of their time offering services other than family planning which is reasonable because the main

objective of mobile clinics in Egypt is to offer family planning services (El-Zanaty and Hamed 2001). Moreover, the capital costs of the mobile clinics were high because the estimated cost for each mobile clinic is high (nearly L.E. 500,000) with today prices (at the time of the study in 2011) compared to the static clinics.

The total costs for contraceptive methods offered by the mobile clinics (**L.E**. **97,429.8**) are less than those offered by the static clinics (**L.E. 154,148**) which can be explained partly by the fact that the number of contraceptive methods dispensed for clients of the static clinics (44,006) is higher than the number of contraceptive methods dispensed for clients of the mobile clinics (36,169) from November, 2009 till October, 2010 and this may provide an idea about the utilization of family planning methods by the mobile and static clinics and provoke thought about the reasons for the difference in the attendance and utilization of family planning services in both types of clinics.

No doubt that the unit cost and the main types of materials and supplies are the same in both mobile and static clinics, however, the amount of these materials and supplies needed by the static clinics is much more that the amount needed by the mobile clinics which may explain the higher costs in the static clinics. The family planning nurse at the static clinic or the nurse that is assigned for each mobile clinic is the person in charge of determining and ordering the proper amounts of the materials and supplies for the clinic at which she works.

Thus, though the mobile clinics may play an important role in providing family planning services in the Assiut Governorate and in overcoming the accessibility problem that faces some of the women living in remote rural underserved areas, yet pouring money into those mobile clinics is not the answer especially with the current economic situation that Egypt faces.. The government needs to reallocate resources in such a way that assures continuity in providing family planning services to women living in deprived areas on one hand and the wise and effective use of the money spent on these services on the other hand.

The government must find other alternatives to the mobile clinics. The findings of another study in 2009,which showed that only 5.5% of women living in the remote rural areas of the Assiut Governorate get their family planning method via the mobile clinics while the majority of them prefer the static clinics (EL-Gibaly *et al.* 2009). So, as a solution, and instead of building new static clinics in remote rural areas, renting building in these areas, which can serve as static clinics, may solve some of this dilemma. On the other hand, if the government feels that the mobile clinics can't be replaced by the static clinics at the present time, at least plans for reallocating the costs of the mobile clinics should be settled especially since the main costs of the mobile clinics are mainly consumed in salaries and incentives of the health team within these clinics. Moreover, plans for the areas covered by the mobile clinics should be taken into consideration.

4. Conclusion & Recommendations

The findings of the present study showed that the static clinics are more cost effective than the mobile clinics concerning the CYPs and the total number of FP visits. Moreover, the grand total costs for the mobile clinics are much higher than the corresponding costs of the static clinics, which place a burden on the financial resources of the MOH. The main cause for the excessive expenditures of the mobile clinics is mainly due to salaries and incentives and capital costs. Further experimental longitudinal national studies could be implemented by the MOH where mobile clinic services are withdrawn from a service site.. Then this site can be taken as a control to be compared with another site, which depends upon mobile clinic only, and a third site, which depends on mobile and static clinics. The use of family planning services could be compared within the 3 sites and the decision about continuing or discontinuing using the mobile clinics should then be made accordingly.

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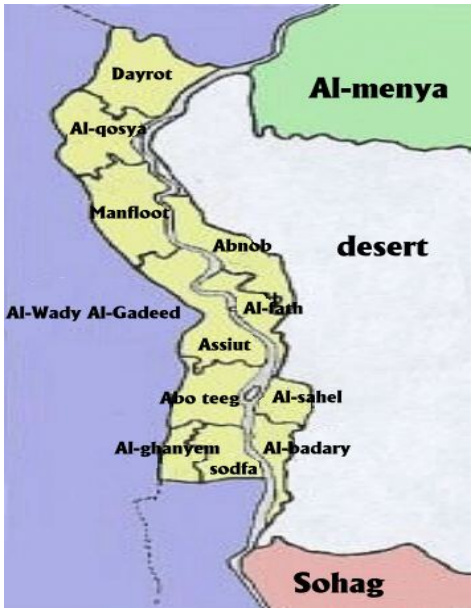
Figure 1:



Source: Assiut Governorate website

Figure 2: Framework of the Different Types of Cost and Effectiveness Measures

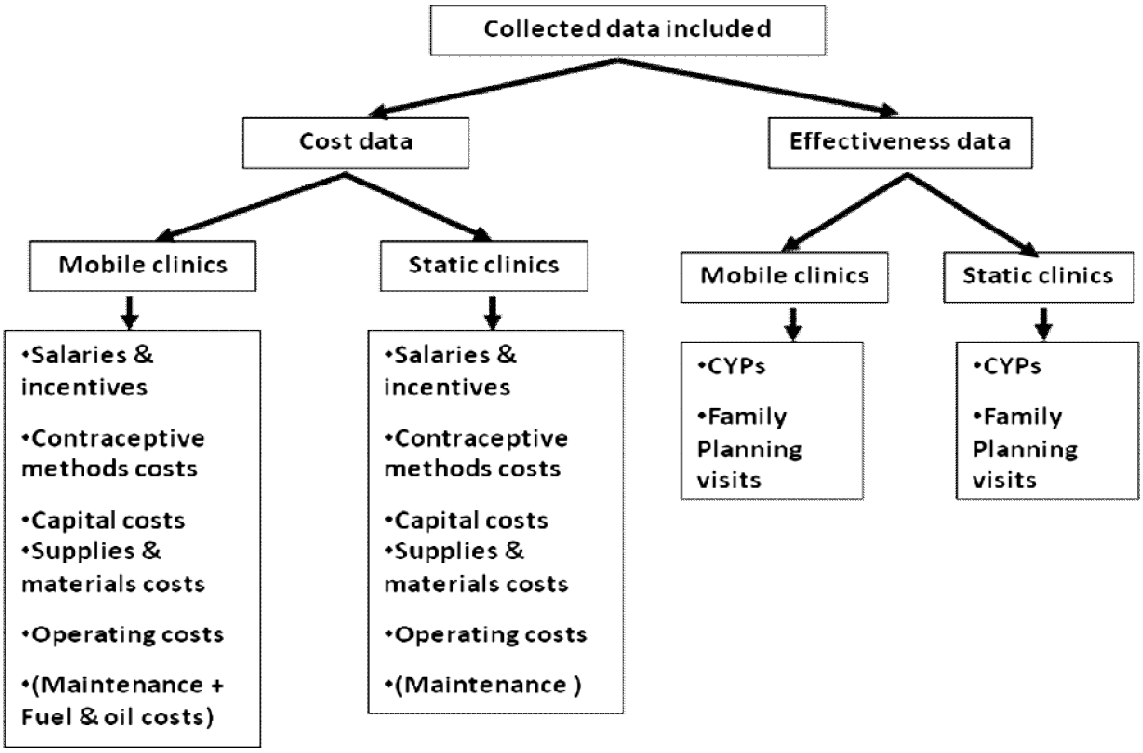
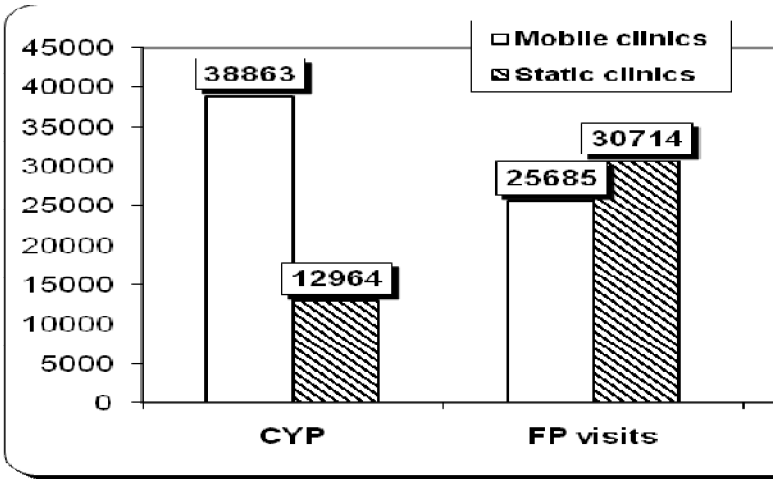


Figure 3: The Carpenter Fixing a Cupboard at the Mobile Vehicle, Assiut, Egypt

Figure 4: Some of the Spare Parts for the Mobile Vehicle; Fuel Filters, Assiut, Egypt

Figure 5: Effectiveness Measures for Mobile and Static Clinics (November, 2009 till October, 2010) at Assiut Governorate, Egypt



Appendix

Table 1: Unit Cost and Unit Price of Contraceptive Methods at the Mobile and Static Clinics, Assiut, Egypt, November 2009 to October 2010.

Contraceptive method	Unit cost (in pounds)	Unit price	
		Mobile clinic	Static clinic
IUD	L.E. 3.5	Free of charge	L.E. 2
Pills tablets	L.E. 0.95 – 3.00	L.E. 1	L.E. 0.65 – 1 *
One Injectable	L.E. 7.60	Free of charge	L.E. 1
Condoms	L.E. 0.35	Free of charge	L.E. 0.1
Implants capsules	L.E. 205	NA**	L.E. 5

Notes: * There are 2 types of pills offered in the static clinics; Leonor minipills, which costs 3 pounds and sold by 1 pound per unit, while compound pills costs 0.95 and sold by 0.65 pounds per unit for clients. While at the mobile clinics, Leonor minipills are the only type of pills that is dispended for clients. ** NA = Non-applicable as no capsules are applied to women in the mobile clinics.

Table 2: Total number of Dispensed Contraceptive Methods According to Each Mobile and Static Clinics, Assiut, Egypt, November 2009 to October 2010.

Clinic ID	Mobile clinics				Static clinics				
	Pills	IUD	Injections	Condoms	Pills	IUD	Injections	Condoms	capsules
1	620	1,052	120	150	989	50	611	47	0
2	482	1,089	90	1,155	1,260	265	712	722	36
3	181	493	101	79	5,044	627	2,898	2,349	0
4	790	782	309	433	743	72	922	338	0
5	592	1,068	278	508	370	40	529	385	0
6	598	742	273	897	1,128	229	1,398	196	0
7	210	455	60	230	1,866	261	1,043	510	0
8	317	607	177	146	995	166	340	660	0
9	707	617	327	1672	1,039	271	705	990	0
10	663	1,182	248	1460	400	44	855	275	0
11	396	829	102	580	204	98	299	357	0
12	1,711	1,078	473	1,725	756	82	244	214	0
13	1,082	1,148	235	1,665	625	109	567	807	0
14	239	133	34	415	1,195	187	608	565	0
15	665	556	343	510	1,966	449	944	1,350	0
Total / clinic	**9,253**	**1,1831**	**3,170**	**11,625**	**18,580**	**2,950**	**12,675**	**9,765**	**36**
Grand total			**36,169**				**44,006**		

Table 3: Total costs (in L.E.) According To Each Mobile Clinic, Assiut, Egypt, November 2009 to October 2010

Costs in L.E.	Mobile clinics														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Salaries & incentives	**50337.2**	**50721.3**	**48509**	**55303.6**	**29754.4**	**50006.5**	**37521.5**	**37748.3**	**43350**	**50511.5**	**44646.1**	**51952.9**	**47797.6**	**40595**	**38947.4**
Grand total salaries & incentives								**677,702.3**							
Fuel costs	**2,238.7**	**2,101.8**	**850.3**	**1,376.1**	**847.4**	**897.1**	**681.7**	**994.6**	**1,170.6**	**3,348.4**	**844.5**	**2,539.8**	**1,977.8**	**720.3**	**810.7**
Grand total fuel costs								**21,400.1**							
Oil	**848**	**796.2**	**306**	**495.2**	**304.9**	**322.8**	**245.3**	**357.9**	**443.4**	**1141.5**	**303.9**	**817.7**	**749.2**	**261.9**	**307.1**
Grand total oil costs								**7,701.1**							
Contraceptive methods costs	6,608	6,345.8	3,063.8	7,606	7,804.6	6,779.8	2,759	4,471.8	7,350.9	8,521.8	5,067.7	13,104.6	9,632.8	1,586.2	6,726.3
Grand total methods costs								**97,429.8**							
Mean total supplies & materials	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920	1,920
Grand total supplies								**28,800**							
Mean operating costs	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400	5,400
Grand total operating costs								**81,000**							
Mean capital costs	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**	**100,000**
Grand total capital costs								**1,500,000**							
Grand total costs								**2,414,033.3**							

Table 4: Total Costs (in L.E.) According To Each Static Clinic, Assiut, Egypt, November 2009 to October 2010

Costs (in L.E.)	Static clinics														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Salaries & incentives	14,078.5	43,363.7	23,231.2	64,726.3	7,892.3	24,401.4	10,105.8	14,005.1	14,546.1	6,623.1	6,462.4	8,373.4	8,281.1	18,410.6	8,438.4
Grand total salaries & incentives								**272,939**							
Contraceptive methods costs	6,788.3	16,460	35,003	8,844.9	5,025.9	13,723	12,704	5,361.1	8,705	7,538.3	3,143.3	3,709.4	6,207.5	7,833.2	13,101
Grand total methods costs								**154,148**							
Mean total supplies & materials	1,309.8	2,179.8	1,359	3,856.8	1,953	1,983	3,550.8	2,446.8	1,702.8	1,702.8	1,630.8	2,326.8	2,998.8	2,998.8	3,856.8
Grand total supplies								**35,857**							
Mean operating costs	120	120	120	120	120	120	120	120	120	120	120	120	120	120	120
Grand total operating costs								**1,800**							
Mean capital costs	12,000	12,000	12,000	15,600	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	15,600
Grand total capital costs								**187,200**							
Grand total costs								**651,944**							

Table 5: Measures of Effectiveness According To Each Mobile Clinic, November 2009 to October 2010.

Variable	Mobile clinics														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total visits	855	2,542	934	2,052	1,849	2,084	853	1,405	2,013	1,720	1,859	2,923	2,669	501	1,426
Grand total visits									**25,685**						
CYPs for:															
■ Pills	6.2	4.82	1.81	7.9	5.92	5.98	2.1	3.17	7.07	6.63	3.96	17.11	10.82	2.39	6.65
■ IUD	3,366	3,485	1,578	2,502	3,418	2,374	1,456	1,942	1,974	3,782	2,653	3,450	3,674	425.6	1,779
■ Injections	30	22.5	25.25	77.25	69.5	68.25	15	44.25	81.75	62	25.5	118.3	58.75	8.5	85.75
■ Condoms	4.4	11.55	0.79	4.33	5.08	8.97	2.3	1.46	16.72	14.6	5.8	17.25	16.65	4.15	5.1
Total CYPs	**3,407**	**3,524**	**1,605**	**2,592**	**3,498**	**2,458**	**1,475**	**1,991**	**2,080**	**3,866**	**2,688**	**3,602**	**3,760**	**440.6**	**1,877**
Grand total CYPs									**38,863**						

Table (6): Measures of Effectiveness According To Each Static Clinic, November 2009 to October 2010

Variable	Static clinics														
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
Total visits	1,738	1,847	1,697	7,486	929	2,665	3,070	1,476	1,658	1,139	688	931	1,267	2,022	2,101
Grand total visits								**30,714**							
CYPs for:															
■ Pills	9.89	12.6	50.44	7.43	3.7	11.3	18.6	9.9	10.4	4	2.1	7.6	6.2	11.9	19.7
■ IUD	160	848	2,006.1	230.4	128	732.8	835.2	531.2	867.2	140.8	313.6	262.4	348.8	598.4	1436.8
■ Injections	152.7	178	724.5	230.5	132.3	349.5	260.8	85	176.2	213.7	74.7	61	141.7	152	236
■ Capsules	0	72	0	0	0	0	0	0	0	0	0	0	0	0	0
■ Condoms	0.47	7.2	23.5	3.4	3.8	1.9	5.1	6.6	9.9	2.7	3.6	2.2	8.1	5.6	13.5
Total CYPs	**323.1**	**1,117.8**	**2,804.8**	**471.7**	**267.8**	**1,095.5**	**1,119.7**	**632.7**	**1,063.7**	**361.3**	**393.9**	**333.1**	**504.9**	**768**	**1,706**
Grand total CYPs								**12,964**							

Table 7: Total Costs and Effectiveness Measures of Family Planning According to Different Static Clinics, November 2009 to October 2010.

Clinic ID	Total costs		Total number of visits		Total CYP	
	Mobile	**Static**	**Mobile**	**Static**	**Mobile**	**Static**
1	167,351.90	34,296.6	855	1,738	3,407	323.1
2	167,285.10	74,124	2,542	1,847	3,524	1,118
3	160,049.10	71,713	934	7,486	1,605	2,805
4	172,100.90	93,148	2,052	1,697	2,592	471.7
5	146,031.30	26,991	1,849	929	3,498	267.8
6	165,326.20	52,227	2084	2,665	2,458	1096
7	148,527.50	38,481	853	3,070	1,475	119.7
8	150,892.60	33,933	1,405	1,476	1,991	632.7
9	159,634.90	37,074	2,013	1,658	2,080	1,064
10	170,843.20	27,984	1720	1,139	3,866	361.3
11	158,182.20	23,357	1,859	688	2,688	393.9
12	175,735.00	26,530	2,923	931	3,602	333.1
13	167,477.40	29,607	2,669	1267	3,760	504.9
14	150,483.40	41,363	501	2,202	440.6	768
15	154,111.50	41,116	1,426	2,101	1,877	1,706
Total	**2,414,032.20**	**651,944**	**25,685**	**30,714**	**38,863**	**12,964**

Table 8: Cost Effectiveness Of Family Planning According To Different Clinics, November 2009 to October 2010

Clinic ID	Costs/ FP visits		Costs/ CYPs	
	Mobile	Static	Mobile	Static
1	195.7	19.7	49.1	106.1
2	65.8	40.1	47.5	66.3
3	171.4	9.6	99.7	25.6
4	83.9	54.9	66.4	197.5
5	79.0	29.1	41.7	100.8
6	79.3	19.6	67.3	47.7
7	174.1	12.5	100.7	321.5
8	107.4	23.0	75.8	53.6
9	79.3	22.4	76.7	34.8
10	99.3	24.6	44.2	77.5
11	85.1	33.9	58.8	59.3
12	60.1	28.5	48.8	79.6
13	62.7	23.4	44.5	58.6
14	300.4	18.8	341.5	53.9
15	108.1	19.6	82.1	24.1
Total	**94.0**	**21.2**	**62.1**	**50.3**

Table A: List of the Working Mobile Clinics and Static Clinics Under The Study, November 2009 to October 2010

Code of the clinic	Mobile clinic		Static clinic	
	Car number	District served	Clinic named after the name of the village at which the clinic lies	District served
1	1042/24 or 4816/24	Assiut	Al-Bora	Assiut
2	1043/24 or 4716/24	Assiut	Reefa	Assiut
3	1044/24 or 1425/24	Dyerout	Masarah	Dyerout
4	948/24	Dyerout	Dyerout Medical Center	Dyerout
5	1024/24 or 1041/24	Al-Qouseya	Dair Al-Qouseir	Al-Qouseya
6	954/24	Al-Qouseya	Ballout	Al-Qouseya
7	949/24	Manfalout	Bani-Rafee	Manfalout
8	1048/24	Manfalout	Bani-Magd	Manfalout
9	1046/24	Al-Fath	Bani-Zeid	Al-Fath
10	951/24	Abnub	AL-Shanablaa	Abnub
11	1045/24 or 1846/24	Sahel Seleem	Al-Khawaled	Sahel Seleem
12	952/24 or 1239/24	Al-Badaree	Al-Koum Al-Ahmar	Al-Badaree
13	1047/24 or 1839/24	Abu-Teig	Doweena	Abu-Teig
14	991/24	Sedfa	Al-Dowear	Sedfa
15	955/24	AL-Ghanayem	Al-Ghanayem Medical Center	AL-Ghanayem