Primary Health Care Initiatives (PHCI)

Utilization of Health Services Delivery and Health Status Study (Pretest Phase)

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Prepared by

Ali Arbaji, MD, MPA

Abt Associates Inc. ■ 4800 Montgomery Lane, Suite 600, Bethesda, MD 20814 ■
Tel: 301/913-0500 ■ Fax: 301/652-3916

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Abstract

This report represents the pretest phase of an evaluation study of Primary Health Care Initiatives (PHCI) project activities. The project is implemented in cooperation of the Ministry of Health (MoH) over 5 years (September1999-September 2004). PHCI aims at improving primary health care and reproductive health. The evaluation follows quasi-experimental design. Users of UNRWA health centers served as the control (comparison) group while clients of MoH health centers served as the intervention group. A representative sample was selected using stratified two stage cluster sampling approach from users of MoH health centers and another sample was selected from UNRWA facilities. A set of utilization of services and proxy health status indicators were chosen for evaluation. The indicators were based on timeliness of vaccination, growth and development visits, antenatal postnatal visits, screening children and pregnant women for anemia, screening for hypertension, contraceptive use, anemia of children and pregnant women, status of control of diabetes and hypertension. Some variables were collected from records and others through cross-sectional surveys. Data for pretest was collected during October-November of 2000, while posttest will be carried out during June 2004. The baseline findings of the pretest phase for MoH showed that 64.4% of 2-year old children received all their immunizations timely. Only 21.3% of 3-year old children did appropriate growth and monitoring visits (63.3% during the first year of life, 37% during the second year and 35.6% during the third year). Only 57.7% of pregnant women did 4 or more antenatal visits (risk pregnancies were excluded) while 29.6% attended the postnatal care at least once over the first 6 weeks of delivery. The prevalence of modern contraceptives was 51.6%. Screening adults aged 40 years and older for hypertension was practiced in about 37% of the cases. Children aged 6-24 months had their hemoglobin checked and documented only in 37.8% of the cases with 25.4% anemia prevalence. About 88% of pregnant women were tested for anemia during pregnancy with 24.7% anemia prevalence. The prevalence of poor control of diabetes as judged by glycosylated hemoglobin was 43.1%. Only 11% of the hypertensive patients were found to have controlled (normal) blood pressure with over 60% of the patients found in the second and third grade of hypertension. The above findings serve as guidance for various PHCI project activities as well as for MoH to improve quality of services provided to clients.

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Acknowledgments

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Document Design

- This report starts with an executive summary covering the introduction, methodology, results and recommendations.
- Section 1 describes the introduction covering background information, purpose and objectives of the study.
- Section 2 describes methodology covering the study design, sampling procedures, main variables, data collection techniques and tools, data collection plan and data analysis procedures.
- Section 3 describes the findings of the study. This section is organized in subsection (3.1-3.9) each describing one of the indicators based on the relevant variables.
- Each subsection in section 3 is organized in the following way:
  - A short summary of the subsection describing in brief the methodology and findings.
  - An introduction that describes the relevant indicator including justification. It further describes the non-responses and missing values.
  - The sample characteristics are discussed under the background variables.
  - The main variables and relevant indicators are described next. Associations with available background variables are discussed as appropriate.
  - Introduction, background and main variables are described separately for both the intervention group (MoH) and control group (UNRWA).
  - All important tables are included within the text with numbering starting with subsection number. The rest of the tables are presented in appendices at the end of each subsection.
  - Numbers in tables are presented in unweighted format while means and proportions are weighted.
- Section 4 offers the main recommendations based on study findings.
- Annexes that include tools used for data collection are presented at the end of the report.

Executive Summary

Introduction

Background

Primary Health Care Initiatives (PHCI) is a USAID supported project that has been implemented throughout the Hashemite Kingdom of Jordan by the international consulting firm Abt Associates, Inc. in cooperation with Ministry of Health (MoH). The life time of the project is 5 years (September1999-September 2004). It is designed to improve primary health care and reproductive health through provision of an integrated package of services. The project has six main components namely; (a) quality assurance, (b) training, (c) health communication and marketing, (d) management information systems, (e) applied research, and (f) renovation and equipment. One of the main objectives of the Research component at PHCI is overall project evaluation.

Purpose and Significance

The purpose of this study is to evaluate the impact of the various PHCI project activities on utilization of services and health status. It looks for such important health issues as the status of diabetes and hypertension control as proxy health indicators that the project activities are intended to improve. The status of control of these two major chronic diseases that lead to significant morbidity and mortality has never been done for clients of MoH facilities on a national scale.

The study further examines other important utilization indicators like screening for hypertension and contraceptive use rate. Although contraceptive use has been widely researched in Jordan, studies examining contraceptive use by MoH users are not available. Finally, the study looks at some record based indicators of health status and utilization such as anemia of children and pregnant women, timeliness of vaccination doses, appropriateness of growth and monitoring visits for children and appropriateness of antenatal-postnatal care.

The purpose of this report is to inform MoH and other stakeholders, such as other health care providers, local universities involved in health research and the local communities, of the current status of some utilization and health status indicators. At a later stage, the pretest (baseline) data presented in this report will be compared with the posttest data to detect any change.

Objective

The main objective of the pretest phase of the study is to measure a set of selected utilization of services and proxy health indicators for users of MoH health centers.

Methodology

Study Design

This study follows the "quasi-experimental design" in which there is random selection of study subjects as well as a pre-test and post-test with a control group but lacks the random allocation of subjects to either control or intervention groups.

The Intervention group are users of MoH health centers while users of UNRWA* facilities constitute the control group. The intervention group is subjected to various PHCI activities while the control group is not. The selected indicators were measured at the pretest phase during October-November 2000. During June 2004 the indicators will be measured again during the posttest phase. Then the indicators of pretest will be compared to those of the posttest for each of the intervention and control groups to look for change.

Although patients using UNRWA services represent the most suitable available control group, they are expected to be different from MoH users at the pretest stage on several variables. This stresses the fact that the proposed design is a non-equivalent groups design. It is worth mentioning that in all tools except for the status of control of diabetes and hypertension, the design is a separate pretest posttest. This type of design carries the risk of having nonequivalence within each group since the same subjects are not followed up from pretest to posttest.

Sampling Design

A stratified two stage cluster sampling design was used for MoH facilities. The three regions of Jordan (north, center and south) and the two types of health centers (CHCs and PHCs) served the basis for stratification into six strata.

Health centers are the Primary Sampling Units (PSUs) representing the first level cluster. Study subjects were chosen at random from the selected health care centers (clusters) using the available logbooks and registries. For cross-sectional survey studies a sample of clients visiting the health center during the survey period were included. For certain centers with expected low load of patients, the first arrivals were selected to assure finding sufficient number of study subjects over the 2-3 day period of data collection. This issue was further dealt with by weighting since centers with low load will definitely get lower weights.

Sampling frame for PSUs consisted of a total of 306 PHCs and CHCs that offer MCH services. Estimation of the sample size was based on the results of a national study on contraceptive use in Jordan carried out in 1997. The prevalence was about 0.4 and that would allow the maximum variability possible taking into consideration the estimates for other main variables**.** The calculated sample size was used for all other variables despite that some of them required a smaller sample size. The minimum required number of PSUs was 45 health centers given 10 subjects to be selected from each health center. That number of health centers was distributed among the six strata proportionate to size where the annual visits and number of employees in each health

* United Nations Relief and Works Agency For Palestine Refugees in the Near East

center served the basis for the size. Furthermore, health centers in each stratum were inflated to ensure sufficient number of subjects in each stratum where the final number of health centers reached 89 and the number of study subjects 890. The health centers in each stratum were selected at random. For two variables (diabetes and hypertension control) where paired observations on the same individuals are to be collected in both the pretest and posttest, the number of subjects per cluster was increased to 13 instead of 10 to compensate for the expected attrition over a 4 year period.

Weighting was done in the first place to reflect the population from which the sample was drawn. The weight of selecting each health center in stratum as well as the weight of selecting a subject in the health centers were calculated. The product of the two weights was used to weigh each selected subject in the sample.

Variables and Indicators

Variables	Indicators
Timeliness of Vaccination: Dates of vaccination of 2 year old children.	*Proportion of children aged 2 years who were timely vaccinated.*
Growth and Development Visits: Number of growth and development visits made by 3 year old children.	Proportion of 3 year old children with appropriate use of growth and development service (5, 2 and 1 visits for 1st, 2nd and 3rd year respectively).
Testing Children for Anemia: The presence of at least one hemoglobin reading in the child's record that was performed at the age 6-24 months.	Proportion of children aged 6-24 months with hemoglobin test done and recorded.
Antenatal Visits: Number of antenatal visits made by a pregnant woman during her last completed pregnancy.	Proportion of pregnant women with at least 4 antenatal visits at the end of pregnancy.
Postnatal Visits: Number of postnatal visits made by a pregnant woman after her last delivery.	Proportion of pregnant women with at least 1 postnatal visit within the first 6 weeks after delivery
Testing Pregnant Women for anemia: The presence of at least one hemoglobin reading during pregnancy in the antenatal record.	Proportion of pregnant women with hemoglobin test was done and recorded.

Variables	Indicators
Use of Contraceptive Methods: The status of using contraceptive methods by women aged 15-49 years.	Proportion of women of reproductive age who were currently using any method of contraception.
Hypertension Screening: The status of screening of non-hypertensive adults aged 40 years and above of both sexes during the last year.	Proportion of non-hypertensive adults screened for hypertension.
Anemia of Children: Hemoglobin readings made at 6-24 months of life.	Proportion of anemic children at 6-24 months of age.
Anemia of Pregnancy: Hemoglobin readings of pregnant women attending MCH centers.	Proportion of anemic pregnant women.
Control of Diabetes: Glycosylated hemoglobin (HbA1c) readings for diabetic patients.	Proportion of controlled diabetics.
Control of Hypertension: Blood pressure measurements for the selected hypertensive subjects.	Proportion of controlled hypertensives.

*Definitions of timeliness of vaccine doses are detailed on page 14.

Data collection Techniques

Three main Techniques of data collection were used in the study:

- **Using available information** for record based surveys on timely vaccination, growth and development visits, antenatal-postnatal visits, anemia of pregnancy, anemia of children and partly screening for hypertension. The necessary data was transcribed from existing records to survey instruments. One form was used to fill out each record.

- **Interviewing study subjects with questionnaires** was used to get data on contraceptive use and partly for screening of hypertension, diabetes and hypertension control status.

- **Measurements (observations)** that applies to measuring glycosylated hemoglobin, and blood pressure in diabetes and hypertension.

Findings

Timeliness of Vaccination

This section aims at determining the proportion of two year old children utilizing MCH facilities at MoH health centers who are timely vaccinated for individual doses as well as for all doses.

Data was collected from a total of 879 and 198 records, in 89 MoH and 8 UNRWA health centers respectively. Table A shows the main results of timeliness of vaccination by dose as well as the combined indicator according to study group.

Table A: Distribution of Timeliness of Different Vaccine Doses by Study Group

Vaccine Dose	Timeliness %	
	MoH	UNRWA
1st of DPT, Polio and Hepatitis B	82.7	94.5
2nd of DPT, Polio and Hepatitis	91.3	95.4
3rd of DPT, Polio and Hepatitis	89.9	97.1
1s Measles	88.4	97.4
2nd Measles	97.3	96.7
Booster of DTP and Polio	96.8	97.3
All doses combined	64.6	81.7

When interpreting MoH results, the primary doses of DPT, Polio and Hepatitis B showed relatively lower level of timeliness than other doses, mainly due to more stringent criteria. The lowest figures were observed with the first visit for DPT, polio and hepatitis B at about 83% indicating that 17% of the children were brought to health centers for the first vaccine doses at more than 3 months of age. Booster of DTP and Polio and second measles doses were given on time at about 97%.

The figures of timeliness generally look acceptable when considering individual doses. Combination of all doses brings timeliness down to 64.6% which means that about 35% of children are brought to receive their shots untimely, at least once during the first two years of life. The combined indicators also hints that defaulters are not the same all the way through.

Some statistically significant differences were observed at region as well as at stratum levels with the north showing the best results and the south the lowest. Timeliness of vaccination was found to be positively associated with both maternal and paternal education. Sex of the child as well as income were not found to affect the timeliness of vaccination.

Growth and Development Visits

This section aims at studying the utilization of growth and development monitoring visits during the first three years of life for children using MoH facilities.

Data was collected from a total of 867 children from 87 MoH health centers and 200 from 8 UNRWA health centers.

Table B shows the overall prevalence of appropriateness of visits over the three years where MoH users managed to have only about 21% of their visits appropriate.

Table B: Appropriateness of Growth Visits During The First Three Years of Life

Appropriateness / Group	1st Year	2nd Year	3rd Year	3 years combined
MoH (Intervention)	63.3	37	35.6	21.3
UNRWA (Control)	99.9	79.7	57.1	53.2

The appropriateness of visits during the first year for MoH users was about 63% which dropped to 37% and 36% for the second and third years respectively. Data showed that over 80% of those with inappropriate growth visits during year one continued to do so in subsequent years. Targeting parents who don't bring their children to health centers to monitor their growth appropriately during the first year of life will definitely affect the utilization of such services during subsequent years.

Region, type of health center, sex of the child, monthly income and parent's education as provided in the records did not show any logical association with the appropriateness of use of growth and development monitoring visits.

Taking into consideration that most of the above mentioned factors are not under the provider's control, other factors are expected to affect the outcome. Improvement of quality of care and access through various project activities are therefore expected to improve utilization of such important services.

Antenatal-Postnatal Visits

This section aims at studying the utilization of antenatal-postnatal services at MCH facilities of MoH by pregnant women.

Data was collected from a total of 840 women from 88 MoH health centers and 200 from 8 UNRWA health centers.

The mean number of antenatal visits was 4.56, the median was 4 and the appropriateness of visits was less than 58%. Figures were much lower than those reported by Demographic Health Study (DHS) of 1997.

Table C shows the main indicators related to antenatal and postnatal visits. Overall, 57.7% of antenatal visits made at MoH facilities were appropriate. The northern region had the highest proportion of appropriateness (62%), while the central region had the lowest (52%). Income and educational level of the pregnant woman and her spouse were negatively associated with appropriateness of antenatal care visits. These findings can be partly explained by availability of alternative providers for residents in the central region as well as for pregnant women with higher socio-economic status.

Table C: Summary Indicators for Antenatal-Postnatal Visits

Variable / Group	Appropriateness of Antenatal Care %	Postnatal Care Utilization %	FP Counseling %	Decision about FP %
MoH (Intervention)	57.7	29.6%	34.7	71.4%
UNRWA (Control)	73.3	79.3	93.0	58.0

The same 840 records of antenatal care were used for data on postnatal care and family planning counseling during postnatal visits. Overall, 29.6% of those registered for antenatal care appeared at least once for postnatal care. Utilization was found to be the highest in the north and the lowest in the central region mainly because of the availability of alternative providers. Of those who attended the postnatal services only 34.7% were offered counseling for family planning methods. Of the latter 71% were able to decide on using a certain method of family planning. It seems evident that increasing utilization of postnatal care can increase the use of family planning methods.

Use of Contraceptive Methods

This section aims at studying the current practices of married non-pregnant women aged 15-49 who are users of MoH services regarding various family planning methods.

Data was collected from a total of 892 women aged 15-49 years from 89 MoH health centers and 200 from 8 health centers.

Table D: Prevalence of Using Different Methods of Family Planning

Method / Group	Modern Method %	Traditional Methods %
MoH (Intervention)	51.6	15.9
UNRWA (Control)	65.5	17.3
1999 JAFS	39.8	16.8

MoH data showed that the prevalence of using any modern contraceptive method or any traditional method was found to be 51.6% and 15.9% respectively (Table D). The use of modern methods was found to be higher than the national widely distributed figures of Jordan Annual Fertility Survey (JAFS) of 1999. This fact is probably related to the differences in study designs. The probability of using family planning methods is higher for a women visiting health facilities with MCH services than for a women encountered in a household surveys.

IUDs, pills and condoms were the most commonly used modern methods at 29.2%, 13.9% and 5.3% respectively while breastfeeding was the most common traditional method at 7.9%.

The use of modern methods of contraception was positively associated with the level of education and employment of the respondent. The younger age group of 15-24 and

the older of above 44 were shown to use less contraception than other age groups. Women having more male children tended to use family planning more frequently.

No difference was noted in using modern methods among regions or according to the type of the health center.

About 39% of women got their contraceptive methods from the surveyed health center and about 37% from outside facilities other than MoH. The most commonly reported difficulty was complications and side effects of IUDs and pills.

The utilization rate of modern methods among users of MoH health centers was higher than the national figures. Nevertheless a good proportion of women reported getting the service from outside the MoH. Improving quality of services at the MoH facilities through PHCI project activities is expected to result in increased proportion of users who get the service from the closest MoH centers.

Screening for Hypertension

This section aims at studying the current practices of screening those aged 40 or above for hypertension.

Data was collected on a total of 884 individuals aged 40 years and above and who were not known hypertensives in 89 MoH health centers and 200 individuals in 8 UNRWA health centers. Data was collected from the study subjects through exit interviews and review of records.

Table E: Screening for Hypertension

Screening / Group	Yes %	No %
MoH (Intervention)	37.1	62.9
UNRWA (Control)	81.7	17.3

When questioning MoH patients whether their BP was checked on the day of the study, 26.6% replied positively, but reviewing their records showed that only 15.2% had their BP checked and documented. Furthermore, the number of times the patient visited the health center in the past year and how many times his/her BP was checked and recorded were examined. It was found that 36.6% of all patients had their BP checked at least once over the last year. Adding recorded BP of the survey day to last year's results did not affect the overall screening indicator which was about 37% (Table E).

The above figures were found to be consistent irrespective of the type of health center, region, sex, age and education. This fact reflects the presence of two general problems, one is related to documentation in the patient's chart and the other pertains to the practice of screening for hypertension. The simplicity of the procedure, the high expected yield and the importance of controlling hypertensive patients should definitely urge both PHCI and MoH to take immediate steps to solve the discrepancy.

Anemia of Children

This section aims at studying the proportion of children aged 6-24 months visiting health centers for monitoring growth and development and getting their hemoglobin checked and recorded at least once as well as determining the prevalence of anemia among these children.

Data on anemia came from the records for growth and development with a total of 867 children from 87 MoH health centers and 200 from 8 UNRWA health.

Table F: Prevalence of Anemia Among Children Aged 6-24 Months by Group

Group	Utilization of Hb Testing %	Hb Mean	Anemia %
MoH (Intervention	37.8	11.39	25.4
UNRWA (Control)	99	11.14	30

Out of the total of 867 records in 87 MoH facilities only 328 in 71facilites had hemoglobin values recorded in their files. As shown in table F less than 38% of children aged 6-24 months in MoH facilities had their hemoglobin tested and documented. This unexpectedly small number of children affected further analysis, where data on anemia should be interpreted with caution in terms of representativeness and generalizability.

Almost one fourth of children with recorded hemoglobin were found to have hemoglobin less than 11g/dl and thus considered anemic. The highest prevalence of anemia was found in the north (31%) and the lowest in the central region (21%).

Anemia During Pregnancy

This section aims at studying anemia during pregnancy as well as utilization of hemoglobin testing during pregnancy.

Data on anemia came from the same 840 MoH and 200 UNRWA records for the antenatal postnatal section.

Table G: Prevalence of Anemia Among Pregnant Women by Group

Group	Utilization of Hb Testing %	Hb Mean g/dl	Anemia %
MoH (Intervention	88	11.6	24.7
UNRWA (Control)	96.5	11.1	33.2

Overall, 739 out of the selected 840 (88%) records were found to have data on hemoglobin. The mean hemoglobin value was 11.6 g/dl for MoH clients and about 25% were found to be anemic (Table G).

Anemia during pregnancy was found to be negatively associated with the level of education of both the pregnant women and her husband.

Data failed to demonstrate any other statistically significant associations with age, stratum, region, type of the health center as well as income. These findings are partly

explained by the more or less homogeneity of pregnant women attending antenatal-postnatal care at MoH facilities.

Status of Diabetes Control

This section aims at studying the status of diabetes control among users of MoH facilities.

Data was collected from a total of 1190 diabetic individuals who were MoH service users in 89 health centers and 203 diabetics who were UNRWA users in 8 health centers.

Ranging from a few months to 30 years, the average duration of diabetes was 7 years. Over two thirds of the sample (70%) reported having diabetes for more than three years. The average BMI for the sample was found to be at the cutoff point of obesity (30.12 Kg/m^2). While 82% of the sampled diabetics were overweight or obese, significant difference was found between males and females in terms of obesity.

Table H: Status of Control of Diabetes Mellitus

Group \ Status of Control	Good %	Fair %	Poor %
MoH (Intervention)	35.7	21.2	43.1
UNRWA (Control)	17	21.9	61.1

It is significant, but yet disturbing, to find that over 43% of the diabetics using MoH facilities were in the poor control category, meaning that they are more prone to develop complications for this very common disease in the country (Table H).

The central region had the lowest percentage of poorly controlled diabetes at 39.6% with the southern region at 41.1% and the northern region having the highest at 48.2%. The higher proportion of the poorly controlled in the north was of statistical significance. Body mass index, age, sex, employment status, did not seem to be associated with the status of diabetes control. The mean duration of the disease was significantly higher and mean years of schooling was significantly lower in the poorly controlled compared to all others.

Although the status of control was found to be associated with disease duration and years of schooling, other factors that were not included in this study might play a significant role in the control of diabetes. Example of such factors are knowledge of the disease, medication, family history, complications, status of physical activity and nutrition. Therefore, other studies of a more comprehensive nature are recommended.

Status of Hypertension Control

This study aims at studying the status of control of hypertension among known hypertensive patients using MoH facilities.

A total of 1148 hypertensive subjects at 89 MoH facilities and 198 subjects at 8 UNRWA facilities were interviewed and their BP recorded.

Ranging from few months to 41 years, the average duration of hypertension was 6.4 years among hypertensive subjects at MoH facilities. About 37% reported having their hypertension diagnosed during the last 3 years. The average BMI for the sample was found to be within the obesity range at 31.72 Kg/m^2. While 88.5% of the sampled subjects were overweight or obese, significant difference was found between males and females in terms of obesity.

Table I shows that only 11% of the hypertensive subjects users of MoH facilities were well managed and able to bring their blood pressure to the normal values.

Table I: Summary of the Status of Control of Hypertension

Group	Status of Control of Hypertension (%)			
	Controlled BP	Grade I Hypertension	Grade II Hypertension	Grade III Hypertension
MoH (Intervention)	11	28.6	33	27.4
UNRWA (Control)	16.6	39.8	26.3	17.3

The control of hypertension was the best in the central region (13.8%) and worst in the north (7.4%). At the stratum level, central CHCs were the best with about 18% of controlled subjects while south PHCs were the worst at less than 7% of controlled.

Age, sex, employment, occupation, duration of the disease and body mass index did not show any association with the status of disease control. Only education was positively associated with control of hypertension where control increased from less than 10% in the illiterate group to almost 19% in the highest education category.

Given that good control of the disease is almost equal to no disease, it is quite evident that this very common chronic disease needs more attention at all levels.

Recommendations

Various PHCI project activities namely: training, quality assurance, management information system and health communication are designed to meet most of the proposed recommendations. In addition, some immediate actions have to be taken by the Ministry of Health. Following are the main recommendations:

- Formulation of a national strategy for chronic non-communicable diseases is urgently needed to improve the status of awareness, treatment, and control levels among the hypertensive and diabetic populations.

- Review and institute policies and procedures necessary for early detection of anemia both during pregnancy and early childhood. Further efforts should be exercised to improve screening procedures for anemia among children and pregnant women.

- Food fortification and iron supplementation strategies are major approaches that can be developed to control nutritional anemia.

- Recording systems should have clear evaluation schemes in order to facilitate correct monitoring of health problems.

- Creating a management system whereby a set of standards is provided and ensured.

- Improving the quality of maternal and child health care services in order to ensure high quality care delivery.

- Screening mechanisms for hypertension among those aged 25 years and above have to be established with no delay.

- Assisting the MoH in developing a health education scheme that targets common health problems.

- Developing ways to improve the postnatal care at MCH facilities including outreach programs. Missed opportunities for family planning during postnatal visits have to be considered seriously.

- Improving the utilization of growth and development monitoring visits for children during second and third year of life.

1. Introduction

1.1 Background

In cooperation with the Hashemite Kingdom of Jordan, USAID/Jordan has developed a program to improve basic primary health care through an integrated package of family health services in which reproductive health, child health, adult health and health prevention and promotion will be delivered by a family health provider team. This project, called the Primary Health Care Initiatives (PHCI), is being implemented throughout the country by the international consulting firm Abt Associates, Inc. in cooperation with Ministry of Health. The life time of the project is 5 years (September1999-September 2004)

The project has seven interventions and include: (a) quality assurance, (b) training, (c)management, (d) health communication and marketing, (e) management information systems, (f) applied research, and (g) renovation and equipment. One of the main objectives of the Research component of PHCI is overall project evaluation. The combination of the various inputs is designed to increase the quality of health care services in MoH based primary health care facilities in Jordan namely, primary and comprehensive health care centers (CHCs and PHCs). In turn, this is expected to lead to improvements in client and provider satisfaction as well as more appropriate utilization of health services and, ultimately, improvement in health status. The five-year life of this project presents the opportunity to empirically test the validity of these assumptions. This evaluation study uses mainly process and outcome measures to help identify gaps in the current system and to evaluate the quality and impact of the various PHCI programs. Furthermore, information from this evaluation process can be used to refine existing MoH programs and activities and establish new ones if needed.

1.2 Purpose & Significance

The purpose of this study is to evaluate the impact of the various PHCI project activities on utilization of services and health status. Methodologically, the study uses quasi-experimental design with pretest, posttest and control group. Results of the pretest phase of the study are presented in this report. The posttest phase will be conducted at the end of the project in 2004.

The indicators of utilization and health status used in the study were carefully selected with involvement of various stakeholders over two roundtable sessions. The two roundtable workshops were attended by specialists from MoH, PHCI, Universities, USAID and some visiting Abt consultants.

The purpose of this report is to inform MoH and other stakeholders, such as other health care providers and local universities involved in health research in addition to the local communities, of the current status of some utilization and health status

indicators. At a later stage, the pretest data presented in this report will be compared with the posttest data to detect any change.

This study tests whether a health project supported by a donor agency will make a difference upon its completion. The study covers users of MoH primary health care system. It looks for such important health issues as the status of diabetes and hypertension control as proxy health indicators that the project activities are intended to improve. The status of control of these two major chronic diseases that lead to significant morbidity and mortality has never been done in MoH facilities on a national scale. The determinants of the above indicators extend well beyond the traditional boundaries of the health care system such as socio-economic status. Nevertheless, it is believed that these indicators would provide a good appraisal of quality health care.

The study further examines some utilization indicators like screening for hypertension and contraceptive use rate. Contraceptive use has been well researched in Jordan but no figures were available for MoH users. Finally, the study looks at some record based indicators of health status and utilization such as anemia of children and pregnant women, timeliness of vaccination doses, appropriateness of growth and development monitoring visits for children and appropriateness of antenatal-postnatal care.

The current report provides a strong foundation for decision making and activity planning that can positively affect the people of Jordan.

1.3 Objectives

In light of the above background and purpose, the overall primary objectives of this evaluation study are the following:

- To measure and assess the change in a set of selected appropriate utilization of services indicators in Primary and Comprehensive Health Care Centers over the period October / 2000-June / 2004

- To measure and assess the change in selected proxy health status indicators among users of Primary and Comprehensive Health Care Centers over the period October / 2000-June / 2004.

The objectives for the current pretest phase of the study will be limited to measuring the indicators as baseline to enable the comparison and assessment of the change after the posttest is done at the end of the project.

2. Methodology

2.1 Study Design

This study follows the "quasi-experimental design" in which there is random selection of study subjects as well as a pre-test and post-test with a control group but lacks the random allocation of subjects to either control or intervention groups. This is illustrated as follows:

		October 2000		June 2004
Utilization and proxy health status indicators in certified MoH facilities (intervention group)	[R]	O_1	X	O_2
Utilization and proxy health status indicators in non-certified MoH facilities (control group)	[R]	O_3	X	O_4
Utilization and proxy health status indicators in UNRWA facilities (control group)	[R]	O_5		O_6

where,

O_1 = Selected utilization and health status indicators in certified MoH facilities (intervention group) before project interventions.

O_2 = Selected utilization and health status indicators in certified MoH facilities (intervention group) after project interventions.

O_3 = Selected utilization and health status indicators in non-certified MoH facilities (control group) before project interventions. This group is considered control for the certified but it is still an intervention group as part of the whole MoH facilities versus the true control of UNRWA facilities mentioned in O_5 .

O_4 = Selected utilization and health status indicators in non-certified MoH facilities (control group) after project interventions.

O_5 = Selected utilization and health status indicators in UNRWA facilities (control group) before project interventions.

O_6 = Selected utilization and health status indicators in UNRWA facilities (control group) after project interventions.

X = PHCI interventions (quality assurance, training, management, health communication and marketing, management information systems, applied research, and renovation and equipment). A special certification system is going to be designed by the quality assurance component to score achievements of each health care center on 0-100 scale after applying different components. It is postulated that all health care centers can not attain the same level of achievements by the end of the project. When the above interventions lead to 80% or more of achievements, the health center is considered **certified**. Attaining 40% or less of achievements will consider the health center as **non-certified**.
The number of health centers that will eventually be subjected to the certification process is not finalized yet as well as the levels of certification.

R = Random selection of the subjects

Although patients using UNRWA services represent the most suitable available control group, they are expected to be different from MoH users at the pretest stage for several variables. This stresses the fact that the proposed design is a non-equivalent groups design. It is worth mentioning that all tools but the status of control of diabetes and hypertension, the design is a separate pretest posttest. This kind of design carries the risk of having nonequivalence within each group since the same subjects are not followed up from pretest to posttest. It is worth mentioning that the design was agreed upon during the 2 roundtable workshops for choosing appropriate indicators for the study.

The above design including the certification process is subject to changes at the posttest stage depending on changes of PHCI original work plan.

The pretest was carried out in October-November 2000, and the posttest will be conducted between May-June 2004. The timing for pretest and posttest is different because the project is expected to finish in September 2004 and posttest data collection needs to occur for at least 3-4 months before this date.

2.2 Sampling Design

2.2.1 Introduction

A stratified two stage cluster sampling design was used for MoH facilities. Since the study aims at generalizing results according to the type of health care center at the regional as well as national levels, three samples of PHCs and three samples of CHCs were selected proportionate to size from the three regions of Jordan, namely; north, central and south. Health centers in each stratum were then selected at random.

The primary and comprehensive health care centers are the Primary Sampling Units (PSUs) representing the first level cluster. Study subjects were chosen at random from the selected health care centers (clusters) using the available logbooks and registries.

For cross-sectional surveys, a sample of clients visiting the health center during the survey days were included. For certain centers with expected low load of patients, the first arrivals were selected to ensure finding sufficient number of study subjects over the 2-3 day data collection period. This issue was further dealt with by weighting since centers with low load will definitely get lower weights.

2.2.2 Sampling Frame

Sampling frame for PSUs consisted of a total of 306 PHCs and CHCs that offer MCH services. All centers (about 70) that do not offer MCH services were excluded because three of the instruments used were designed to collect data on MCH related indicators. The sampling frame covered all 12 Governorates as well as the 20 health directorates. Table 2.1 summarizes the sampling frame. Users of the above centers constituted the sampling frame for the selected subjects

Table 2.1: Sampling frame for PSUs

Health Center Type	Number of Centers
Central CHC	20
Central PHC	97
Northern CHC	11
Northern PHC	115
Southern CHC	11
Southern PHC	52
TOTAL	**306**
Total CHC	**42**
Total PHC	**264**

2.2.3 Sample Size

Estimation of the sample size was based on the results of a study on contraceptive use in Jordan carried out in 1997. The prevalence of contraceptive use was about 0.4 and that would allow the maximum variability possible taking into consideration the estimates for other main variables**.** The calculated sample size was used for all other variables despite that some required a small sample size. The Coefficient of Variation (CV) was found to be 0.02 while the variance within each cluster (S^2w) was 0.041554 and the variance among clusters (S^2b) was 0.02726. The estimated variation for proportion V (p) was calculated for CV% of 5% to be 0.000692. The following formula was used to estimate the number of PSUs:

$\hat{V}(p) = S^2b/n + S^2w/mn$ where m is the sample size for PSUs and n represents the number of subjects to be selected in each cluster.

If "n" is considered 8 then we will end up with an m of 47 centers, if "n" is 10 then we need 45 centers and when "n" is 12 then the expected number is about 44 centers. It was decided to use 10 subjects per cluster, therefore a minimum of 45 centers were needed (Using 10 subjects per cluster lead to selecting 45 clusters). For certain variables (hypertension and diabetes control) where paired observations on the same individuals are to be collected in pre and posttests, the number of subjects per cluster was increased to 13 to compensate for the expected attrition over a 4 year period. As a

result, the minimum number of required subjects was 450 with 10 subjects from each of the 45 centers.

Data on annual number of visits and number of employees for 1999 was obtained from the MoH information centers. PSUs were selected at random with probability proportionate to size (PPS)within each stratum.

The size of each health center was calculated according to the following formula:

$$\text{Size of the center} = \frac{\text{capacity of center} \times \text{number of annual visits}}{2}$$

The capacity was calculated according to the following formula:

$$\text{Capacity} = \frac{\text{No. of clients per stratum} \times \text{No. of employees at a given center}}{\text{Number of employees per stratum}}$$

Table 2.2 shows the distribution of health centers by size for each stratum that was used to define the number of health centers in each stratum proportionate to size. The fifth column shows the adjusted number after selection with probability proportionate to size. As far as sampling from each stratum separately the number of PSUs were inflated to allow sufficient number of health centers in each stratum. The inflation was done in an arbitrary way taking into account the number of the health centers in each stratum and the number calculated by PPS. The adjusted final numbers used in the sample are shown in the last column of Table 2.2. Within each stratum the PSUs were selected at random.

Finally, instead of the minimum of 45 centers, 89 (well distributed) centers were

Table 2.2: Selection of Primary Sampling Units with Probability Proportionate to Size

Health Center	Size	Number of Centers	Rounded N with PPS	Adjusted Number
Central CHC	767883	20	7	**11**
Central PHC	1464292	97	13	**24**
Northern CHC	342858	11	3	**5**
Northern PHC	1503615	115	14	**28**
Southern CHC	330372	11	3	**5**
Southern PHC	526134	52	5	**16**
TOTALS	4935154	306	45	**89**

selected over the six strata of health centers. The overall sample size was expected to be 890 for all the tools with 10 subjects from each health center. For diabetes and hypertension studies about 1160 individuals were expected for the pretest stage.

2.2.4 Calculating Weights

Weighting was done in the first place to reflect the population from which the sample was drawn. Three types of weights were used to fit the design in various conditions.

- **Expansion weight** was calculated for each study subject in all tools according to the following formula: EW=W1×W2 where, EW is the expansion weight, W^1 is the weight of a health center in the stratum and W^2 is the weight for the study subjects in the health center.

  W^1 was calculated as a reciprocal of the probability of selecting the health center in the stratum. Dividing the size of the health center by the total size in the stratum and multiplying the product by the number of health centers in the stratum calculated the probability of selecting a health center in that stratum.

  W^2 was calculated as the reciprocal of the probability of selecting one study subject in a given health center. Dividing the number of selected subjects at the health center by the total number of clients visiting the center during the study period equaled the probability of selecting a study subject.

  Expansion weight allows the number of sampled study subjects to mirror the number they represent in the population. This type of weighting was used for all analysis at the stratum level including UNRWA .

- **Relative weight** was calculated by dividing the expansion weight for each subject by the average weight. The average or mean weight was calculated by dividing the total expansion weight for all subjects in the sample by the total number of subjects in the sample.

  The above mentioned expansion weight is suitable for inflation of the small samples at the stratum level in order to mirror the population that they represent. But when analysis at the national, regional or health center type levels is needed the inflation resulting from using the expansion weight will render the tests of statistical significance, with a standard statistical package like SPSS, almost meaningless. This happens simply because the computations do not reflect the actual number of observations and become too exaggerated ending up mostly with statistically significant relationships.

  Relative weights just downsize the expansion weights to numbers that are close to the actual sample size but still maintain the appropriate distribution of cases as produced by the expansion weight.

- **Adjusted weight** is calculated by the following formula:

  AW= EW×(n/(n-m))

  where AW is the adjusted weight, EW is the expansion weight, n is the number of subjects selected and m the number with missing values.

  The adjusted weight is used as one method to adjust for differential coverage or response (non-response or missing values bias). The adjusted weight was used only in one variable: anemia of children. That variable was studied as part of an instrument looking for growth and development visits in the records as well as anemia status. Weighting was necessary because a large proportion of files were found to be missing.

2.2.5 Sampling for UNRWA Facilities (Control Group)

A total of 23 health care centers are run by UNRWA in Jordan. The centers distribution is limited to refugee camps or areas very close to them (13 centers inside the camps and 10 outside). The bulk of the camps are in the Central region (Amman, Zarqa and Balqa), with fewer centers in the north (Irbed and Jarash) and none in the south. Furthermore, only 13 health centers are providing all the services provided by the selected MoH centers and thus constituted the sampling universe for UNRWA centers. A two-stage cluster sampling was applied to UNRWA facilities with no stratification.

A total of 8 UNRWA health centers (over 60% of eligible centers) were chosen. A total of 25 subjects from each cluster were selected bringing the total number of subjects for each instrument to 200. About 18 subjects from each health center assures a confidence level above 95% and a precision level of 5% and having 7 more study subjects is expected to add more confidence to the study.

2.3 Main Variables and Indicators

Main variables are those used for calculation of utilization and health status indicators. The variables were divided into two groups: a) utilization of services; and b) proxy health status variables. Each of the above groups was further divided into three categories. The first category deals with children up to three years of life, the second deals with women and the third with the adult population. This categorization is used throughout the this report.

Table 2.3 shows the main study variables and their relevant indicators.

Table 2.3: Main Study Variables and Indicators

Utilization Variables: These are variables used to calculate some process indicators related to utilization of services at health care centers. Appropriate utilization was defined for each variable separately after reviewing the relevant literature and consulting with the local specialists about the standards. Three categories of clients were identified namely: children (0-3), women of child bearing age (15-49) and adults (mainly aged 40 or above)	
Variables	**Indicators**
Children:	
Timeliness of Vaccination: Dates of vaccination of 2 year old children.	*Proportion of children aged 2 years who were timely vaccinated.*
Growth and Development Visits: Number of growth and development visits made by 3 year old children.	Proportion of 3 year old children with appropriate use of growth and development service (5, 2 and 1 visits for 1st, 2nd and 3rd year respectively).
Testing Children for Anemia: The presence of at least one hemoglobin reading in the child's record that was performed at the age 6-24 months.	Proportion of children aged 6-24 months with hemoglobin test done and recorded.
Women:	
Antenatal Visits: Number of antenatal visits made by a pregnant woman during her last completed pregnancy.	Proportion of pregnant women with at least 4 antenatal visits at the end of pregnancy.
Postnatal Visits: Number of postnatal visits made by a pregnant woman after her last delivery.	Proportion of pregnant women with at least 1 postnatal visit within the first 6 weeks after delivery
Testing Pregnant Women for anemia: The presence of at least one hemoglobin reading during pregnancy in the antenatal record.	Proportion of pregnant women with hemoglobin test was done and recorded.

Use of Contraceptive Methods: The status of using contraceptive methods by women aged 15-49 years.	Proportion of women of reproductive age who were currently using any method of contraception.
Adults	
Hypertension Screening: The status of screening of non-hypertensive adults aged 40 years and above of both sexes during the last year.	Proportion of non-hypertensive adults aged 40 years and above screened for hypertension.
Health Status Variables Due to the relatively short lifetime of the project, measurable impact is not expected on major health indicators like infant mortality, maternal mortality and life expectancy nor prevalence of main diseases like hypertension and diabetes. Instead, the impact of PHCI interventions on proxy health indicators for children aged 2 years, women aged 15-49 and adults (mainly over 40) was studied. In contrast to utilization, the proposed health status measures were considered more of an outcome measures.	
Children:	
Anemia of Children: Hemoglobin readings made at 6-24 months of life.	Proportion of anemic children at 6-24 months of age.
Women:	
Anemia of Pregnancy: Hemoglobin readings of pregnant women attending MCH centers.	Proportion of anemic pregnant women.
Adults	
Control of Diabetes: Glycosylated hemoglobin (HbA1c) readings for diabetic patients.	Proportion of controlled diabetics.
Control of Hypertension: Blood pressure measurements for the selected hypertensive subjects.	Proportion of controlled hypertensives.

The study design as well as the above variables and indicators were selected during two roundtable workshops with participation of MoH, PHCI, Universities, USAID and some visiting Abt consultants.

The vaccination coverage in Jordan is very high; figures above 90% for individual vaccines are reported from different sources. Jordan is currently at the final stages of poliomyelitis eradication and the early stages of measles elimination with application of multiple National Immunization Days for both diseases. Given the population movement from other countries that are still behind Jordan in vaccination coverage, the timeliness of vaccination seems very important

Regular growth assessment of children during their first years of life is the single measurement that best defines the health and nutritional status. Certain socio-economic factors are beyond the control of the health team providing the service. Nevertheless, there is a long list of health conditions affecting growth that can be corrected with appropriate growth monitoring visits to MCH centers including anemia.

Antenatal-postnatal care addresses both the psychosocial and the medical needs of the pregnant woman. Periodic health check-ups during the antenatal period are necessary to establish confidence between the woman and her health care provider, and to identify and manage any maternal complications or risk factors. Antenatal visits are also used to provide essential services that are recommended for all pregnant women, such as tetanus toxoid immunization and the prevention of anemia through nutrition education and provision of iron/folic acid tablets. Postnatal care is also essential for the early detection and adequate management of problems and disease emerging during the first 6 weeks after delivery.

Jordan has realized the discrepancy between the natural population growth rate and economic growth that poses increasing pressure on the public sector regarding education, health, employment and other aspects as well. Jordan's National Population Strategy calls for the expansion of family planning services throughout the Kingdom and seeks to increase rates of family planning use.

Despite the fact that contraceptive prevalence has been widely studied in Jordan with almost annual Jordan Population and Family Health Surveys over the last years, the current study is designed to gather information on users of MoH as far as the PHCI project is more facility based project. The results provided by nationwide community based household surveys are different from facility based surveys depending on type of facility under consideration.

Hypertension is a highly prevalent disease in Jordan. Jordan Morbidity Survey of MoH in 1996 pointed to an overall 32% prevalence of hypertension in those aged 25 years and above. The disease is the best example of secondary prevention. Screening for hypertension is a simple procedure applied to a prevalent disease with serious complications, easily prevented by the availability of very effective treatment schedules once the disease is discovered.

A mixture of health problems that is common in both developing and industrialized countries burdens the health care delivery system in Jordan. Hypertension occupies a major role in the etiology and development of coronary heart disease and stroke. It specifically poses a major public health challenge to public health authorities in developing countries where the health system is already loaded with other more evident health problems. The severity of elevated blood pressure is directly related to coronary heart disease and stroke.

One of the most common chronic conditions prevailing in the Jordanian community is Diabetes. In 1998, the National Center for Diabetes, Endocrine and Genetic Diseases in Jordan reported a 13.4% prevalence rate for diabetes mellitus[*]. Management and control of diabetes is essential for delaying complications.

[*] Ajlouni K, Jaddou H, Batieha A. Diabetes and impaired glucose tolerance in Jordan: prevalence and associated risk factors. J Intern Med 1998 Oct;244(4):317-23.

2.4 Data Collection Methods

2.4.1 Data Collection Techniques

Three main Techniques of data collection were used in the study:

- **Using available information** was utilized for record based surveys on timely vaccination, growth and development visits, antenatal-postnatal visits, anemia of pregnancy, anemia of children and partly screening for hypertension. The necessary data was transcribed from existing records to survey instruments. One form was used to fill out each record.

- **Interviewing study subjects using questionnaires** was used to get data on contraceptive use and partly for screening of hypertension, diabetes and hypertension control status.

- **Measurements (observations)** that apply to measuring glycosylated hemoglobin, and blood pressure in diabetes and hypertension.

2.4.2 Data Collection Tools

Following are the tools used in the study:

2.4.2.1 Timeliness of Vaccination

Data for the timeliness of vaccination was obtained from records of MCH centers for sampled subjects. Annex 1 shows the form used for data collection on timeliness of vaccination. The tool was used to transfer data from records on dates of vaccination and other available background variables of two year old children. The six categories of parents' education were brought down to four during data analysis by combining elementary and secondary to become "less than secondary" and the last two categories to become "higher education".

Data was collected on vaccination dates for doses of hepatitis B, DTP, polio, measles and MMR. Children who were registered for the first time during the period from 1/1-30/4/1998 constituted the sampling universe for the pretest stage of the study. The number of children was recorded as the "Total Number of Children" in the annex. This total number serves the purpose of weighting at the analysis stage and will appear in all other tools.

The required number of records was selected by systematic random sampling from the total number of children who registered for the first time during the above-specified dates. Children were expected to register when they were 2 months old and vaccination records were traced for about two years after registration. Children were expected to be 2 years of age by 1/3/2000.

A vaccination dose was considered timely if the child was brought to the clinic on the scheduled date (Table 2.3). For the first three doses of hepatitis, DTP and polio an additional one-month was allowed between doses. If the time between two subsequent doses was less than 28 days, the visits were labeled as inappropriate. First measles dose was considered appropriate even when given up to three months after the proposed age of 9 months. The second dose of measles as well as the booster doses were considered appropriate if given between 15 and up to 24 months of age.

Subtracting the birth date from each the date of each dose indicated how close the vaccination is to the scheduled date. Table 2.4 shows the age in months for timeliness of different doses of vaccination based on consultation with the local experts at MoH.

Table 2.4: Timeliness of Vaccination for Different Doses

Vaccine Dose	Age of Children				
	Hepatitis B	**DTP**	**Poliomyelitis**	**Measles**	**MMR**
1st	8-12 weeks	8-12 weeks	8-12 weeks	9-12 months	15-24* months
2nd	30-60 days from first	30-60 days from first	30-60 days from first	15-24* months	
3rd	30-60 days from Second	30-60 days from Second	30-60 days from Second		
Booster		15-24 months	15-24 months		

- The second dose of measles was looked for only if MMR was not given.

2.4.2.2 Growth and development visits, and anemia of children

Data for these variables was obtained from MCH records of selected subjects. Annex 2 shows the instrument that was used for data collection. The reason for grouping a utilization variable (growth and development visits) and a health status variable (anemia of children) was to enable measuring the utilization of testing for anemia. Furthermore, data on the two variables was available on the same medical record.

Growth and development visits were collected from a sample of children who were registered to get the service for the first time during the period from 1/1-30/4/1997. Children are expected to register at 2 months of age; they were traced until the age of 3 years. The number of growth and development visits was recorded for the first, second and third years of life separately.

Appropriate was considered 5 or more visits during the first year of life, 3 or more visits for the second year and 1 or more visits for the third year of life.

Anemia of children was calculated based on the hemoglobin test that is routinely done at about one year of age. Children having hemoglobin (Hb) or packed cell volume (PCV) readings any time between 6 and 24 months of age were considered screened for anemia. Anemia was considered to be present when Hb was less than 11 g/dl according to WHO criteria. Anemia was considered mild, moderate and severe when Hb was 10 –11 g/dl, 7/10 g/dl and less 7 g/dl respectively

2.4.2.3 Antenatal, postnatal visits, and anemia of pregnancy

Data for the above three main variables was obtained from the records of subjects of selected sample of health centers. Annex 3 shows the instrument for data collection for the main variables as well as some background and control variables. The reason behind grouping two utilization variables (antenatal and postnatal visits) and one health status variable (anemia of pregnancy) once again was to enable measuring the utilization of testing for anemia. Furthermore, data on the three variables were available on the same medical record.

Antenatal care was measured by noting the number of antenatal care visits made by a pregnant woman in the selected sample whose registration date lied within the period from 1/1/-30/4/1999. This gave an opportunity to study pregnancies that will be completed just before the posttest begins in June 2004. Any notes found to indicate incomplete pregnancy disqualified the women from being included in the study. All pregnancies labeled as "risk pregnancies" were excluded from the sample to reduce the bias of frequent visits in such situations. Risk pregnancies as defined by MoH are those with essential hypertension, diabetes, proteinuria, heart disease and abnormal fetal positions. Visits not related to pregnancy were not counted.

Paying 4 or more antenatal visits during the period of a completed pregnancy was considered appropriate for normal uncomplicated pregnancy.

The postnatal care variable measures the attendance of postnatal clinic by a pregnant woman in the selected sample whose registration date lies within the period from 1/1/-30/4/1999. Attending a postnatal clinic once within the first 6 weeks after delivery was considered appropriate. All pregnancies labeled, as "risk pregnancies" were excluded from the sample as for antenatal visits to reduce the bias of frequent visits in such situations.

Screening for anemia of pregnancy in the same sample for antenatal-postnatal visits was considered done if at least one Hb reading was available in the record. Anemia was calculated based on the last available Hb or PCV readings. Anemia was considered to be present when Hb was less than 11 g/dl according to WHO criteria. Anemia was considered mild, moderate and severe when Hb was 10 –11 g/dl, 7-10 g/dl and less 7 g/dl respectively. It was originally thought of recording the trimester of hemoglobin testing, but the pilot test revealed a large proportion of files were missing the last menstrual date and figuring out the trimester of testing for Hb would be cumbersome.

2.4.2.4 Use of Contraceptive Methods

Data on the current use of contraceptives was collected through an exit interview at the selected health care center for a sample of women in the age group 15-49. Annex 4.1 shows the questionnaire on the use of contraceptives.

Variables related to the use of any method whether modern or traditional were included in the questionnaire. Some questions on the source of contraceptive methods as well as problems related to the use of contraceptive methods were also included.

It is worth mentioning that the list of occupation categories appearing in this tool and in other tools as well was found too long during analysis stage. Legislators, professionals and technical and associated professionals were combined in one category called "professionals". Elementary occupations were labeled as "unskilled workers". All other categories but housewife category were classified as "skilled workers". As for educational categories, only those with 0 years of schooling were considered illiterate.

Another questionnaire shown in annex 4.2 was designed for providers. In addition to identification variables this questionnaire included questions to the providers on the availability of various types of contraceptives on the survey day. One questionnaire was filled for each of the 89 MoH and 8 UNRWA selected centers.

2.4.2.5 Screening for Hypertension

Data for screening hypertension was collected through an exit interview using the questionnaire shown in annex 5. Data was collected on a sample of non-hypertensive adults aged 40 years and above of both sexes during the study period.

The questionnaire contains variables that test the screening practice for hypertension on the day of the survey as well as over the period of the last year from the date of the survey.

The patient was considered screened for hypertension when the medical file showed that blood pressure was recorded at least once over the last year including the day of the survey. To look for the discrepancy between checking BP and recording the result in the patient's file, the data collected on the day of the survey was used. The patient was first asked about checking his/her BP and the response was compared to what was recorded in the medical file.

2.4.2.6 Status of Diabetes Control

Data on Diabetes control was collected using the questionnaire shown in annexes 6.1 and 6.2. Blood specimens were obtained for a sample of diabetic subjects for measuring glycosylated hemoglobin (HbA_{1c}). The classification shown in table 2.5 was used to determine the status of control of diabetes.

All readings above 7.6% were considered uncontrolled while the good in addition to the fair control category were considered controlled. For purpose of standardization, the test was done only at the Central Laboratories at the MoH.

As far as this study is not intended to look in depth for factors affecting diabetes control, only few independent variables were collected such as weight, height and disease duration.

Table 2.5: Definitions of Blood Sugar Control Levels

HbA_{1c} Readings in %	**Category of Control**
≤ 6.7	Good Control
6.8-7.6	Fair Control
> 7.6	Poor Control

Data was collected on weight and height to calculate the body mass index **(BMI)**. Known for its simplicity, the index correlates to fatness and can be applied to both men and women. BMI was calculated using the conventional formula (weight*10,000 /height^2) where weight is in kilograms and height in centimeters.

Table 2.6: Categories of BMI

Category	Value (Kg/m^2)
Underweight	<18.5
Normal	18.5-24.99
Overweight	25-29.99
Obesity I	30-34.99
Obesity II	35-39.99
Obesity III	≥40

BMI of 30 Kg/m^2 was considered the cutoff point between obesity and non-obesity. BMI of 25 Kg/m^2 was considered the cutoff point between normal and overweight. BMI was calculated for those who were above 17 years of age. Table 3.8.2 demonstrates the definition of the 6 categories of BMI. It is clear from the table that overweight and obesity are not mutually exclusive, since obese persons are also overweight

As mentioned earlier 13 patients were selected in each health center to allow for the expected attrition and deaths in 4 years from the pretest. Patient's name, address and phone number were collected to facilitate locating them at the posttest stage. Patients were selected as for all other tools using systematic random sampling depending on the load during the 2-4 days of the survey in the target health centers.

2.4.2.7 Status of Hypertension Control

Data was collected using the questionnaire shown in annex 7. In addition to recording systolic and diastolic blood pressure, data on some additional independent variables was collected similar to the previous tool on diabetes. Number of subjects selected at each health center was 13 as for diabetes.

Using standard mercury sphygmomanometer, 2 seated blood pressure measurements were recorded in both arms, and the higher measurement was recorded. Korotkoff phases 1 and 5 established the levels of systolic and diastolic pressures, respectively.

Blood pressure readings below 140 and 90 for systolic and diastolic pressure respectively were considered as controlled. All readings above the given figures were labeled as uncontrolled. Further classification of degrees of uncontrolled hypertension were done at the analysis stage, using the criteria shown in table 2.7 based on WHO 1999 guidelines[*].

Table 2.7: Definitions of Blood Pressure Levels

BP Readings in mm/Hg		Category of Control
Systolic	Diastolic	
<140	<90	*Controlled Disease*
140-159	90-99	Mild Disease (Grade1)
160-179	100-109	Moderate Disease (Grade 2)
>179	>109	Severe Disease (Grade 3)

[*] 1999 World Health Organization-International Society of Hypertension Guidelines for the Management of Hypertension

2.4.3 Data Collection Plan

2.4.3.1 Personnel and Logistics for Data Collection

Teams from MoH staff served as data collectors for the above-mentioned 7 tools (Annexes 1-7). Data collection was carried out by 15 teams consisting of three data collectors each. A team consisted of one general practitioner, a midwife or a nurse who was working in MCH facilities and a certified nurse, capable of drawing blood or a lab technician capable of drawing blood as a substitute.

In addition to his work as data collector, the GP in the group was assigned as a supervisor. Since the time needed to fill in various forms and questionnaires was expected to vary greatly in different facilities, the supervisor was asked to assure equitable involvement of all team members taking into consideration that annex 4 on contraceptive use was filled only by a female nurse or midwife.

Each of the 15 teams collected data from one health care facility at a time and the average stay in one health center was two days.

To facilitate data collection, three teams collected data form the south, six teams from the north and six teams from the central region. Team members were selected exclusively from their relevant region. Each team of data collectors was assigned a central supervisory team consisting of mainly the research component counterparts who provided guidance in addition to supervision.

Additionally one team composed of two MoH employees (a physician and a midwife working in MCH facilities) was used to validate data collection for 5% of all health centers., This team also helped in checking and organizing the collected data under guidance from the research team at PHCI office.

All field activities were closely monitored by a team composed of the PHCI research advisors and their counterparts at the ministry.

Detailed tasks for each of the data collectors and their field supervisors were described in a comprehensive training manual that covered all issues from greeting to details in sampling patients and records to transporting blood and filled questionnaires. Training of data collectors, including field-testing, was done.

Following final checking and pre-entry cleaning, a team of four persons entered data at PHCI office using the data entry program mentioned later.

Transportation and cellular phones were provided to each team of data collectors and for supervisors to provide easy communication with the investigators as well as with supervisors. Collected blood from diabetic patients was transported irrespective of the closeness of the center to the central lab on a daily basis.

Working 6 days a week, data collection started on 28th of October and finished on 22nd of November 2000.

2.4.3.2 Ensuring quality of collected data

Ensuring both accuracy and reliability of the collected data was of prime concern throughout the study. The following measures were carried out to ensure quality:

- The sampling plan detailed earlier was followed very strictly giving minimal chance for deviation and after consulting with the investigators or supervisors.
- Data collection tools were pretested on several occasions including training of interviewers. Finally, all questions in the forms and questionnaires raised no ambiguity and open-ended questions were set at the minimum possible.
- About 5% of selected health facilities were revisited for validation of data collection on tools that are record based.
- All sphygmomanometers for measuring BP were new and from the same provider
- Glycosylated hemoglobin was done in one laboratory where quality assurance methods were applied.
- A fieldwork-training manual was developed. It provided all the details regarding the work to be done by data collection teams.
- Research teams received training before the actual data collection including field-testing of all instruments.
- Adequate supervision was provided for all teams with double-checking for quality control.
- Due efforts were exercised over more than two months to clean the data after the data entry was completed. Special check programs using SPSS were created to look for odd looking and missing values and to check the records for data entry errors. This was followed whenever possible by visiting centers to check the records, calling respondents in case of hypertension or diabetes control.

2.4.4 Data Analysis

Data entry for windows for SPSS was used to enter the data collected by various tools. The program was used to create forms (entry screens) that had almost the same design as the original questionnaires with all necessary validation rules, checks and skips to minimize errors. The data entry screens were largely devoid of coding. All coding was dealt with at the stage of building the data entry forms, defining and labeling variables. Even multiple response questions were imaged on the data entry screens as in the questionnaire or form. The very few open-ended questions posed no problem later at the analysis stage.

SPSS 10 was used to analyze data taking into consideration that the above mentioned data entry forms stored data directly in SPSS format.

Frequencies were calculated for simple description of the results (means, medians, 95% confidence intervals etc.)

Cross-tabulations showing relationships of main variables with control and background variables were used with various types of χ^2.

Independent-sample t test was used to compare means of continuous numeric variables for various groups. Analysis of variance (ANOVA) was used for all conditions where the grouping variable had more than two categories. Correlations and linear regression for continuous variables were also used.

All counts were presented in unweighted format, while all proportions and means were based on weighted numbers. The previously mentioned three types of weighting were used. The type of weight used is mentioned clearly in each section.

3. Findings

Utilization Variables:

3.1 Timely Vaccination for Children
3.2 Growth and Development Visits
3.3 Antenatal-Postnatal Visits
3.4 Contraceptive Use
3.5 Screening for Hypertension

Proxy Health Status Variables:

3.6 Anemia of Children
3.7 Anemia of pregnancy
3.8 Status of Control of Diabetes
3.9 Status of Control of Hypertension

3.1 Timeliness of Vaccination

3.1.1 Summary

Jordan has reached an advanced stage in vaccination coverage for the main antigens. Currently, Jordan is at the final stages of poliomyelitis eradication and early stages of measles elimination. The country is considered vulnerable regarding introduction of wild virus through immigrants coming from countries that are behind Jordan in vaccination coverage. In order to have the highest possible immune response among Jordanian children one should consider the timeliness of vaccine doses.

This section aims at determining the proportion of two year old children utilizing MCH facilities at MoH health centers who are timely vaccinated for individual doses as well as for all doses through reviewing a sample of records. Subjects were chosen by systematic random sample from the population of children who had their first vaccination visit during the period from 1/1/-30/4/1998.

Data was collected from the existing records using the form shown in Annex 1. The main variables were dates of administration of vaccine doses and birth dates.

The data was weighted to satisfy the two stage stratified cluster sampling method using mainly relative weight for MoH data and expansion weight for UNRWA data.

Data on vaccination dates was collected from a total of 879 records in 89 MoH centers and 198 records in 8 UNRWA centers. Table 3.1.1 shows the main results of timeliness of vaccination by dose as well as the combined indicator according to study group (intervention vs. control).

When interpreting MoH results, the primary doses of DPT, Polio and Hepatitis B showed relatively lower level of timeliness than other doses, mainly due to more stringent criteria. The lowest figures were observed with the first visit for DPT, polio and hepatitis B at about 83% indicating that 17% of the children were brought to health centers for the first vaccine doses at more than 3 months of age. Booster and second measles doses were given on time about 97%.

Table 3.1.1: Distribution of Timeliness of Different Vaccine Doses by Study Group

Vaccine Dose	Timeliness %	
	MoH	UNRWA
1st of DPT, Polio and Hepatitis B	**82.7**	**94.5**
2nd of DPT, Polio and Hepatitis	**91.3**	**95.4**
3rd of DPT, Polio and Hepatitis	**89.9**	**97.1**
1st Measles	**88.4**	**97.4**
2nd Measles	**97.3**	**96.7**
Booster of DTP and Polio	**96.8**	**97.3**
All doses combined	**64.6**	**81.7**

The figures of timeliness generally look acceptable when considering individual doses. Combination of all doses brings timeliness down to 64.6% which means that about 35% of children are brought to receive their shots untimely, at least once during

the first two years of life. The combined indicators also hints that defaulters are not the same all the way through.

Some statistically significant difference were observed at regional as well as at stratum levels with the north showing the best results and the south the lowest. Timeliness of vaccination was found to be positively associated with both maternal and paternal education. Sex of the child as well as income were not found to affect the timeliness of vaccination.

3.1.2 Ministry of Health

3.1.2.1 Introduction

Please note that all tables with A3.1.x numbering appear in Appendix 3.1 at the end of this section, otherwise tables are incorporated in the text.

The vaccination coverage in Jordan is very high and figures above 90% for individual vaccines are reported from different sources. Jordan is currently at the final stages of poliomyelitis eradication and the early stages of measles elimination with application of multiple National Immunization Days for both diseases. Given the population movement from other countries that are still behind Jordan in vaccination coverage, the issue of timeliness of vaccination seems very important. This part of the study aims at determining the proportion of two year old children utilizing MoH facilities who are timely vaccinated for individual doses as well as for all doses through reviewing a sample of records.

Data was collected on 13 different doses of vaccination that are usually given over 5 visits to the health center as shown in Table 3.1.2. During the same visit the child receives the three vaccines of DPT, poliomyelitis and hepatitis B. The first booster dose for DPT and polio as well as the second dose of measles are given during the same visit. The same table shows the age and interval criteria between doses used to define timeliness for the rest of this section.

Table 3.1.2: Visits, Vaccine Doses and Definitions of Timeliness of Vaccination

Visit	Vaccine Dose	Timeliness
1st	1st DPT	8-12 weeks of age
	1st Polio	8-12 weeks of age
	1st Hepatitis B	8-12 weeks of age
2nd	2nd DPT	30-60 days from 1st
	2nd Polio	30-60 days from 1st
	2nd Hepatitis B	30-60 days from 1st
3rd	3rd DPT	30-60 days from 2nd
	3rd Polio	30-60 days from 2nd
	3rd Hepatitis B	30-60 days from 2nd
4th	1st Measles	9-12 months
5th	2nd Measles or MMR	15-24 months
	1st Booster DPT	15-24 months
	1st Booster Polio	15-24 months

Data on date of birth served the basis of calculation of timeliness of vaccination mainly for the first doses of vaccines. In addition data was collected on some available background information like sex, income and education of parents.

Ten subjects were chosen from each health center by systematic random sample from the population of children who had their first vaccination visit during the period from 1/1/-30/4/1998. Data was collected from a total 879 out of the expected 890 from the 89 health centers. Non-response was noted for eight records due to poor recording system and three records were found invalid at the data entry stage.

Table A3.1.1 shows the valid number and the percentage of missing values for each variable for the available 879 records. Table A3.1.1 shows clearly how the proportion of missing values increased with age. While no missing values were observed for the first doses of DPT, polio and hepatitis B, the figure went up to about 0.7% for the

second dose, 1.1% for the third dose, reaching up to 11.5% for the booster doses. The same trend was observed for measles with missing values at 4.7% and 14.9% for the first and second doses respectively. Missing values for educational level of parents and income were relatively high at 7.7% and 18.8% respectively. While missing values for different vaccination doses might appear for a variety of reasons such as changing the place of residence, recording or changing the provider. Missing values for income and educational level of parents are related only to recording of the information by the staff.

Missing values were excluded from analysis for each dose of vaccination. The same rule was applied to the combined variable of timeliness where any missing dose rendered the overall timeliness as missing.

Analysis for first, second and third doses of DPT, poliomyelitis and hepatitis B was performed jointly for each dose since all of them are administered during the same visit and records did not reveal any differences in dates of administration.

Furthermore, all counts appearing hereafter represent the unweighted values while means and proportions are calculated from weighted values using expansion and relative weights as appropriate to account for the study design.

3.1.2.2 Background Variables

Table 3.1.3 summarizes the overall sample characteristics. The male female ratio was very close to 1:1 with 51.6% of the sample being males. Table A3.1.2 shows the distribution of sex by region. Significant differences did not exist among the three regions in this regard ($\chi^2 = 1.75$, $p = 0.42$).

Central region was represented by 46.2% of the respondents followed by the north at 35.7% and the south at 18.1%. About 29% of the subjects came from CHCs while the rest from PHCs.

Overall, literacy rate among mothers and fathers of the selected children was 92.5% and 93.7% respectively (Tables A3.1.3 and A3.1.4). The percentage of those falling in the category of higher education was about one fifth for both mothers and fathers. No statistically significant differences were noted in levels of education among regions.

Table A3.1.5 shows mean income by regions. The national mean of income was about 161 JDs. The lowest reported income was 44 and the highest of 1000. The highest mean of income was observed in the central region at about 170 JDs. There was statistically significant lower mean of income in the north compared with the other 2 regions (F=6.8 and p=0.001). Table A3.1.6 shows that differences in the first four quintiles were small moving from 108.7 JDs for the first quintile and going only to 241.5 JDs for the fourth quintiles and having 95% of the respondents with less than 300 JDs a month. Table A3.1.7 shows that the majority of respondents (70.1%) had income between 100 and 199 JDs. Only 6.8% were in the income category 300 JDs or more and 8.4% less than 100 JDs a month. The above data indicates that attendants of MoH centers are mainly of low to middle income level.

Table 3.1.3: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	879	**100**
Sex		
Male	459	**51.6**
Female	420	**48.4**
Region		
North	341	**35.7**
Central	345	**46.2**
South	193	**18.1**
Stratum		
Central CHCs	109	**15.2**
North CHCs	50	**5.8**
South CHCs	49	**8.1**
Central PHCs	236	**31.0**
North PHCs	281	**29.8**
South PHCs	154	**10.1**
Total CHCs	208	**29.1**
Total PHCs	671	**70.9**
Income		
<100	32	**8.4**
100-199	174	**70.1**
200-299	40	**14.7**
≥300	17	**6.8**
Education (Mother)		
Illiterate	61	**7.5**
Less than Secondary**	299	**35.4**
Secondary	290	**35.7**
Higher Education	161	**21.4**
Education (Father)		
Illiterate	52	**6.3**
Less than Secondary	314	**37.3**
Secondary	292	**36.1**
Higher Education	153	**20.2**

* Weighted

** Combines both elementary and secondary education.

3.1.2.3 Timeliness of the 1st Dose of DPT, Polio and Hepatitis B

Table 3.1.4: Distribution of Timeliness of the First Dose of DPT, Polio and Hepatitis B by Region

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	295	**86.9**	279	**80.8**	143	**79.2**	717	**82.7**
No	46	13.1	66	19.2	50	20.8	162	17.3
Total	341	100	345	100	193	100	879	100

As shown in Table 3.1.4 the timeliness for the first dose of DPT, polio and hepatitis B was 82.7% for the overall sample. The northern region had the highest figure of timeliness at about 87% compared with about 80% for the other two regions. The observed difference was of statistical significance (χ^2 = 6.3, p= 0.043).

3.1.2.4 Timeliness of the 2nd Dose of DPT, Polio and Hepatitis B

Table 3.1.5: Distribution of Timeliness of the Second Dose of DPT, Polio and Hepatitis B by Region

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	314	**92.9**	317	**90.4**	174	**90.5**	805	**91.3**
No	24	7.1	26	9.6	18	9.5	68	8.7
Total	338	100	343	100	192	100	873	100

Overall 91.3% of the second doses for the three vaccines were timely (Table 3.1.5). Despite the fact that figures of timeliness for the north were a little higher than the other two regions, the difference was of no statistical significance (χ^2 = 1.64, p= 0.44).

3.1.2.5 Timeliness of the 3rd Dose of DPT, Polio and Hepatitis B

Table 3.1.6: Distribution of Timeliness of the Third Dose of DPT, Polio and Hepatitis B by Region

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	308	**92.0**	306	**90.8**	159	**83.4**	773	**89.9**
No	28	8.0	36	9.2	32	16.6	96	10.1
Total	336	100	342	100	191	100	869	100

Overall 89.9% of the third doses for the three vaccines were timely (Table 3.1.6). The southern region had the lowest figure at 83.4% as compared with 92% and 90.8% at the northern and central regions respectively. The observed difference was of statistical significance (χ^2 = 9.1, p= 0.011).

3.1.2.6 Timeliness of the First Dose of Measles

The first dose of measles was considered timely if the child was brought to receive the shot at the age between 9 and 12 months of age. All those brought earlier than 9 months or later than one year of age were considered as having untimely vaccination.

Table 3.1.7: Distribution of Timeliness of the First Dose of Measles

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	300	**90.5**	288	**88.2**	161	**84.9**	749	**88.4**
No	28	9.5	38	11.8	23	15.1	89	11.6
Total	328	100	326	100	184	100	838	100

About 88% of the first doses of measles were timely (Table 3.1.7). Once again the northern region showed the highest figure of timeliness at 90.1%. The slightly lower timeliness in the south at about 85% was statistically insignificant with $\chi^2 = 3.17$ and p= 0.21.

3.1.2.7 Timeliness of the Second Dose of Measles

The second dose of measles was considered if the child received measles vaccine or MMR. The second dose of measles was considered timely if the child was brought to receive the shot between 15 and 24 months of age. It is worth mentioning that the dates in some records for second dose of measles and first dose of booster of DPT, polio and hepatitis B were inconsistent. This fact dictated the analysis of the two doses separately.

Table 3.1.8: Distribution of Timeliness of the Second Dose of Measles or MMR

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	306	**99.0**	269	**97.2**	147	**92.9**	722	**97.3**
No	6	1.0	9	2.8	11	7.1	26	2.7
Total	312	100	278	100	158	100	748	100

Table 3.1.8 shows that 97.3% of the children in the overall sample were considered timely for the second dose of measles. There were some variations among regions, where timeliness of vaccination in the south (about 93%) was found to be statistically lower than the other two regions ($\chi^2 = 11.2$ and p= 0.004). The observed close to perfect figures of timeliness across the country is directly influenced by the less stringent definition of timeliness. A range of nine months most of the children the opportunity to be considered timely vaccinated for this dose.

3.1.2.8 Timeliness of the First Booster Dose of DPT and Polio

Analysis for first booster dose of DPT and polio was performed jointly since both of them are administered during the same visit and records did not reveal any differences in dates of administration. The first booster doses of DPT and Polio were considered timely if the child was brought to receive the vaccine between 15 and 24 months of age.

Table 3.1.9: Distribution of Timeliness of the First Booster Dose of DPT and Polio

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	307	**99.0**	283	**96.6**	160	**93.0**	750	**96.8**
No	6	1.0	12	3.4	10	7.0	28	3.2
Total	313	100	295	100	170	100	778	100

Table 3.1.9 shows that 96.8% of the children in the overall sample were considered timely vaccinated for the first booster doses with some variations among regions. The timeliness of vaccination in the south at 93% was found to be statistically lower than the other two regions (χ^2 = 11.4 and p= 0.003). The above figures are very close to those of the second dose of measles. Actually, most of the children receive the second measles and the booster dose during the same visit most of the time.

3.1.2.9 Timeliness For All Vaccine Doses Combined

The timely vaccination for all vaccine doses combined was calculated only for records with all the 13 doses available. This brought the number of records from 879 to only 745.

Table 3.1.10: Distribution of Timeliness of All Doses Combined

Timeliness	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	219	**70.9**	177	**62.9**	83	**53.1**	479	**64.6**
No	93	29.1	99	37.1	74	46.9	266	35.4
Total	312	100	276	100	157	100	745	100

Table 3.1.10 shows the timeliness of vaccination when considering all doses combined. Overall 64.6% of the selected children were timely vaccinated. As expected, the northern region had the best figure at almost 71% while the south showed only about 53% of timeliness and the central region was in the middle at about 63%. Only the southern region was found to be statistically lower than the other two regions (χ^2 = 11.99 and p= 0.003). The combined figures being much lower than any individual dose hints to the fact that a child being timely vaccinated for a certain dose is not consistent for the rest of the doses.

Table 3.1.11 analyzes the timeliness further by taking into consideration the number of doses. Almost 90% of timeliness was observed with 10 doses. In other words 90% of the children were making timely visits to receive their shots but once. Not coming timely one time for any of the three primary vaccines (DPT, Polio and Hepatitis B) will lead to missing the whole of the three doses because they are administered jointly.

Table 3.1.11: Distribution by Number of Timely Doses

Number of Doses Given Timely	Number of Subjects	%	Cumulative %
13	479	64.6	64.6
12	39	5.8	70.4
11	1	0.2	70.7
10	147	19.1	89.8
9	20	2.5	92.3
7	34	4.0	96.3
6	15	2.2	98.5
4	5	0.5	99.0
3	3	0.7	99.7
1	1	0.1	99.9
0	1	0.1	100
Total	745	100	

Children brought timely to CHCs to receive their vaccination shots constituted 68.9% which was higher than that of PHCs at only 63.3% (Table 3.1.12). Nevertheless, visitors to CHCs were not doing any better than those of PHCs from statistical viewpoint ($\chi^2 = 1.8$, p= 0.17).

Table 3.1.12: Distribution of Timeliness by Type of Health Center

Timeliness	Type of HC				Total	
	CHC		PHC			
	N	**%**	**N**	**%**	**N**	**%**
Yes	118	**68.9**	361	**63.3**	479	**64.6**
No	53	31.1	213	36.7	266	35.4
Total	171	100	574	100	745	100

When looking at the stratum level that combines regions and type of health centers as shown in Table A.3.1.8 the differences of timeliness were obvious. Children using central CHCs, north CHCs and PHCs were found to have the highest and almost identical figures of timeliness at about 71%. Southern CHCs and PHCs showed the lowest results at 58.3% and 50.3% respectively. Central PHCs showed that 60.2% of their children were vaccinated timely. The differences among strata were significant ($\chi^2 = 252$, p <0.0001).

When analyzing the overall timeliness of vaccination by sex, it was found that males are enjoying a higher rate of timeliness at 66.9% as compared with 62% for the

Table 3.1.13: Timeliness of Vaccination by Sex

Timeliness	Sex				Total	
	Male		Female			
	N	**%**	**N**	**%**	**N**	**%**
Yes	264	**66.9**	215	**62.0**	479	**64.6**
No	130	33.1	136	38.0	266	35.4
Total	394	100	351	100	745	100

females (Table 3.1.13). This difference was not found to be significant (χ^2 = 1.93, p = 0.095) where males and females are considered to have the same level of timeliness.

The overall timeliness of vaccination was found to have an association with the level of education of the child's mother. The timeliness went from a low figure at 38.1% for illiterate mothers to 76.4% with higher education (Table3.1.14). The observed differences were found to be of statistical significance (χ^2=27.3, p< 0.0001).

Table 3.1.14: Distribution of Timeliness by Type of Education of the Mother

Timeliness	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	19	**38.1**	157	**59.1**	184	**74.4**	100	**76.4**
No	28	61.9	99	40.9	64	25.6	33	23.6
Total	47	100	256	100	248	100	133	100

The level of education of the child's father was also found to be associated with timeliness of combined vaccine doses. As noticed in table 3.1.15 the timeliness rose from 45% for children with illiterate fathers to more than 70% for fathers with higher education. The observed differences were found to be of statistical significance. (χ^2 = 9.4, p = 0.02).

Table 3.1.15: Distribution of Timeliness by Type of Education of the Father

Timeliness	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	21	**45**	185	**67.4**	159	**63.5**	84	**70.1**
No	21	55	87	32.6	87	36.5	40	29.9
Total	42	100	272	100	246	100	124	100

Table 3.1.16 shows that there were only mild differences in timeliness among various income categories. The observed variation was found statistically insignificant (χ^2 = 4.76, p = 0.19). The means of income for timely and not timely groups were almost identical at 158.7 and 156.1 respectively with no significant difference. The main reason behind these findings is the absence of quite noticeable income differential between subjects.

Table 3.1.16: Distribution of Timeliness by Income Categories

Timeliness	Income Categories							
	<100		100-199		200-299		≥300	
	N	%	N	%	N	%	N	%
Yes	40	**67.3**	279	**63.3**	56	**76**	26	**67.5**
No	19	32.7	156	36.7	20	24	12	32.5
Total	59	100	435	100	76	100	38	100

Taking into account the high vaccination coverage in Jordan, finding 65% of 2-year old children timely vaccinated for all the 13 doses can considered acceptable but needs improvement. Few studies are available worldwide on timeliness of vaccination. Some of theses studies pointed to the same problem of poor timeliness of vaccination[*].

3.1.2 UNRWA

3.1. 2.1 Introduction

Data was collected from a total of 198 records in 8 health centers. Table A3.1.1 shows the valid number of records for each variable. The non-response rate for dates of various doses was lower than 1.4%. Data on income and education will not appear in this section because UNRWA records do not have it. Data will be weighted using the expansion weight only since there was no stratification.

3.1.3.2 Background Variables

The male female ratio among the sampled children was 1:1 with males being 53.5%. The figures of sex for UNRWA were very close to those of MoH. Data on parents' education and income were not available in UNRWA records (Table A3.1.9).

3.1.3.3 Timeliness of Various Doses of Vaccination

Analysis for all doses of DPT, Poliomyelitis and Hepatitis were performed jointly since all these vaccine doses were administered during the same visit and records did not reveal any differences in dates of administration. Table 3.1.17 shows the figures of timeliness for all vaccine doses.

Table 3.1.17: Distribution of Timeliness of Different Doses of Vaccination For UNRWA Respondents

Vaccine Dose	Timeliness					
	Yes		No		Total	
	N	%	N	%	N	%
1st of DPT, Polio and Hepatitis B	189	**94.5**	9	5.5	198	100.0
2nd of DPT, Polio and Hepatitis	186	**95.4**	11	4.6	197	100.0
3rd of DPT, Polio and Hepatitis	191	**97.1**	6	2.9	191	100.0

[*]Childhood vaccination coverage in Italy: results of a seven-region survey. The Italian Vaccine Coverage Survey Working Group. Bull World Health Organ 1994;72(6):885-95

[*] Weese CB, Krauss MR . A 'barrier-free' health care system does not ensure adequate vaccination of 2-year-old children. Arch Pediatr Adolesc Med 1995 Oct;149(10):1130-5

Table 3.1.17: Distribution of Timeliness of Different Doses of Vaccination For UNRWA Respondents

Vaccine Dose	Timeliness					
	Yes		No		Total	
	N	%	N	%	N	%
1s Measles	191	**97.4**	6	2.6	191	97.6
2nd Measles	184	**96.7**	6	3.3	184	96.7
Booster of DTP and Polio	182	**97.3**	4	2.7	186	100
All doses combined	152	**81.7**	33	18.3	185	100

The first dose of DPT, polio and hepatitis B was 94.5%, a figure that is higher than that of MoH (82.7%). Over 95% of children visiting UNRWA clinics were timely vaccinated during their second visit to the clinic. This figure was close to that of MoH at 91.3%.

About 97% of children visiting UNRWA clinics were timely vaccinated during their Third visit to the clinic. This figure is significantly higher than that of MoH at about 90%.
Over 97% of measles doses were given timely compared to only about 88.4% at MoH facilities. The second dose of measles was 96.7% timely compared to 97.3% at MoH facilities showing no difference in this regard. Similar figures were noted for the booster dose at 97.3% compared to 96.8% at MoH facilities.

The timely vaccination for all vaccine doses combined was calculated only for records with all the 13 doses available. This brought the number of records from 198 to 185. About 82% of all children were brought consistently on time to receive their vaccine shots. This figure was much higher than that of MoH at only 64.6%.

It is very clear that UNRWA figures were higher than those of MoH for timeliness of most vaccine doses. Away from methodology issues, it seems that MCH centers at UNRWA are doing a better job than those of MoH.

Appendix 3.1

Table A3.1.1: Listing of Variables and % of Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
First Dose of Hepatitis B	879	0.00%	198	0.00%
Second Dose of Hepatitis B	872	0.68%	197	0.11%
Third Dose of Hepatitis B	868	1.25%	197	0.11%
First Dose of DTP	879	0.00%	198	0.00%
Second Dose of DTP	873	0.68%	197	0.11%
Third Dose of DTP	869	1.14%	197	0.11%
Booster Dose of DTP	778	11.49%	186	1.37%
First Dose of Polio	878	0.00%	198	0.00%
Second Dose of Polio	872	0.80%	197	0.11%
Third Dose of Polio	869	1.14%	197	0.11%
Booster Dose of Polio	778	11.49%	186	1.37
First Dose of Measles	838	4.66%	192	0.68%
Second Dose of Measles or MMR	748	14.90%	190	0.91%
Date of Birth	879	0.00%	198	0.00%
Sex	879	0.00%	198	0.00%
Monthly Income	714	18.77%	NA*	NA
Mother's Education	811	7.74%	NA	NA
Father's Education	811	7.74%	NA	NA
Region and Stratum	879	0.00%	NA	NA
Type of Health Center	879	0.00%	NA	NA
Total Number of Records	**879**		**198**	

NA: Not available because UNRWA records do not have the required information

Table A3.1.2: Distribution of Sex of the Child by Region (MoH)

Sex	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	185	**54.1**	178	**51.2**	96	**47.8**	459	**51.6**
Female	156	45.9	167	48.8	97	52.2	420	**48.4**
Total	341	100	345	100	193	100	879	100

Table A3.1.3: Educational Level of Mothers by Region (MoH)

Educational Level	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	22	6.0	23	8.0	16	8.8	61	**7.5**
< Secondary	111	34.8	129	37.2	59	32.0	299	**35.4**
Secondary	118	40.1	119	35.7	53	34.2	290	**35.7**
> Secondary	53	19.1	67	19.2	41	25.0	161	**21.4**
Total	304	100	338	100	169	100	811	100

Table A3.1.4: Distribution of Educational Level of Fathers by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	20	5.7	22	7.2	10	4.7	52	**6.3**
< Secondary	113	38.2	135	38.7	66	32.2	314	**37.3**
Secondary	113	37.5	112	32.9	67	42.3	292	**36.1**
> Secondary	57	18.6	69	21.2	27	20.8	153	**20.2**
Total	303	100	338	100	170	100	811	100

Table A3.1.5: Distribution of Income Mean by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**144.61**	137.12	152.10
Central	**170.23**	159.00	181.45
South	**168.80**	155.24	182.36
National	**161.20**	154.77	167.63

Table A3.1.6: Quintiles, 90 and 95 percentiles of Income (MoH)

Q_1	Q_2	Q_3	Q_4	90^{th} %	95^{th} %
108.7	135.0	150.0	200.0	241.5	300.0

Table A3.1.7: Income Categories by Region (MoH)

Monthly Income in JDs	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<100 s	34	13.9	22	5.8	11	5.1	67	**8.4**
100-199	196	73.8	196	69.5	109	65.2	501	**70.1**
200-299	27	9.5	50	16.1	24	20.3	101	**14.7**
≥300	8	2.8	23	8.6	14	9.4	45	**6.8**
Total	265	100	291	100	158	100	714	100

Table A3. 1.8: Distribution of Timeliness of Vaccination by Stratum (MoH)

Stratum	Timeliness of Vaccination				Total	
	Yes		No			
	N	%	N	%	N	%
Central CHC	56	**70.7**	23	29.3	79	100
North CHC	33	**71.3**	14	28.7	47	100
South CHC	21	**58.3**	15	41.7	36	100
Central PHC	121	**60.2**	76	39.8	197	100
North PHC	182	**70.7**	77	29.3	259	100
South PHC	66	**50.3**	61	49.7	127	100
Total	479	**64.6**	266	35.4	745	100

Table A3.1.9: Distribution of Sex (UNRWA)

Sex	Unweighted Count	Weighted %
Male	102	**53.5**
Female	96	**46.5**
Total	198	100.0

3.2 Growth and Development Monitoring

3.2.1 Summary

This section aims at studying the utilization for growth and development monitoring visits during the first three years of life of children using MoH facilities.

A total of 867 children from 87 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers were chosen by a systematic random sample from the population of children who registered for the service for the first time during the period 1/1-30/4/1997. Data was collected from the existing records where data was transcribed by midwife data collectors into a special form prepared for this purpose (Annex 2). The data was weighted to satisfy the two stage stratified cluster sampling method using mainly relative weight for MoH data and expansion weight for UNRWA data.

Table 2.1 shows the overall prevalence of appropriateness of visits over the three years. MoH users made only about 21% of their visits appropriate.

Table 3.2.1: Appropriateness of Growth Visits During The First Three Years of Life

Appropriateness / Group	1st Year	2nd Year	3rd Year	3 years combined
MoH (Intervention)	63.3	37	35.6	21.3
UNRWA (Control)	99.9	79.7	57.1	53.2

The appropriateness of visits during the first year for MoH users was about 63% and dropped to 37% and 36% for the second and third years respectively. Data showed that over 80% of those with inappropriate growth monitoring visits during one year continued to do so in subsequent years. Targeting parents who don't bring their children to health centers to monitor their growth appropriately during the first year of life will definitely affect the utilization of such services during subsequent years.

Region, type of health center, sex of the child, monthly income and parent's education as provided in the records did not show any logical association with the appropriateness of use of growth and development monitoring visits.

Taking into consideration that most of the above mentioned factors are not under the provider's control, other factors are expected to affect the outcome. Improvement of quality of care and access through various project activities are therefore expected to improve utilization of such important service.

3.2.2 Ministry of Health

3.2.2.1 Introduction

Please note that all tables with A3.2.x numbering appear in Appendix 3.2 at the end of this section, otherwise tables are incorporated in the text.

Disturbances in a child's health and nutrition, regardless of their etiology, affect child growth. Regular growth assessment of children during their first years of life is the single measurement that best defines their health and nutritional status. Certain socio-economic factors are beyond the control of the health team providing the service. Nevertheless, there is a long list of health conditions affecting growth that can be corrected with appropriate growth visits to MCH centers. Making the appropriate number of growth assessment visits is crucial to discover causes and try to correct them even in a seemingly healthy child.

This part of the study aims at determining the proportion of three-year-old children utilizing MoH MCH facilities who are appropriately using growth and development monitoring services.

The sampling frame consisted of 3-year-old children who registered for the first time in the surveyed health center during the period from 1/1-30/4/1997. Ten children were chosen from each health center by systematic random sampling. Data was collected on the total number of growth and monitoring visits made during each year of life. All visits associated with illnesses were excluded. Making 5, 2 and 1 or more visits during the first, second and third years of life respectively was considered appropriate. Appropriateness was calculated for each year separately and then a combined indicator for the three years was calculated.

Data was collected from 87 health centers instead of 89 because two health centers did not have records of children eligible for data collection. The latter centers were from the south, one was a CHC from Ma'an and the second a PHC form Aqaba. Dropping the above two centers is not expected to affect the analysis, taking into consideration the over sampling of heath centers in all strata especially in the south. From the 87 health centers, data was collected from a total of 867 records with only 3 non-responses.

Missing values were absent for main variables on growth and development monitoring visits. In contrast the background variables were missing in the selected records from 12.5% for mother's education and up to about 25% for income (Table A3.2.1).

All counts appearing hereafter represent the unweighted values while means and proportions are calculated from weighted values using expansion and relative weights as appropriate in order to account for the study design.

3.2.2.2 Background Variables

Table 3.2.2 summarizes the overall sample characteristics. The male/female ratio was very close to 1:1 with 52.6% of the sample being males. Table A3.2.2 shows the distribution of sex by region. Significant differences did not exist among the three regions in this regard ($\chi^2 = 3.1$, p= 0.21).

Central region was represented by 49.5% of the respondents followed by the north at 33.8% and the south at 16.7%. About 29% of the subjects came from CHCs while the rest from PHCs.

Table A3.2.3 shows mean income by regions. The national mean income was about 159 JDs. The lowest reported income was 40 and the highest 1000. There was no statistically significant difference in mean income among regions (F=0.52 and p=0.59). Table A3.2.4 shows that differences in the first four quintiles were small moving from 100 JDs for the first quintile and going to 200 JDs for the fourth quintile and having 95% of the respondents with less than 337 JDs a month. Table A3.2.5 shows the majority of respondents (66.5%) have income between 100 and 199 JDs. Only 7.2% were in the income category 300 JDs or more and 13.1% less than 100 JDs a month. The above data indicates that attendants of MoH centers are mainly low to middle income. Again no differences were found among regions ($\chi^2 = 5.5$, p= 0.48).

Overall, the literacy rate among mothers and fathers of the selected children was 94.2% and 95% respectively (Tables A3.2.6 and A3.2.7). The percentage of those falling in the category of higher education was about one fifth for both mothers and fathers.

Table 3.2.2: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	867	**100**
Sex		
Male	459	**52.6**
Female	420	**47.4**
Region		
North	329	**34.8**
Central	355	**49.5**
South	183	**16.7**
Stratum		
Central CHCs	110	**16.3**
North CHCs	50	**5.5**
South CHCs	48	**7.3**
Central PHCs	245	**33.1**
North PHCs	279	**28.9**
South PHCs	135	**8.9**
Total CHCs	208	**29.1**
Total PHCs	671	**70.9**
Income		
<100	88	**13.1**
100-199	423	**66.5**
200-299	93	**13.2**
≥300	48	**7.2**
Education (Mother)		
Illiterate	46	**5.8**
Less than Secondary**	279	**35.4**
Secondary	278	**38.3**
Higher Education	154	**20.5**
Education (Father)		
Illiterate	41	**5.0**
Less than Secondary	302	**38.3**
Secondary	276	**36.7**
Higher Education	140	**20.0**

*W: Weighted

** Combines both elementary and secondary education.

3.2.2.3 Growth and Development Monitoring Visits During 1st Year of Life

Table 3.2.3: Mean Number of Growth Visits During the First Year by Region

Region	Mean Number of Visits	95% CI	
		Lower	Upper
North	**5.97**	5.66	6.29
Central	**5.31**	5.08	5.54
South	**5.35**	4.96	5.73
National	**5.54**	5.37	5.71

The mean number of visits during the first year of life was found to be about 5.54 ranging from 5.97 visits in the north and going down to 5.35 visits in the south (Table 3.2.3). The median was 5 visits. The differences between the north and the other two regions was found to be of statistical importance (F=6.6, p=0.001).

Table 3.2.4: Appropriateness of Growth Visits During the First Year of Life by Region

Appropriate Visits	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	204	**65.2**	220	**63.2**	107	**60**	531	**63.3**
No	125	34.8	135	36.8	76	40	336	36.7
Total	329	100	355	100	183	100	867	100

Table 3.2.4 looks at appropriateness of growth visits during the first year in the three regions. Only about 63% of children attended five or more growth and development monitoring visits. While in the north about 65.2% were using the service appropriately, the figure went down to about 60% in the south. The observed differences among regions were not significant ($\chi^2 = 1.13$, p=0.57).

3.2.2.4 Growth and Development Monitoring Visits during 2nd Year of Life

Table 3.2.5: Mean Number of Growth Visits During the Second Year by Region

Region	Mean Number of Visits	95% CI	
		Lower	Upper
North	**2.18**	1.96	2.40
Central	**2.03**	1.85	2.21
South	**2.30**	1.98	2.62
National	**2.13**	2.00	2.25

The mean number of visits during the second year of life was found to be about 2.13, while the median was close to 2 visits. The small observed differences shown in table 3.2.5 among regions regarding mean number of visits during the second year of life were statistically insignificant (F=1.3, p=0.27)

Table 3.2.6 shows appropriateness of visits during the second year in the three regions. Only 37% of children had 2 or more growth and development monitoring visits. The observed mild differences among regions were not significant ($\chi^2 = 0.95$, p=0.62).

Table 3.2.6: Appropriateness of Growth Visits During the Second Year of Life by Region

Appropriate Visits	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	109	**36.1**	130	**38.6**	66	**34.5**	305	**37.0**
No	220	63.9	225	61.4	117	65.5	562	63.0
Total	329	100	355	100	183	100	867	100

The second year of life witnessed a decline in appropriateness of visits by almost 42%. Table 3.2.7 shows that over 89% of inappropriate visits during the first year) continued to be so in the second year and only about 52% of the appropriate group remained so in the second year. Good correlation between the number of visits in the first and second years were found with Pearson correlation coefficient of 0.6 (p<0.0001).

Table 3.2.7 : Agreement in Appropriateness of Growth and Development Visits Between 1st and 2nd Years

Appropriateness of First Year Visits	Appropriateness of Second Year Visits				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	280	**52.3**	251	47.7	531	100
No	25	10.7	311	**89.3**	336	100
Total	305	37.0	562	63.0	867	100

3.2.2.5 Growth and Development Monitoring Visits during 3rd Year of Life

The mean number of visits during the third year of life was found to be 0.8 visits (Table 3.2.8). The southern region had the best figure of one visit followed by the central at 0.85 and the northern at 0.61 visits. The north was found to have significantly lower mean of visits during the third year of life than the other two regions (F=6.7, p=0.001).

Table 3.2.8: Mean Number of Growth Visits During the Third Year by Region

Region	Mean Number of Visits	95% CI	
		Lower	Upper
North	**0.61**	0.47	0.75
Central	**0.85**	0.73	0.97
South	**1.00**	0.83	1.30
National	**0.80**	0.72	0.89

Table 3.2.9 looks further into the appropriateness of visits during the third year in

Table 3.2.9: Appropriateness of Growth Visits During the Third Year of Life by Region

Appropriate Visits	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	80	**27.2**	124	**37.8**	86	**46.2**	290	**35.6**
No	249	72.8	231	62.2	97	53.8	577	64.4
Total	329	100	355	100	183	100	867	100

the three regions. The south showed the highest figure at 46.2 and the north the lowest at 27.2% ($\chi^2 = 17$, $p<0.0001$).

Table 3.2.10 shows that over 80% of inappropriate visits during the second year of life continued during the third year. Over 37% of appropriate visits during the second year became inappropriate during the third year of life. Good correlation between the number of visits in the second and third years were found with Pearson correlation coefficient of 0.58 ($p<0.0001$).

Table 3.2.10: Agreement in Appropriateness of Growth and Development Visits Between 2nd and 3rd Years

Appropriateness of Second Year Visits	Appropriateness of Third Year Visits				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	182	**62.6**	123	37.4	305	100
No	108	19.6	454	**80.4**	562	100
Total	290	35.6	577	64.4	867	100

It seems evident that attracting parents to appropriately bring their children for monitoring growth and development during the first year will positively affect subsequent visits. The majority of those with inappropriate visits continued to do so in subsequent years.

3.2.2.6 Overall Appropriateness of Growth and Development Visits

Table 3.2.11 shows that only 21.3% of all children were appropriately brought to health centers to monitor their growth over the first three years of life. The figure was so small because about 48% of those with appropriate visits during the first year stopped in year 2 (Table 3.2.7) and about 37% of those with appropriate visits during the second year stop doing so during the third year (Table 3.2.10). There were almost no differences among regions for this combined indicator with uniform practice of the users all over the Kingdom ($\chi^2 = 2.47$, $p = 0.29$).

Table 3.2.11: Appropriateness of Growth Visits During the First Three Years of Life by Region

Appropriate Visits	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	52	**18.4**	74	**23.3**	42	**21.4**	168	**21.3**
No	277	81.6	281	76.7	141	78.6	699	78.7
Total	329	100	355	100	183	100	867	100

PHCs seem to attract more children with appropriate visits at 22.3% compared to CHCs at 19.6% (Table 3.2.12). Statistics found the observed difference between PHCs and

Table 3.2.12 : Appropriateness of Growth Visits During The First Three Years of Life by Type of HC

Appropriate Visits	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	39	**19.6**	129	**22.3**	168	**21.3**
No	177	80.4	522	77.7	699	78.7
Total	216	100	651	100	867	100

CHCs insignificant (χ^2 = 085, p= 0.36).

As shown in table 3.2.13 females had higher figures at about 3%. Statistically, the difference between males and females in appropriateness of visits over the first three years of life was insignificant (χ^2 = 1.1, p= 0.3).

Table 3.2.13: Appropriateness of Growth Visits During The first Three Years of Life by Sex

Appropriate	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Yes	84	**20.0**	84	**22.9**	168	**21.3**
No	382	80.0	317	77.1	699	78.7
Total	466	100	401	100	867	100

Table 3.2.14 looks at how the appropriateness of visits and various income categories. It seems that income has no effect on appropriateness of visits (χ^2 = 1.8, p = 0.6).

Table 3. 2.14: Appropriateness of Growth Visits During The first Three Years of Life by Income Categories

Appropriate	Income Category							
	<100		100-199		200-299		≥300	
	N	%	N	%	N	%	N	%
Yes	35	**27.0**	85	**21.1**	9	**24.2**	5	**20.0**
No	152	73.0	306	78.9	37	75.8	23	80.0
Total	187	100	391	100	46	100	28	100

Table 3.2.15 shows the lowest figures of appropriateness of growth visits were children of mothers with the highest education Observed difference in appropriateness relative to mother's education was statistically significant (χ^2 = 9.5, p= 0.024).

Table 3.2.15: Appropriateness of Growth Visits During the First Three Years of Life by Mother's Education

Appropriate	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	11	**20.0**	58	**24.5**	67	**26.6**	24	**14.4**
No	35	80.0	221	75.5	211	73.4	130	85.6
Total	46	100	279	100	278	100	154	100

Appropriateness of visits by father's education shown in table 3.2.16 revealed no specific trend.

Table 3. 2.16: Appropriateness of Growth Visits During The first Three Years of Life by Father's Education

Appropriate	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	7	**13.7**	75	**28.2**	56	**21.4**	22	**16.8**
No	34	87.3	227	71.8	220	78.6	118	83.2
Total	41	100	302	100	276	100	140	100

The only consistent finding was that related to mother's education where a negative association was found with the utilization of growth visits. The latter finding can be explained by the fact that highly educated mothers are mainly employed reducing the opportunity to bring children on time.

In summary, the overall appropriateness of growth and development monitoring visits over the three years was about 21%. This figure seems very low for Jordan where the network of MCH centers is well developed. The decline over time in the proportion of appropriate visits is easily explained by the reduction of the number of vaccination shots, which are considered attractive for parents to bring their children to MCH clinics. Finding consistent behavior of inappropriate visits to MCH centers for monitoring growth over time dictates the necessity to target the guardians of children early during their first visits to encourage them to come on time.

Failing to find consistent associations by regions, type of health center, sex of the child, monthly income and educational level hints towards other factors that can be influenced by various PHCI projects activities.

3.2.3 UNRWA

3.2.3.1 Introduction

Data was collected from 200 children in the selected 8 health centers. There were no missing values for any of the variables (A3.2.1). Data on monthly income, mother and father education were not available in UNRWA records and they were labeled as not available (NA). Data will be weighted using the expansion weight only since there was no stratification.

3.2.3.2 Background Variables

Sex of the child was the only available background variable. Table A3.2.8 shows that 46.5% of the sampled children were males and the rest were female.

3.2.3.3 Growth and Development Visits

Table 3.2.17 summarizes the mean number of growth visits for UNRWA centers. The mean number of visits during the first year was about 10 visits compared to only 5.5 visits for MoH. Mean number of visits during the second year was 4.1 in the second year compared to only 2.1 at MoH and the 1.4 during the third year is compared to 0.8 visits at MoH.

Table 3.2.17: Mean Number of Growth Visits During The Three Years (UNRWA)

Year	Mean Number of Visits	95% CI	
		Lower	Upper
First Year	9.93	9.88	9.97
Second Year	4.11	4.06	4.16
Third Year	1.42	1.38	1.46

Table 3.2.18: Distribution of Appropriateness of Growth Visits (UNRWA)

Year of life	Appropriateness of Visits			
	Yes		No	
	N	%	N	%
First Year of Life	198	**99.9**	2	**0.1**
Second Year of Life	158	**79.7**	42	**20.3**
Third Year of Life	115	**57.1**	85	**42.9**
All Years Combined	108	**53.2**	92	**46.8**

Table 3.2.18 summarizes the appropriateness of growth visits for UNRWA centers. Almost 100% of growth visits were appropriate during the first year of life as opposed to only 63% at the MoH facilities.

Almost 20% of the children failed to meet the criteria of appropriateness for the second year compared to 63% for MoH.

During the third year of life the decline continued leading to just about 57% appropriateness of visits compared with about 36% in MoH facilities. The overall combined indicator for the three years was about 53% in comparison with 21% of MoH with appropriate number of visits.

Table 3.2.19: Appropriateness of Growth Visits During The first Three Years of Life by Sex (UNRWA)

Appropriate	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Yes	47	**49.1**	61	**56.9**	108	53.2
No	46	50.9	46	43.1	92	46.8
Total	93	100	107	100	200	100

Although female children showed more appropriate visits at about 57% compared with only 49% for males, the difference was not statistically significant (χ^2 = 0.8, p= 0.36).

There is no doubt that UNRWA had children with more appropriate number of visits at each year of age. It is not only appropriateness as defined in our study but also the overall number of visits that was almost twice that of MoH during each of the three years. Therefore, a lesson can be learned from UNRWA in this regard as well as in other MCH related activities.

Appendix 3.2

Table A3.2.1: Listing of Variables and Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Region & Stratum	867	**0**	NA	NA
Sex	867	**0**	200	00
Monthly Income	652	**24.8**	NA	NA
Mother's Education	757	**12.7**	NA	NA
Father's Education	759	**12.5**	NA	NA
Growth Visits During First Year	867	**0**	200	00
Growth Visits During Second Year	867	**0**	200	00
Growth Visits During Third Year	867	**0**	200	00

Table A3.2.2: Child's Sex by Region (MoH)

Sex	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	185	55.8	196	52.3	85	46.9	466	**52.6**
Female	144	44.2	159	47.7	98	53.1	401	**47.4**
Total	329	100	355	100	183	100	867	100

Table A3.2.3 : Distribution of Income by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**162.95**	147.21	178.70
Central	**154.75**	144.57	164.93
South	**162.21**	148.28	176.13
National	**158.88**	151.24	166.51

Table A3.2.4: Quintiles, 90 and 95 Percentiles of Income (MoH)

Q_1	Q_2	Q_3	Q_4	90^{th} %	95^{th} %
100	120	150.0	200.0	250	336.9

Table A3.2.5: Income Categories by Region (MoH)

Monthly Income in JDs	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<100 JDs	30	12.2	36	14.4	22	11.4	88	**13.1**
100-199 JDs	153	67.4	168	66.1	102	65.9	423	**66.5**
200-299 JDs	35	14.8	42	12.8	16	11.4	93	**13.2**
≥300	13	5.7	21	6.7	14	11.4	48	**7.2**
Total	231	100	267	100	154	100	652	100

Table A3.2.6: Educational Categories for Mothers by Region (MoH)

Educational Categories	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	*4*	1.6	24	7.2	18	9.9	46	**5.8**
Less than Secondary	92	31.0	123	38.6	64	34.8	279	**35.4**
Secondary	120	49.6	106	34.6	52	27.7	278	**38.3**
Higher Education	49	17.8	63	19.7	42	27.7	154	**20.5**
Total	265	100	316	100	176	100	757	100

Table A3.2.7: Educational Categories for Fathers by Region (MoH)

Educational Categories	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	4	1.5	23	6.4	14	7.9	41	5.0
Less than Secondary	100	38.6	123	37.1	79	40.7	302	**38.3**
Secondary	113	40.9	108	35.3	55	32.9	276	**36.7**
Higher Education	49	18.9	63	21.2	28	18.6	140	**20.0**
Total	266	100	317	100	176	100	759	100

Table A3.2.8: Sex of the Child (UNRWA)

Sex	Count	Weighted %
Male	93	**46.5**
Female	107	**53.5**
Total	200	100.0

3.3 Antenatal-Postnatal Visits

3.3.1 Summary

This section aims at studying the utilization of MCH services by pregnant women. It is well known from different sources that the appropriateness of antenatal visits are quite acceptable nationwide, but there is a major problem with utilization of postpartum care service.

A total of 840 women from 88 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers were chosen by systematic random sample from the population of pregnant women who had their first antenatal visit during the period from 1/1/-30/4/1999. Paying 4 or more antenatal visits during a period of completed pregnancy was considered appropriate for normal uncomplicated pregnancy. All pregnancies labeled, as "risk pregnancies" were excluded. Paying one or more postnatal visits within the first six weeks after delivery was considered appropriate utilization of the service.

Data was collected and transcribed by a midwife data collector from the existing records into a special form prepared for this purpose (Annex 3). The data was weighted to satisfy the two stage stratified cluster sampling method using mainly relative weight for MoH data and expansion weight for UNRWA data.

The mean number of antenatal visits was 4.56, a median of 4 and less than 58% of the visits were appropriate. Figures were much lower than those reported by Demographic Health Study (DHS) of 1997[*]. Obvious reasons such as inclusion of risk pregnancies, recall bias in DHS might be behind the difference. Inadequate recording at MoH facilities might be another cause for such variation in results.

Table 3.3.1: Summary Indicators for Antenatal-Postnatal Visits

Variable / Group	Appropriateness of Antenatal Care %	Postnatal Care Utilization %	FP Counseling %	Decision about FP %
MoH (Intervention)	57.7	29.6	34.7	71.4
UNRWA (Control)	73.3	79.3	93.0	58.0

Table 3.1 shows the main indicators related to antenatal and postnatal visits. Overall, 57.7% of antenatal visits made at MoH facilities were appropriate. The northern region had the highest proportion of appropriateness (62%), while the central region had the lowest (52%). Income and educational level of pregnant women and their spouses were negatively associated with appropriateness of antenatal care visits. These findings can be partly explained by availability of alternative providers for

[*] Population and Family Health Survey –1997. Department of Statistics-Jordan and Macro International Inc.

residents in the central region as well as for pregnant women with higher socio-economic status.

The same 840 records of antenatal care were used for data on postnatal care and family planning counseling during postnatal visits. Overall, 29.6% of those registered for antenatal care appeared at least once for postnatal care. Utilization was found to be the highest in the north and the lowest in the central region mainly because of the availability of alternative providers. Of those who attended the postnatal services 34.7% were offered counseling for family planning methods. Of the latter 71% were able to decide on using a certain method of family planning. It seems evident that increasing utilization of postnatal care can increase use of family planning methods.

3.3.2 Ministry of Health

3.3.2.1 Introduction

Please note that all tables with A3.3.x numbering appear in Appendix 3.3 at the end of this section, otherwise tables are incorporated in the text.

Antenatal-postnatal care addresses both the psychosocial and the medical needs of the pregnant woman. Periodic health check-ups during the antenatal period are necessary to establish confidence between the woman and her health care provider, and to identify and manage any maternal complications or risk factors. Antenatal visits are also used to provide essential services that are recommended for all pregnant women, such as tetanus toxoid immunization and the prevention of anemia through nutrition education and provision of iron/folic acid tablets. Postnatal care is also essential for the early detection and adequate management of problems and disease emerging during the first 6 weeks after delivery. Furthermore, postnatal care can be used to offer family planning methods.

This section aims at studying the utilization of MCH services by pregnant women. It is well known from different sources that the appropriateness of antenatal visits is quite acceptable nationwide, and there has been a major problem with utilization of postpartum care service.

Study Subjects were chosen by systematic random sample from of the records of pregnant women who had their first antenatal visit during the period 1/1/-30/4/1999. Paying 4 or more antenatal visits during a period of completed pregnancy was considered appropriate for normal uncomplicated pregnancy. All pregnancies labeled, as “risk pregnancies” were excluded. Paying one or more postnatal visits within the first six weeks after delivery was considered appropriate utilization of the service.

Data was collected and transcribed by midwife data collectors from the existing records into a special form prepared for this purpose (Annex 3). The data was weighted to satisfy the two stage stratified cluster sampling method using relative and expansion weight for MoH data and expansion weight for UNRWA data.

Data was collected from 88 health centers as one selected center in south had no registered women for antenatal care. A total of 840 instead of the planned 880 records were collected with almost 4.5 % non-response, mainly because some centers had less than the 10 eligible women, or records were missing due to poor record keeping system. Over 80% of the non-responses were in 10 health centers in the south.

Table A3.3.1 shows the valid number and the percentage of missing values for each variable for the 840 records. Income appeared only in 77% of records.

From now on the counts represent the unweighted values while means and proportions are calculated from weighted values.

3.3.2.2 Background Variables

Table 3.3.2 summarizes the sample characteristics. The north had the highest weighted proportion at 44.4% followed by the central region at 40% and the south at 15.6%. The higher weight for the northern region was a result of lower probabilities of selecting individual subjects at health centers. Overall, about 30% of cases came from CHCs and 70% from PHCs.

The mean age of subjects was about 26 years with a minimum of 15 and a maximum of 46 years. The 95% C.I. showed little variation between upper and lower limits as shown in Table A3.3.2. The difference in mean age by region was not found to be significant (F=0.98, p= 0.38). The majority of women (66%) were in the age group 20-29 and about 9% were below the age of 20. Table A3.3.3 shows the distribution of age groups by region.

Table A3.3.4 shows mean income by regions. The national mean of the sample income was 154.2 with 30 JDs as the lowest reported income and 1100 JDs as the highest. There was no statistically significant difference of income means by region (F=0.69 and p=0.5). Table A3.3.5 shows that differences in the first four quintiles were small moving from 110 JDs for the first quintile to only 180 JDs for the fourth quintiles and having 95% of the respondents with less than 280 JDs a month. The majority of respondents (77%) have income between 100 and 199 JDs. Less than 5% were in the income category 300 JDs or more and about 7% less than 100 JDs a month. The above data indicates that attendants of MoH centers are mainly low to middle income . Table A3.3.6 shows the distribution of income categories by region

Literacy rate for the overall sample of pregnant women was 95.3% ranging from 96.8% in the north to 90.5% in the south. Literacy rate for spouses was 96.5% ranging

Table 3.3.2: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	840	**100**
Region		
North	330	**44.4**
Central	347	**40.0**
South	163	**15.6**
Stratum		
Central CHCs	110	**16.7**
North CHCs	50	**9.4**
South CHCs	33	**4.3**
Central PHCs	237	**23.7**
North PHCs	280	**36.2**
South PHCs	130	**9.7**
Total CHCs	193	**30.3**
Total PHCs	647	**69.7**
Age (years)		
<20	75	**8.8**
20-29	545	**65.9**
30-39	203	**23.7**
≥40	13	**1.6**
Income		
<100	49	**7.3**
100-199	491	**77.1**
200-299	73	**10.8**
≥300	33	**4.8**
Education (Pregnant)		
Illiterate	40	**4.7**
Less than Secondary**	255	**31.0**
Secondary	357	**44.4**
Higher Education	168	**19.8**
Education (Husband)		
Illiterate	31	**3.5**
Less than Secondary	317	**39.5**
Secondary	295	**36.3**
Higher Education	177	**20.7**

* Weighted

** Combines both elementary and secondary education.

form 97.4% in the north to 94.8 in the south. No statistically significant difference in literacy rate for women and their husbands was noted among regions (χ^2 =6.9, 1.86 and p=03, 0.4 respectively). Furthermore, no statistically significant differences were noted between literacy rate of pregnant women and their spouses at the national and regional levels. Detailed description of educational levels is presented in Tables A3.3.7 and A3.3.8.

3.3.2.3 Antenatal Visits

The mean number of antenatal visits for the national sample was 4.56, while the median was 4.00. the minimum and maximum number of visits were 1 and 13 respectively. Despite the large range, the difference between upper and lower limits of 95% C.I. was relatively small as shown in table 3.3.3

Table 3.3.3: Mean Number of Antenatal Visits by Region

Region	Mean Number of Visits	95% CI	
		Lower	Upper
North	**4.98**	4.88	5.07
Central	**4.08**	3.97	4.15
South	**4.55**	4.39	4.7
National	**4.56**	4.49	4.61

There were significant differences in the mean number of antenatal visits between the central and northern regions only (F=9.13, p<0.0001). The central region having the lowest mean number of visits can be partly explained by the availability of other service providers, especially the private sector. There were significant differences in the means of antenatal visits by stratum with northern CHCs having the highest mean of 5.93 and the central CHCs having the lowest mean of 3.70 (Table A3.3.9)

The mean number of visits looks much lower than the number reported by the Population and Family Health Survey (DHS) of 1997. The latter reported a median of 8 visits based on the 5 year experience preceding the survey in 1997. The difference between DHS and study results can be explained by the fact that this study looked at normal pregnancies excluding all risk pregnancies that might have affected the number of visits. Furthermore, the results of this study were based on records and not on experiences that might be subject to recall bias especially, over a period of 5 years. Finally, DHS covered the whole of the Jordanian population, while the sample of the current survey was restricted to users of MoH facilities.

Based on monthly MCH reports for the period 1996-2000, the MoH data showed that annual average antenatal visits per pregnant woman was around 7 which was again far from the finding of this study at just 4.56 visits. Excluding risk pregnancies in the current study might explain only part of the discrepancy. The reporting system at MoH should also be closely examined to exclude over reporting or under recording.

Table 3.3.4 shows that the north had the best figure of appropriateness of antenatal visits at about 62% followed by the south at 59% and central region at only about 52%, which follows the same pattern as the mean number of visits. The differences among regions in appropriateness of visits were significant (χ^2 =7.5 , p=.023).

Table 3.3.4: Appropriateness of Antenatal Visits by Region

Appropriate	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	201	**62.2**	177	**52.2**	88	**59.0**	466	**57.7**
No	129	37.8	170	47.8	75	41.0	374	**42.3**
Total	330	100	347	100	163	100	840	100

No significant difference was found (t=-0.149, p=0.881). when comparing the mean number of antenatal visits by type of facility (table 3.3.5) This happened despite the fact that services provided by comprehensive health centers are supposed to be more attractive to pregnant women due to the availability of specialists with ultrasound and lab tests.

Table 3.3.5: Mean Number of Antenatal Visits by Type of HC

Region	Mean Number of Visits	95% CI	
		Lower	Upper
CHCs	4.51	4.39	4.63
PHCs	4.57	4.50	4.64
Total	4.56	4.49	4.61

The percentage of appropriate antenatal visits was found to be 53.3% and 59.7% for CHCs and PHCs respectively (table 3.3.6).The type of health center didn't have significant association with the appropriateness of visits (χ^2=2.9, p=0.088) for the overall national sample which confirms the above argument of CHCs being no better than PHCs.

Table 3.3.6: Appropriateness of Antenatal Visits by Type of HC

Appropriate	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	95	**53.3**	371	**59.7**	466	57.7
No	98	46.7	276	40.3	374	42.3
Total	193	100	647	100	840	100

Mean numbers of antenatal visits by income categories (table 3.3.7) were not significantly different for all categories (F=1.66, p=0.17). The seemingly lower number of antenatal visits for the highest income group stresses the fact that pregnant women with higher

Table 3.3.7: Mean Number of Antenatal Visits by Income Category

Region	Mean Number of Visits	95% CI	
		Lower	Upper
<100 JDs	**4.23**	3.59	4.87
100-199 JDs	**4.64**	4.40	4.89
200-299 JDs	**4.87**	4.04	5.70
≥300JDs	**3.67**	2.87	4.48
Total	**4.59**[*]	4.38	4.81

[*] This number is different from the overall mean of 4.56 because we had only 646 respondents with income out of the 840

income were probably making fewer visits to MoH centers while attended other facilities.

Table 3.3.8: Appropriateness of Antenatal Visits by Income Categories

Appropriate	Income Categories							
	<100		100-199		200-299		≥300	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Yes	27	**53.2**	278	**58.7**	38	**55.7**	13	**45.2**
No	22	46.8	213	41.3	35	44.3	20	54.8
Total	49	100	491	100	73	100	33	100

The above argument was consistent when analyzing the appropriateness of visits by income categories shown in table 3.3.8. The highest income group showed less appropriateness of visits. But the differences among groups were not significant as witnessed by p value of only 0.45.

Table 3.3.9: Appropriateness of Antenatal Visits by Pregnant's Education

Appropriate	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Yes	23	**66.7**	148	**61.6**	198	**55.3**	86	**54.9**
No	17	33.3	107	38.4	159	44.7	82	45.1
Total	40	100	255	100	357	100	168	100

Analysis of appropriateness of visits by educational categories of women and their husbands revealed decreasing proportion of appropriate visits with increasing education (tables 3.3.9 and 3.3.10).

Table 3.3.10: Appropriateness of Antenatal Visits by Husband's Education

Appropriate	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Yes	19	**69.0**	193	**64.6**	154	**52.2**	89	**52.4**
No	12	31.0	124	35.4	141	47.8	88	47.6
Total	31	100	317	100	295	100	177	100

However, the demonstrated differences were not significant (χ^2=4.18 p=0.282) for the women's education but were significant for the husband's educational levels at χ^2=13.6 and p=0.003.

Finally, mean age for those making appropriate and inappropriate visits was 26 and 26.5 years respectively (t=-1.2 , p= 0.23). Looking at appropriateness by age groups revealed similar results with no statistical difference (χ^2 =1.86 , p=0.6).

3.3.2.4 Postnatal Visits

Overall 29.6% of women attending the antenatal clinics showed up at postnatal care within the first 6 weeks after delivery. Table A3.3.11 shows the utilization of postnatal visits by stratum. Again central CHCs showed the lowest percentage at only 18.6% while southern CHCs showed the highest utilization rate at 44.4%. These differences were significant at χ^2=16.97 and p=0.005.

Table 3.3.11: Utilization of Postnatal Care by Region

Appropriate	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	107	**32.8**	92	**26**	49	**29.1**	248	**29.6**
No	223	67.2	255	74	114	70.9	592	**70.4**
Total	330	100	347	100	163	100	840	100

The distribution of postpartum care utilization by region is given in table 3.3.11, with the highest rate at 32.8% in the north followed by the south at 29.1% and the central region at 26%. The observed differences were found to be statistically insignificant (χ^2=3.99, p=0.137). The differences shown at the stratum level did not show up here because of the opposing effects of PHCs and CHCs in the same region.

Table 3.3.12: Utilization of Postnatal Care by Type of Health Center

Utilization of Postpartum	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	57	**27.5**	191	**30.5**	248	29.6
No	146	72.5	446	69.5	592	70.4
Total	203	100	637	100	840	100

Table 3.3.12 shows that 27.5% of women attending antenatal care at CHCs showed up for postnatal care while 30.5% did so at PHCs. Again postnatal care was found to have no association to the type of health center (χ^2 =0.75 , p=0.39).

No significant differences were noted in postnatal visits by age or income (t=-.118, p=0.9 and t= -1.47, p=0.14 respectively). Cross tabulation with levels of education revealed no association.

Table 3.3.13: Utilization of Postnatal Care by Appropriateness of Antenatal visits

Appropriateness of Antenatal Visits	Utilization of Postnatal Care				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	182	**74.2**	284	**50.8**	466	57.7
No	66	**25.8**	308	**49.2**	374	42.3
Total	248	100	592	100	840	100

Table 3.3.13 shows that 74.2% of women attending postnatal care were making appropriate antenatal visits. About 51% of women who did not attend the postpartum care were having appropriate antenatal visits. The differences were significant at (χ^2 =39 and p<0.0001). These results points to the fact that women with appropriate antenatal visits tend to have a better chance of utilizing postnatal care.

3.3.2.5 Counseling on Family Planning

Counseling on family planning was provided only for 34.7% of the 248 women who attended the postnatal care.

Table 3.3.14: Counseling on Family Planning During Postpartum Visit by Region

Appropriate	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	42	**42.4**	32	**29.5**	8	**17.6**	82	**34.7**
No	65	57.6	60	70.5	41	82.4	166	**65.3**
Total	107	100	92	100	49	100	248	100

Regional differences were noted with the northern region having the highest family planning counseling of 42.2% and the lowest in the south at 17.6% (Table 3.3.14). All differences among regions were statistically significant (χ^2=8.7, p=0.013). Despite overall low postnatal attendance, only one third of attendants were provided with family planning counseling which stresses the presence of missed opportunities.

Out of the 82 offered counseling on family planning over 71% made decisions on the method they are going to use (table 3.3.15). This indicates the importance of FP counseling during postnatal visit. It is evident that promoting postnatal visits alone can create a vicious circle.

Table 3.3.15: Decision on Family Planning Method

Decision Made	N	%
Yes	**60**	**71.4**
No	22	28.6
Total	82	100.0

3.3.3 UNRWA

3.3.3.1 Introduction

Data was collected from a total of 200 records. Table A3.3.1 shows the valid number of records for each variable. Antenatal, postnatal visits and age variables were complete. Data on income and education will not appear here because UNRWA records do not have it. Data will be weighted using the expansion weight only since there was no stratification.

3.3.3.2 Background Variables

Age of the women was the only background variable available. Tables A3.3.12 and A3.3.13 summarize the data on age where the mean age was found to be 25.7 with minimum of 16 and maximum of 43. Over 60% of women were in the age group 20-29 and very few (1.5%) were above the age of 40. The above age figures were not different from those of MoH.

3.3.3.3 Antenatal, Postnatal and Family Planning Variables

Table 3.3.16: Antenatal-Postnatal Utilization (UNRWA)

Variable	Not W* Number	W %
Appropriateness of Antenatal Visits		
Yes	147	**73.3**
No	53	26.7
Total	200	100
Appropriateness of Postnatal Visits		
Yes	157	**79.3**
No	43	20.7
Total	200	100
Counseling on Family Planning		
Yes	138	**93**
No	19	**7**
Total	157	100
Decision on Use of FP Method		
Yes	85	**58**
No	53	42
Total	138	100

*W: Weighted

Table 3.3.16 summarizes the variables on antenatal-postnatal care utilization. The percentage of appropriate antenatal visits was 73.3%. Median number of antenatal visits was 5 and the mean was 4.74 (4.67-4.81) with a minimum of 1 and a maximum of 11.

Despite that the median number of visits was found close to MoH at 4, the appropriateness of visits was much higher at 73.3% compared to 57.6% for MoH. The figure of appropriateness for UNRWA looks closer to the 1997 DHS at about 87% than that of the MoH.

Over 79% of the sampled women attended postnatal care compared with less than 30% at MoH facilities.

Counseling on family planning use during postpartum care visits was found to be very high at UNRWA facilities at 93%. When it comes to women making decisions to use family planning only 58% of those counseled choose a method to use. That figure was not statistically different from that of MoH at 71.4%.

Finally, Table A3.3.14 shows the comparison between UNRWA and MoH indicators. It seems once again that MoH can learn a lesson from UNRWA to improve utilization of MCH services.

Appendix 3.3

Table A3.3.1: Listing of Variables and Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Income	646	23.10	NA	NA
Age	836	0.48	200	0.00
Husband's Education	820	2.38	NA	NA
Pregnant's Education	820	2.38	NA	NA
Antenatal Visits	840	0.00	200	0
Postnatal Visits	840	0.00	193	3.5
Total Number of Records	840		200	

Table A3.3.2: Mean Age by Region (MoH)

Region	Mean Age	95% CI	
		Lower	Upper
North	**26.51**	26.34	26.68
Central	**26.25**	26.05	26.45
South	**25.7**	25.41	26
National	**26.29**	26.17	26.41

Table A3.3.3: Distribution of Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<20	23	6.9	37	11.1	15	8.3	75	**8.8**
20-29	224	68.3	214	61.9	107	69.6	545	**65.9**
30-39	77	23.3	89	25.0	37	21.4	203	**23.7**
≥40	5	1.6	6	1.9	2	0.7	13	**1.6**
Total	329	100.0	346	100.0	161	100.0	836	100.0

Table A3.3.4: Distribution of Income Mean by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**150.8**	148.7	153.0
Central	**157.6**	154.1	161.0
South	**157.5**	152.5	162.5
National	**154.2**	152.4	156.0

Table A3.3.5: Quintiles, 90 and 95 percentiles of Income (MoH)

Q_1	Q_2	Q_3	Q_4	90^{th} %	95^{th} %
110	130	150	180	200	280

Table A3.3.6: Income Categories by Region (MoH)

Monthly Income in JDs	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<100 s	16	5.2	21	8.8	12	11.1	49	**7.3**
100-199	225	82.0	177	72.4	89	71.6	491	**77.1**
200-299	23	8.6	39	13.0	11	13.6	73	**10.8**
≥300	13	4.3	14	5.9	6	3.7	33	**4.8**
Total	277	100	251	100	118	100	646	**100**

Table A3.3.7: Educational Level of Pregnant Women by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	11	3.2	16	4.9	13	9.5	40	**4.7**
< Secondary	97	29.4	106	32.9	52	31.0	255	**31.0**
Secondary	153	49.5	142	42.7	62	32.8	357	**44.4**
> Secondary	62	18.0	72	19.5	34	26.7	168	**19.8**
Total	323	100	336	100	161	100	820	**100**

Table A3.3.8: Educational Level of Husbands by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	9	2.6	12	4.0	10	5.2	31	**3.5**
< Secondary	121	38.1	131	40.2	65	41.7	317	**39.5**
Secondary	129	40.2	109	32.3	57	34.8	295	**36.3**
> Secondary	63	19.0	85	23.5	29	18.3	177	**20.7**
Total	322	100%	337	100%	161	100%	820	**100%**

Table A3.3.9: Mean Number of Antenatal Visits by Stratum (MoH)

Region	Mean Number of Visits	95% CI	
		Lower	Upper
Central CHC	**3.7**	3.56	3.85
North CHC	**5.93**	5.7	6.17
South CHC	**4.24**	3.98	4.49
Central PHC	**4.35**	4.24	4.46
North PHC	**4.73**	4.63	4.82
South PHC	**4.68**	4.49	4.88
Total	**4.56**	4.49	4.61

Table A3.3.10: Appropriateness of Antenatal Visits by Stratum (MoH)

Strata	Antenatal Visits				Total	
	Yes		No			
	N	%	N	%	N	%
Central CHC	46	**43.0**	64	57.0	110	100
North CHC	33	**71.6**	17	28.4	50	100
South CHC	16	**53.2**	17	46.8	33	100
Central PHC	131	**58.6**	106	41.4	237	100
North PHC	168	**59.8**	112	40.2	280	100
South PHC	72	**61.7**	58	38.3	130	100
Total	466	**57.7**	374	42.3	840	100

Table A3.3.11: Utilization of Postnatal Care by Stratum (MoH)

Strata	Postnatal Visits				Total	
	Yes		No			
	N	%	N	%	N	%
Central CHC	22	**18.6**	88	81.4	110	100
North CHC	13	**30.4**	37	69.6	50	100
South CHC	15	**44.4**	18	55.6	33	100
Central PHC	70	**31.7**	167	68.3	237	100
North PHC	94	**33.6**	186	66.4	280	100
South PHC	34	**22**	96	78	130	100
Total	248	**29.6**	592	70.4	840	100

Table A3.3.12 : Mean Age in Years (UNRWA)

Variable	Mean	95% CI	
		Lower	Upper
Age in Years	25.66	25.48	25.85

Table A3.3.13: Age Groups (UNRWA)

Age Groups	Count	Weighted %
<20	25	**12.50**
20-29	123	**61.50**
30-39	49	**24.50**
≥40	3	**1.50**
Total	200	**100.00**

Table A3.3.14: Comparison of Main Indicators Between MoH and UNRWA

Indicator	Provider		Significance	
	MoH %	UNRWA %	χ^2	p
Appropriateness of Antenatal Visits	57.7	73.3	15	<0.0001
Utilization of Postnatal Care	29.6	79.3	177	<0.0001
Counseling on Family Planning	34.7	93	63	<0.0001

3.4 Use of Contraceptive Methods

3.4.1 Summary

This section aims at studying the current practices of married non-pregnant women aged 15-49 who are users of MoH services regarding current use of various family planning methods. Despite the fact that contraceptive prevalence has been widely studied in Jordan with almost annual surveys over the last years, this study is designed to gather information on users of MoH. The results provided by nationwide community based household surveys are different from facility based surveys depending on the facility under consideration.

A total of 892 women at 89 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers aged 15-49 years were studied. Data on the use of eight modern and three traditional methods was collected form the study subjects through exit interviews. Modern methods included IUDs, pills, condoms, injectables, vaginal methods, implants, female sterilization and male sterilization (vasectomy). Traditional methods included breastfeeding, abstinence and withdrawal. Data was also collected on the source of family planning methods and type of difficulties facing users of the service.

Table 3.4.1: Prevalence of Using Methods of Family Planning

Group \ Method	Modern Method %	Traditional Methods %
MoH (Intervention)	51.6	15.9
UNRWA (Control)	65.5	17.3
1999 JAFS*	39.8	16.8

MoH data showed that the prevalence of using any modern contraceptive method or any traditional method was found to be 51.6% and 15.9% respectively (Table 5.1). The use of modern methods was found to be higher than the national widely distributed figures of JAFS of 1999. This fact is probably related to the differences in study designs.

IUDs, pills and condoms were the most commonly used modern methods at 29.2%, 13.9% and 5.3% respectively while breastfeeding was the most common traditional method at 7.9%.

The use of modern methods of contraception was positively associated with the level of education and employment status of the respondent. The younger age group of 15-24 and the older of above 44 were shown to use less contraception than other age groups. Women having more male children tended to use family planning more frequently.

No difference was noted in using modern methods among regions or according to the type of the health center.

* Jordan Annual Fertility Survey 1999. Department of Statistics of Jordan.

About 39% of women got their contraceptive methods from the surveyed health center and about 37% from facilities outside MoH. The most commonly reported difficulty was complications and side effects of IUDs and pills.

The rate of use of modern methods among users of MoH health centers was higher than the national figures. Nevertheless a good proportion of women reported getting the service from outside the MoH. Improving quality of services at the MoH facilities through project activities is expected to lead to increased proportion of users who get the service from the closest MoH centers.

3.4.2 Ministry of Health

3.4.2.1 Introduction

Please note that all tables with A3.4.x numbering appear in Appendix 3.4 at the end of this section, otherwise tables are incorporated in the text.

Jordan has realized the dissonancy between the natural population growth rate and economic growth that poses increasing pressure on the public sector regarding education, health, employment and other aspects. Jordan's National Population Strategy calls for the expansion of family planning services throughout the Kingdom and seeks to increase rates of family planning use.

Over the last years contraceptive prevalence has been widely studied in Jordan. This study was designed to gather information on users of MoH because the PHCI project is more facility based project. The results provided by nationwide community based household surveys are different from facility based surveys depending on the type of facility under consideration.

This section aims at studying the current practices of married non-pregnant women aged 15-49 who are users of MoH services regarding various family planning methods. Furthermore, this section looks at the availability of family planning methods at sampled health centers.

Data on the use of contraceptives was collected through an exit interview at the selected health care center for a sample of women in the age group 15-49. Annex 4.1 shows the questionnaire on the use of contraception. Women were selected during the period of data collection (2-3days) by systematic random sampling depending on patient load . Furthermore, another questionnaire shown in annex 4.2 was used to collect data on availability of family planning methods during survey days.

Variables related to the use of any method whether traditional or modern were included in the questionnaire. Some questions on the source of contraceptive methods as well as problems related to the use of contraceptive methods were also included.

Table 3.4.2: Methods of Family Planning

Modern Methods	Traditional Methods
IUDS	Breastfeeding
Pills	Withdrawal
Condoms	Abstinence
Injectables	
Sterilization (Male and Female)	
Vaginal Methods	
Implant	

Data was collected from a total of 892 women at 89 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers aged 15-49 years were studied. Data was collected on use of eight modern and three traditional methods shown in table 3.4.2. Modern methods included IUDs, pills, condoms, injectables, vaginal methods, implants, female sterilization and male sterilization (vasectomy). Traditional methods included breastfeeding, abstinence and withdrawal. Data was also collected on the source of family planning methods and

type of difficulties facing users of the service. One questionnaire was filled for each of the 89 MoH and 8 UNRWA selected centers for the availability of family planning methods.

A total of 892 women in childbearing age were interviewed. Missing values were less than 1% for some background variables and absent for family planning variables (Table A3.4.1).

All counts appearing hereafter represent the unweighted values while means and proportions are calculated from weighted values using expansion and relative weights as appropriate to account for the study design.

3.4.2.2 Background Variables

Table 3.4.3 summarizes the background variables. The mean age of respondents was about 30.5 years and the median was 30 with a minimum of 16 and a maximum of 48 years. The mean age was almost identical for the three regions of Jordan where F=1.79 and p=0.17 (Table A3.4.2). About 53% of the respondents were in age group 25-34 followed by about 25% in the age group 35-45 and about 18 % in the age group of 15-24 years of age (Table A3.4.3). The oldest age group between 45 years and above constituted about 4%.

Mean number of children was found to be 4.2 with a minimum of 0 and a maximum of 14. Mean number of male and female children was almost identical at about 2.1. No differences between regions were noted in this regard (Table A3.4.4). Generally, 48% of respondents had 1-3 children, 35.4% had 4-7 children, 16.4% had 7 or more children and only 0.2% had no children.

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Mean years of schooling was about 10.2 ranging form 9.7 at the south, going up to 10.5 years in the north and being about 10.1 in the center (Table A3.4.5). No statistically significant difference was noted among regions (F=2.2, p=0.1). About 3% of all respondents were illiterate[*] and about 23% had higher education after school. Looking at table A3.4.6, some differences existed among regions mainly the presence of more illiterate in the south at 8% compared with less than 3% in the other two regions (χ^2 = 16.5 , p= 0.01). The mean years of schooling for husbands was 10.8 ranging from 9.9 in the south to almost 11 years in the center, and the north was close to the center at 10.8 years (Table A3.4.7). The difference was significant only between the south and the center with F=3.1 and p=0.04. Only about 2% of the husbands were illiterate and almost 25% have higher education. The better representation of the central region in educational categories compared with the south shown in table A3.4.8 was significant (χ^2 = 27.6 , p= 0.005).

About 14% of the sample were employed, less than 1% retired and the rest (85%) were unemployed (Table A3.4.9). About 80% of the women were housewives, 15.5% were professionals[**] and 4.5%were skilled workers

[*] Roughly those with zero years of schooling were considered illiterate.
[**] Refer to page 16 for definitions of occupational categories.

Table 3.4.3: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	892	**100**
Region		
North	330	**35.2**
Central	350	**55.0**
South	212	**9.8**
Stratum		
Central CHCs	110	**18.9**
North CHCs	50	**8.3**
South CHCs	50	**4.1**
Central PHCs	240	**36.1**
North PHCs	280	**26.9**
South PHCs	162	**5.7**
Total CHCs	210	**31.3**
Total PHCs	682	**68.7**
Age (years)		
15-24	162	**18.4**
25-34	481	**52.5**
35-44	220	**25.1**
≥45	26	**3.9**
No. of Children		
0	3	**0.2**
1-3	408	**48.0**
4-6	334	**35.4**
≥7	147	**16.4**
Education		
Illiterate	52	**3.1**
1-6 years	118	**14.2**
7-12 years	540	**59.9**
≥13	182	**22.8**
Education (Husband)		
Illiterate	24	**2.1**
1-6 years	97	**10.1**
7-12 years	570	**62.1**
≥13	201	**25.7**
Employment		
Yes	136	**13.9**
No	743	**86.1**
Occupation		
Professionals	140	**15.5**
Skilled Workers	44	**4.5**
Unskilled Workers	3	**0.4**
Housewives	705	**79.6**

* Weighted

3.4.2.3 Family Planning Methods (Combined Indicators)

Table 3.4.4: Distribution of Any Method of Family Planning by Region

FP (Any Method)	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	245	**72.3**	257	**63.7**	150	**71.6**	652	**67.5**
No	85	27.7	93	36.3	62	28.4	240	**32.5**
Total	330	100	350	100	212	100	892	100

The overall prevalence of family planning, using any of the 11 methods as shown in table 3.4.4 was found to be 67.5%. The central region was shown to have less family planning at about 64% compared to the other 2 regions as shown in Table 5.3 ($\chi^2 = 7.2$, p= 0.027).

Table 3.4.5 shows the prevalence of using modern family planning methods. Overall 51.6% of the sample were using one of the modern methods. Differences among regions in this regard were negligible with ($\chi^2 = 0.007$, p= 0.996). The overall percentage of women using any traditional methods was 15.9% .

Table 3.4.5: Distribution of Modern Methods of Family Planning by Region

FP (Modern Methods)	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	169	**51.6**	188	**51.6**	100	**51.1**	457	**51.6**
No	161	48.4	162	48.4	112	48.9	435	**48.4**
Total	330	100	350	100	212	100	892	**100**

Since the use of modern contraceptive methods is the most important for family planning, further analysis by background variables will be restricted to these methods.

Table 3.4.6: Using Modern Methods by Type of HC

Use of Modern Methods	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	114	**49.3**	343	**52.6**	457	51.5
No	106	50.7	329	47.4	435	48.5
Total	220	100	672	100	892	100

Users of CHCs and PHCs looked almost alike regarding the use of modern family planning methods as shown in table 3.4.6. The mild observed difference in favor of PHCs at 52.6% versus 49.3% for CHCs was found to be of no statistical significance ($\chi^2 = 0.85$, p= 0.36).

Table 3.4.7: Modern Methods of Family Planning by Age Groups

Age Groups	Use of Modern Methods				Total	
	Yes		No			
	N	%	N	%	N	%
15-24	65	**43.3**	97	56.7	162	100
25-34	256	**52.9**	225	47.1	481	100
35-44	122	**57.2**	98	42.8	220	100
≥45	12	**36.1**	14	63.9	26	100
Total	455	**51.6**	434	48.5	889	100

Overall the mean age of users was only one year more than non-users of modern contraception at 31 and 30 years respectively (t=1.8, p=0.06).

The distribution of users by age groups is shown in table 3.4.7. The youngest and oldest age groups were using less family planning methods than middle aged women. More or less similar patterns of modern methods use was found in the 1997 DHS.

Tables 3.4.8 and 3.4.9 summarize the use of modern methods by levels of education for both the respondents and their spouses.

The use of contraceptive methods showed increasing trend with the woman's educational level increasing from about 29% in the illiterate category to about 59% in the higher education category. The observed difference was shown to be of statistical significance (χ^2 =12.3, p=0.006).

Table 3.4.8: Use of Modern Methods by Woman's Educational Categories

Educational Level	Use of Modern Methods				Total	
	Yes		No			
	N	**%**	**N**	**%**	**N**	**%**
Illiterate	19	**28.6**	33	71.4	52	100
1-6 years	53	**45.3**	65	54.7	118	100
7-12 years	273	**51.5**	267	48.5	540	100
≥13	112	**58.9**	70	41.1	182	100
Total	457	**51.6**	435	48.4	892	100

Table 3.4.9: Use of Modern Methods by Husband's Educational Categories

Educational Level	Use of Modern Methods				Total	
	Yes		No			
	N	**%**	**N**	**%**	**N**	**%**
Illiterate	4	**21.1**	20	78.9	24	100.0
1-6 years	48	**53.3**	49	46.7	97	100.0
7-12 years	292	**52.3**	278	47.7	570	100.0
≥13	113	**52.2**	88	47.8	201	100.0
Total	457	**51.6**	435	48.3	892	100

Similar but less pronounced differences were noted for husband's education where only the illiterate are different from the rest of the educational categories which looked more or less similar(χ^2 =7.3, p=.06). It is worth mentioning that the mean educational years for users and non users of family planning methods were found to be similar for both women and their spouses.

Table 3.4.10 shows the distribution of using modern methods by the employment status of the respondents. It is clear that there were more users of contraception among the employed, at about 67% versus about 50% for unemployed (χ^2 =12.4, p<0.0005).

Table 3.4.10: Using Modern Methods by Employment

Employment	Use of Modern Methods				Total	
	Yes		No			
	N	**%**	**N**	**%**	**N**	**%**
Yes	92	**66.7**	44	33.3	136	100
No	364	**49.6**	386	50.4	750	100
Total	456	51.7	430	48.0	886	100

Table 3.4.11: Mean Number of Children by Use of Modern Methods

Child's Sex	Use of Modern Methods	Mean Number of Children	95% CI	
			Lower	Upper
Male	Yes	2.20	2.07	2.32
	No	1.92	1.78	2.06
Female	Yes	2.07	1.92	2.21
	No	1.87	1.72	2.02

The mean number of male children for users of modern methods at 2.2 was statistically higher than non-users at 1.92 as shown in table 3.4.11 (t= 2.8, p=0.004). There was no statistical difference between the mean number of female children among users and non-users(t= 1.9, p=0.06). The fact that women with more male children tend to use family planning methods more frequently is a reflection of the Jordanian culture regarding the desire for male children.

3.4.2.4 Family Planning Methods (Individual Indicators)

Table 3.4.12: Prevalence (%) of Methods of Family Planning

Modern Methods		Traditional Methods	
Type	**%**	**Type**	**%**
IUDS	29.2	Breastfeeding	7.9
Pills	13.9	Withdrawal	4.8
Condoms	5.3	Abstinence	3.3
Injectables	1.8	**Any Traditional Method**	**15.9**
Female Sterilization	1.2		
Vaginal Methods	0.2		
Any Modern Method	**51.6**	**Using Any Method**	**67.5**

Table 3.4.12 shows the prevalence of contraceptive by various methods. IUDs scored the highest at about 29% with implants and male sterilization (not shown in the table) the lowest at zero prevalence. The use of any traditional method being 15.9 instead of 16 is not a rounding problem but rather due to the few cases, who reported using breastfeeding and withdrawal or abstinence at the same time.

Table A3.4.10 shows the prevalence of using each method of family planning by region.

The use of **IUDs** ranged from 31.6% at the central region decreasing to 27.1% in the north and 23% in the south. Despite the observed obvious difference at least between the center and the south, statistical testing found no difference in this regard (χ^2 = 3.7, p=0.156). The national figure at about 29% was more or less close to the results of 1999 JAFS at 24.5%.

The use of **Pills** was the highest in the center at 14.3% followed by the south at 13.6% and north at 13.3%. It is clear that the prevalence in the three regions was consistent with no statistical difference (χ^2 = 0.15, p=0.93). JAFS of 1999 reported only 8.7% of use of pills in Jordan.

The use of **Condoms** ranged from 8% in the south to 6.4 in the north and to just 4.1 in the center. The seemingly obvious difference among regions was not supported by statistical testing (χ^2 = 3.4, p=0.18). The overall use of condoms by our respondents (5.3%) was considerably higher than that of 1999 JAFS at just 1.3%.

The use of **Injectables** was 2.5% in the north, 2.3% in the south and 1.2% in the central region. Differences among regions were not significant (χ^2 = 2, p=0.36). The overall figure of 1.8% use of injectables was higher than the 1999 JAFS at 0.6%. However, both figures reflect the negligible use of this method.

Overall figure for the use of **Female Sterilization** was found to be low at 1.2%, much lower than the figure reported by 1999 JAFS at 4.4%.

The use of **Vaginal Methods** was almost absent at a rate of 0.2% which is the same prevalence rate reported by the 1999 JAFS, stressing only occasional usage of this method.

The use of **Implants** and **Male Sterilization** was each found to be zero, consistent with the 1999 JAFS and other surveys.

The use of **Breastfeeding** as a method of contraception ranged from about 9% in the north to 8% in the south and to just about 7% in the center with no statistical significance of the observed difference (χ^2 = 0.84, p= 0.66). About 40% of users of breastfeeding mentioned doing that through LAM program at the MoH. The overall national figure of 7.9% is higher than that of the 1999 JAFS at about 4%.

The prevalence of **Withdrawal** ranged from 7.6% in the north to 4.6% in the south and almost to 3% in the central region. The north showed significantly higher prevalence than the other two regions (χ^2 = 8.8, p= 0.012).The overall prevalence of 4.8% is a little lower than the figure reported by the 1999 JPHFS at 5.9%.

Finally, the use of **Abstinence** ranged from 6.9% in the south to 4.5% in the north and to as low as 1.8% in the center. The central region showed significantly lower prevalence of abstinence than the other two regions (χ^2 = 8.2, p= 0.016). The overall prevalence of 3.3% is almost half of the figure reported by the 1999 JPFHS at 7%.

The above mentioned data indicate that the overall prevalence of using any method of family planning among respondents was 67.5% as opposed to 56.7% reported by the 1999 JAFS. The use of any traditional method was at about 16%, close to the JAFS figures at 16.8%. Variation in the utilization rates of modern methods (51.6%) from this study and (39.8%) from the 1999 JAFS study explains the difference in the overall family planning prevalence. Moreover, ranking for IUDs pills, and vaginal methods was consistent in both studies while female sterilization, condoms and injectables were different.

The annual JAFS surveys over the years 1997-1999 showed only 1% increase in the prevalence of using modern methods at 37.7%, 38.7% and 39.8% for 1997, 1998 and 1999 respectively. The difference in the utilization rate of modern family planning methods between the current study done in 2000 and the 1999 JAFS study can't be attributed to time difference. The difference in study designs seems to be the most

plausible cause. The current study was facility based where clients are expected to utilize family planning methods more readily compared to a household design. Furthermore, data collection in the current study was done by midwives from MoH as opposed to JAFS where more impartial data collectors were employed.

The above difference in principle should not pose any problems since the same tools and the same type of data collectors will be used for the posttest to measure changes among users of MoH services rather than looking at the community as a whole.

3.4.2.5 Source of Family Planning Methods

Table 3.4.13 shows the source of contraceptive methods by region. The data is solely related to modern methods with the exception of female sterilization which is not provided at the health center level.

Table 3.4.13: Source of Modern Methods of Family Planning by Region

Source	Regions						National	
	Northern		Central		Southern			
	N	%	N	%	N	%	N	%
This HC	86	55.8	56	26.7	46	51.2	188	**39.1**
Another MoH HC	27	14.1	52	29.5	28	30.2	107	**24.2**
Another Non - MoH HC	51	30.1	78	43.8	22	18.6	151	**36.7**
Total	164	100	186	100	96	100	446	100

About 37% of users were found utilizing non-MoH facilities to receive the service and a close percentage of respondents at about 39% were using health centers in their areas of residence. About 24% received the service from other MoH facilities.

Differences among regions shown in table 3.4.13 clearly reflect the availability of other providers. In the central region about 44% use other non-MoH facilities, while in the south only 18.6% and the north at about 30%. The regional differences were found to be highly significant ($\chi^2 = 41.8$, $p<0.0005$).

It is worth mentioning that about 40% of breast feeders reported receiving the service mostly from the LAM programs at their MoH health centers. The data on LAM programs is not included in the above table.

As expected the surveyed health center was the source of IUDs in only about 19% of the cases while the figure was higher for pills at about 64% and reaching about 76% for condoms (Table 3.4.14).

Table 3.4.14: Source of The Top Three Modern Methods of Family Planning

Source	Method		
	IUDs	Pills	Condoms
This HC	19.1%	63.9%	75.6%
Another MoH HC	34.5%	9.0%	10.3%
Another Non -MoH HC	46.4%	27.1%	14%

Getting the service from outside the MoH facilities was in the reversed order. This might indicate the need to concentrate efforts on marketing the more readily available methods like pills.

3.4.2.6 Difficulties Using Family Planning Methods

Table 3.4.15 : Frequency of Difficulties

Difficulties	Count	Weighted %
Complications and side effects	42	43.5
Availability	23	22.2
Provision not on daily basis	8	26.7
Others	7	7.6
Total	80	100

Overall only 80 women out of the total of 447 (17.9%) reported difficulties in using family planning methods (Table 3.4.15). Complications and side effects were noted in 43.5%. Non availability and irregular provision constituted about 49% of the difficulties, mainly related to IUDs. The others at 7.6% included far distance of the health center providing the service, or the physicians unavailability and long waiting times. No single woman reported male providers being a difficulty for receiving the service.

3.4.2.7 Family Planning Methods in Health Centers

Table 3.4.16: Availability of FP Methods in Health Centers

Method of FP	No. of HCs Offering the method	Not W* %	W %
Pills	89	100	**100**
Condoms	85	95.5	**95.9**
IUDs	33	37.1	**45**
Injectables	45	50.6	**49.7**
LAM	20	22.5	**20.8**
Vaginal Methods	1	1.1	**1.9**
Norplant	0	0	0

* Weighted

The availability of family planning methods in health centers did not correlate well with the reported use of these methods by clients (Table 3.4.16). While pills were available in all the surveyed centers the use of pills was limited to only 13.9%. Furthermore, if we take the source of pills into consideration (Table 3.4.14), only 8.9% of pills users were found to get them from the target health center.

The discrepancy for condoms is more pronounced with almost 96% availability and only 5.3% use. Again when the source is taken into consideration, then the use from the target health center drops to only 4%. IUDs were available at 45%* of centers while the use rate was about 29%. When the source is considered, then use rate from the surveyed center drops to only 5.6%. Injectables were available at almost 50% of the centers where the use rate was as low as 1.8%.

Furthermore, table A3.4.11 shows the availability of various methods by region. The

* The weighted number is higher than the actual because the centers offering IUDs see more patients.

most noticeable difference was in IUDs, where it is available at 54.4% of the centers in the central region, 35% in the north, and only 27.7% in the south.

It is worth mentioning that availability of family planning methods in health centers was obtained for the days of the survey only.

Table 3.4.17: Frequency of IUD Insertion and Sex of Physician*

Variable		No. of HCs	Not W** %	W %
Frequency of IUD Insertion	Daily	15	45.5	**51.6**
	Three times a Week	3	9.1	**9.1**
	Twice a Week	6	18.2	**26.0**
	Once a Week	8	24.2	**11.5**
	Otherwise	1	3.0	**1.8**
Physician's Sex	Male Physician	4	12.1	**8.7**
	Female Physician	29	87.9	**91.3**
Total		33	100	100

* Weighted

To further explore the provision of IUDs in health centers, table 3.4.17 shows the frequency of IUD insertion and the sex of physician. About 52% of health centers offered IUDs on daily basis. Failure to provide services on daily basis was one of the most commonly reported difficulty.

Over 91% of physicians inserting IUDs were females. This might explain the absence of complaints about males being providers of contraceptive methods as seen in section 3.4.2.6.

3.4.3 UNRWA

3.4.3.1 Introduction

Data was collected from a total of 200 records in 8 health centers. Table A3.4.1 shows the valid number of records for each variable. Only 1.5% of missing values was observed for employment variable. Data was weighted using the expansion weight since there was no stratification.

* Physicians are the only medical personnel entitled to insert IUDs in Jordan.

3.4.3.2 Background Variables

The sample characteristics for UNRWA are shown in table 3.4.18. Means of continuous variables are shown in table A3.4.12. The mean age of about 29.2 was found close to the mean age of the MoH sample of 30.5 years. The minimum age was 17 years and the maximum was 48 years. About 49% of the sample were in the age group of 25-34 years, 27% in the youngest age group of 15-24, about 19% in the age

Mean number of children was found to be 3.96 with a minimum of 1 and maximum of 14. Mean number of male and female children was almost identical at about 1.9 years. The mean number of children in the UNRWA sample was lower than that of MoH at 4.2.

Mean years of schooling was about 9 years for both respondent women and their husbands which was about one year less than that of MoH sample. The illiteracy rate for women was 4.4% and 6.6% for their husbands respectively. About 8.3% of women had higher education compared with15.7% for husbands

Less than 4% of the sample were employed women which is much lower than that of MoH at about 14%. About 92% of the women were housewives, 5.4% were professionals and 2.5% were skilled workers.

Table 3.4.18: Sample Characteristics (UNRWA)

Variable	Not W* Number	W %
Total	200	**100**
Age (years)		
15-24	53	**26.8**
25-34	96	**48.3**
35-44	42	**19.3**
≥45	9	**5.6**
# Children		
0	0	**0.0**
1-3	109	**56.7**
4-6	61	**28.7**
≥7	30	**14.6**
Education (Women)		
Illiterate**	9	**4.4**
1-6 years	37	**25.3**
7-12 years	124	**62.0**
≥13	30	**8.3**
Education (Husband)		
Illiterate	11	**6.6**
1-6 years	43	**26.9**
7-12 years	110	**50.7**
≥13	36	**15.7**
Employment		
Yes	8	3.4
No	189	96.6
Occupation*		
Professionals	16	**5.4**
Skilled Workers	8	**2.5**
Housewives	176	**92.2**

* Weighted

** Roughly those with zero years of schooling were considered illiterate

*** Refer to page 16 for definitions of occupational categories.

3.4.3.3 Family Planning Variables

Table 3.4.19: Prevalence of Family Planning Methods (UNRWA)

Modern Methods		Traditional Methods	
Type	**%**	**Type**	**%**
IUDS	37.7	Breastfeeding	10.8
Pills	15.1	Withdrawal	1.9
Condoms	9.2	Abstinence	5.4
Injectables	0.8	**Any Traditional Method**	**17.3**
Female Sterilization	2.5		
Vaginal Methods	0.2		
Any Modern Method	**65.5**	**Using Any Method**	**82.8**

Table 3.4.19 shows the prevalence of contraceptive use for various methods. Overall 82.8% reported using any method of family planning. The prevalence of using any modern method was 65.5%. The use of any traditional method at 17.3% instead of 18.1 is not a rounding problem but rather because few cases reported using breastfeeding and withdrawal or abstinence at the same time.

The above figure for use of modern contraceptives was higher than that reported by Hifa H. Madi.* at about 49% in 2000. Most of the difference came from the higher use of IUDS in the current study.

The use of **IUDs** had the highest prevalence rate at about 37.7% with implants and male sterilization (not shown in the table) the lowest at zero prevalence. The figure was found higher than that of MoH at 31.6%.

The use of **Pills** was the second highest at a rate of 15.1%, close to the MoH figure at 14.3%.

The use of **Condoms** was the third highest with 9.2%, a figure almost double that of the MoH at 5.1% and much greater than the national figure reported by the 1999 JAFS at only 1.3%.

The use of **Injectables** were reported in less than 1% compared to 1.8% among MoH respondents and 0.6% in 1999 JPFHS.

The use of **Female Sterilization** was found to be 2.5%, higher than the MoH at 1.2%, but still much lower than the 1999 JAFS results at 4.4%.

The use of **Vaginal Methods** were reported at the very low rate of 0.2%, consistent with MoH findings.

The use of **Implants** and **Male Sterilization** was found to be zero, consistent with MoH and 1999 JAFS.

The use of **Breastfeeding** was reported to be at 10.8% which was higher than that of the MoH overall national figure of 7.9%.

* Hifa H. Madi. Current Contraceptive Practices Among Mothers of Children 0-3 Years Attending UNRWA MCH Clinics (A Follow-up Study)

The prevalence of **Withdrawal** at 1.9% was lower than MoH at 4.8%.

Finally, the use of **Abstinence** was reported at 5.4% compared with the 3.3% at MoH

The ranking for most of the used methods was consistent in UNRWA and MoH samples, the figures for the first three modern methods accounted for most of the difference between the two providers. Again the higher prevalence rate of using modern contraceptive method use at 65.5% compared with only about 40% in the last JAFS in 1999, is a reflection of the design. Women were selected from health centers that provide MCH services with very high postnatal care and marketing of family planning methods. This can not be compared with a national household community based survey.

3.4.3.4 Source of Family Planning Methods

Table 3.4.20: Source of Family Planning Methods (UNRWA)

Source	Count	Weighted %
This Health Center	82	**75.2**
Another Provider	43	**24.8**

Table 3.4.20 shows that the source of contraceptive methods from the surveyed health center was about 75% of cases compared to only 39% at the MoH facilities. This fact points further to the cause of the high prevalence rate of using modern methods UNRWA facilities. The more readily available service at the surveyed UNRWA centers would probably result in more women of child bearing age using family planning methods visiting the center at any time.

Table 3.4.21: Source of The Top Three Modern Methods of Family Planning (UNRWA)

Source	Method		
	IUDs	Pills	Condoms
This HC	67.2%	92.4%	86.3%
Another Provider	32.8%	7.6%	13.7%

Table 3.4.21 shows the breakdown of source for the top three modern methods. The source was the local health center for over two thirds of IUDs users and about 90% of pills and condom users which explains the high prevalence rate of modern method use at UNRWA facilities.

3.4.3.5 Difficulties Getting Family Planning Methods

Table 3.4.22: Type of Difficulties (UNRWA)

Difficulties	N	Weighted %
Complications and side effects	13	**50.7%**
Provision not on daily basis	4	**28.3**
Male Provider	2	**15.5**
Non Availability	1	**5.5**
Total	20	100

Overall only 20 women out of the total of 125 (16%) reported difficulties in using family planning methods. Complications and side effects were noted in 50.7% of the Cases. Having a male provider was considered an obstacle in 15.5% of cases while this was not reported by women in the MoH sample.

3.4.3.6 Family Planning Methods in Health Centers

Table 3.4.23: Availability of FP Methods in Health Centers (UNRWA)

Method of FP	No. of HCs Offering the method	Not W %	W %
Pills	8	100	100
Condoms	8	100	100
IUDs	8	100	100
Vaginal Methods	6	75	86.6
Norplant	0	0	0
Injectables	0	0	0
LAM	0	0	0

The number of health centers was small (8) but they represent over 60% of UNRWA centers with MCH services. As shown in table 3.4.23, pills, condoms and IUDs were available in all 8 centers. Vaginal methods came next at about 87%. Norplant, injectables and LAM were not available in any of the surveyed health centers. Despite the 100% availability of pills and condoms, their use remained limited although a little better than that of MoH.

Table 3.4.24: Frequency of IUD Insertion and Sex of Physician (UNRWA)

Variable		No. of HCs	Not W %	W %
Frequency of IUD Insertion	Daily	2	25	32.9
	Three times a Week	4	50	42.1
	Twice a Week	1	12.5	22.7
	Once a Week	1	12.5	2.3
Phys. Sex	Male	7	87.5	69.7
	Female	1	12.5	31.3
Total		33	100	100

IUDs were available in all the surveyed centers and the frequency of offering them was quite acceptable. It was quite surprising to see that about 70% of IUD insertion was done by male physicians, which is the opposite of MoH. This explains why some women in UNRWA centers complained of male physicians being providers. Nevertheless, the use rate of IUDs in UNRWA (37.7%) was better than that of MoH (29.2%) and the proportion of women getting the service at the surveyed center was much higher at 67.2% compared with 19.1% in MoH facilities.

Appendix 3.4

Table A3.4.1: Listing of Variables and Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Region and Stratum	892	**0.00%**	NA	NA
Type of Health Center	892	**0.00%**	NA	NA
Age	889	**0.34%**	200	0.00%
Number of Children	892	**0.00%**	200	0.00%
Employment	886	**0.68%**	197	1.50%
Occupation	892	**0.00%**	200	0.00%
Woman's Years of Schooling	892	**0.00%**	200	0.00%
Husband's Years of Schooling	892	**0.00%**	200	0.00%
Family Planning	892	**0.00%**	200	0.00%

Table A3.4.2: Mean Age by Region (MoH)

Region	Mean Age	95% CI	
		Lower	Upper
North	29.93	29.28	30.59
Central	30.82	30.19	31.46
South	30.75	29.53	31.96
National	**30.50**	**30.07**	**30.94**

Table A3.4.3: Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
15-24	57	17.6	66	19.6	39	14.8	162	**18.4**
25-34	193	59.3	167	46.6	121	61.4	481	**52.5**
35-44	71	20.8	103	28.4	46	21.6	220	**25.1**
≥45	8	2.2	12	5.3	6	2.3	26	**3.9**
Total	329	100.0	348	100.0	212	100.0	889	100

Table A3.4.4: Mean Number of Children (MoH)

Mean	North	Center	South	National
Number of male children	2.12	2.02	2.10	**2.06**
Number of female children	2.07	1.86	2.18	**1.97**
Total number of children	4.20	3.88	4.28	**4.03**

Table A3.4.5: Woman's Mean Years of Schooling by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**10.51**	10.14	10.88
Central	**10.08**	9.74	10.42
South	**9.68**	8.74	10.61
National	**10.19**	9.95	10.44

Table A3.4.6: Educational Categories for Women by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	**%**
Illiterate	10	2.5	12	2.7	30	8.0	52	**3.1**
1-6 years	36	9.9	51	16.9	31	14.8	118	**14.2**
7-12 years	219	65.3	210	57.1	111	55.7	540	**59.9**
≥13	65	22.3	77	23.3	40	21.6	182	**22.8**
Total	330	100	350	100	212	100	892	**100**

Table A3.4.7: Husband's Mean Years of Schooling by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**10.83**	10.46	11.20
Central	**10.96**	10.62	11.30
South	**9.90**	9.15	10.64
National	**10.81**	10.57	11.05

Table A3.4.8: Educational Categories for Husbands by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	**%**
Illiterate	3	0.6	9	2.7	12	4.6	24	**2.1**
1-6 years	35	9.6	40	10.6	22	9.2	97	**10.1**
7-12 years	215	68.2	200	55.9	155	74.7	570	**62.1**
≥13	77	21.7	101	30.8	23	11.5	201	**25.7**
Total	330	100	350	100	212	100	892	100

Table A3.4.9: Employment by Region (MoH)

Employment	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	**%**
Employed	38	11.3	52	13.6	46	21.3	136	**13.9**
Not Employed	283	86.8	294	86.2	166	78.7	743	**85.3**
Retired	5	1.9	2	0.2	0	0.0	7	**0.8**
Total	326	100	348	100	212	100	886	100

Table A3.4.10: Prevalence of All Methods of Family Planning by Region (MoH)

Method	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
IUDS	86	27.1	112	31.6	45	23.0	243	**29.2**
Pills	44	13.3	50	14.3	27	13.6	121	**13.9**
Condoms	25	6.4	19	4.1	15	8.0	59	**5.3**
Injectables	7	2.5	6	1.2	8	2.3	21	**1.8**
Female Sterilization	5	2.2	2	0.4	3	2.3	10	**1.2**
Male Sterilization	0	0.0	0	0.0	0	0.0	0	**0.0**
Diaphragm, Jell, Foam	2	0.3	0	0.0	2	1.1	4	**0.2**
Norplant	0	0.0	0	0.0	0	0.0	0	**0.0**
Breastfeeding	37	8.9	40	7.1	24	8.0	101	**7.9**
Withdrawal	28	7.6	16	3.1	8	4.6	52	**4.8**
Abstinence	14	4.5	13	1.8	18	6.9	45	**3.3**
Total	248	72.7	258	64.2	150	69.9	656.	**67.5**

Table A3.4.11: Available Methods of Family Planning by Region (MoH)

Method	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Pills	33	100	35	100	21	100	89	**100**
Condoms	33	100	32	93.5	20	95	85	**95.9**
IUDS	11	35	17	54.5	5	27.7	33	**45.0**
Injectables	13	44.5	16	47	16	84	45	**49.7**
LAM	10	40.1	2	2.1	8	56.4	20	**20.8**
Diaphragm, Jell, Foam	0	0	1	3.5	0	0	1	**1.9**

Table A3.4.12: Mean Age, Number of Children and Years of Schooling (UNRWA)

Variable	Mean	95% CI	
		Lower	Upper
Age in Years	**29.19**	28.88	29.49
Number of Male Children	**1.93**	1.88	1.99
Number of Female Children	**1.90**	1.82	1.98
Number of All Children	**3.96**	3.59	4.34
Women's Years of Schooling	**9.02**	8.87	9.17
Husband's Years of Schooling	**9.07**	8.89	9.24

3.5 Screening for Hypertension

3.5.1 Summary

This section aims at studying the current practices of screening those aged 40 or above for hypertension. Hypertension is a highly prevalent disease in Jordan. The Jordan Morbidity Survey of MoH in 1996 pointed to an overall 32% prevalence of hypertension in those aged 25 years and above. The disease is the best example of secondary prevention. Screening for hypertension is a simple procedure applied to a prevalent disease with serious complications that are easily prevented by the availability of very effective treatment schedules once the disease is discovered.

A total of 884 individuals at 89 MoH health centers and 200 individuals at 8 UNRWA health centers aged 40 years and above and who were not known hypertensives were studied. Data was collected form the study subjects through exit interview and record review. The patient was considered screened for hypertension when the blood pressure (BP) was checked and recorded at the day of the survey or at least one time during visits to the center over the last year.

Table 3.5.1: Screening for Hypertension

Screening / Group	Yes %	No %
MoH (Intervention)	**37.1**	62.9
UNRWA (Control)	**81.7**	17.3

When questioning MoH patients whether their BP was checked on the day of the study, 26.6% replied positively, but reviewing their records showed that only 15.2% had their BP checked and documented. Furthermore, the number of times the patient visited the health center in the past year and how many times his/her BP was checked and recorded were examined. It was found that 36.6% of all patients had their BP checked at least once over the last year. Adding recorded BP of the survey day to last year's results did not affect the overall screening indicator which was about 37% (Table 3.5.1).

The above figures were found to be consistent irrespective of the type of the health center, region, sex, age and education. This fact reflects the presence of two general problems, one is related to documentation in the patient's chart and the other pertains to the practice of screening for hypertension. The simplicity of the procedure, the high expected yield and the importance of controlling hypertensive patients should definitely urge both PHCI and MoH to take immediate steps to solve the discrepancy.

3.5.2 Ministry of Health

3.5.2.1 Introduction

Please note that all tables with A3.5.x numbering appear in Appendix 3.5 at the end of this section, otherwise tables are incorporated in the text.

This study aims at studying the current practices regarding screening for hypertension by MoH physicians in primary health care settings.

Hypertension is a prevalent disease in Jordan. According to the Jordan Morbidity Survey of MoH in 1996, about 40% of those aged 40 and above were hypertensives. Furthermore, the study showed that only about 25% of the study population were aware of the disease. Screening for hypertension is a simple procedure applied to a prevalent disease with serious complications that are easily prevented by the availability of very effective treatment schedules once the disease is discovered.

The study population was non-hypertensive adults aged 40 years and above of both sexes attending health centers. Data was collected through a cross-sectional exit interview study and review of patient's files over the last year using the tool shown in annex 5.

The patient was considered screened for hypertension when the medical file showed that blood pressure was recorded at least once over the last year including the day of the survey. To look for the discrepancy between checking BP and recording the result in the patient's file, the data collected on the day of the survey was used. The patient was first asked about checking his BP and the response was compared with what was recorded in the medical file.

Data was collected from a total of 884 individuals in 89 health centers. In some health centers the overall number of non-hypertensive individuals aged 40 years and above did not reach the desired number of 10. No missing values were noted for any of the collected variables (TableA3.5.1).

All counts are displayed as unweighted, while means and proportions are presented as weighted values to fit the design. Expansion weight was used for analysis at the stratum level while relative weight was used for regional as well as health center type levels.

3.5.2.2 Background Variables

Table 3.5.2 shows the overall description of the sample. About 45% of the respondents came from the central region, 38% from the north and 17% form the south. About 31% of the patients came from CHCs and 69% from PHCs.

The mean age of respondents was about 53 years and the median 50 with a minimum of 40 and a maximum of 95 years. About 46% of the patients were in the age group 40-49 and about 10% were 70 years of age or older. Tables A3.5.2 and A3.5.3 show details of age by region. The age structure in the regions was more or less similar with mean age in the north 2 year higher than the south (F=4.5, p=0.012)

The male/female ratio was 2:3 due to more availability of adult females at the health centers than males which was expected taking into account the structure of the Jordanian society with the male being the paterfamilias and spending his day time at work. Table A3.5.4 shows that the distribution of sex by region was found to be similar ((χ^2 = 2.9, p= 0.23).

Table 3.5.2: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	884	**100**
Region		
North	350	**37.5**
Central	334	**45.2**
South	200	**17.3**
Stratum		
Central CHCs	110	**18.5**
North CHCs	53	**4.8**
South CHCs	49	**7.5**
Central PHCs	235	**28.9**
North PHCs	287	**30.5**
South PHCs	110	**18.5**
Total CHCs	208	**30.7**
Total PHCs	671	**69.3**
Sex		
Male	322	**39.8**
Female	562	**60.2**
Age Groups		
40-49	410	**46.3**
50-59	240	**26.9**
60-69	148	**16.9**
≥70	86	**9.9**
Education		
Illiterate**	400	**43.2**
1-6 years	182	**19.9**
7-12 years	220	**25.8**
≥13	82	**11.1**

* Weighted
** Only those with zero years of schooling

Mean years of schooling was about 5 years ranging form 4.5 at the south and going up to 5.5 years in central region (Table A 3.5.5). The differences among regions were not found to be of significant importance (F=2.5, p= 0.08). As shown in table A 3.5.6. about 43% of all respondents were illiterate. This fact explains the low mean of years of schooling. The high illiteracy rate among patients in our sample is mainly due to the age structure and having more females who have lower education level. The mean years of schooling for males was 7.5 as opposed to 3.5 years for females (t=11.3, p<000).

3.5.2.3 Checking And Recording BP During the Survey Day

Table 3.5.3: Checking BP by Region

BP Checked	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	86	**26.7**	88	**26.6**	40	**25.8**	214	**26.5**
No	264	73.3	246	73.4	160	74.2	670	**73.5**
Total	350	100	334	100	200	100	884	100

Overall 26.5% of patients aged 40 years and more who were not known to be hypertensives reported their BP being checked during the survey (Table 3.5.3).
No significant difference was noted when comparing the three regions, (χ^2 =0.04, p=0.98).

Table 3.5.4 shows almost identical BP checking practices at CHCs compared with PHCs (χ^2 = 0.008, p=0.93) pointing to no superiority of CHCs in this regard.

Table 5.3.4: Checking BP by Type of HC

BP Checking	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	51	**26.4**	163	**26.6**	214	**26.5**
No	162	73.6	508	73.4	670	73.4
Total	213	100	671	100	884	100

Table A3.5.7 shows the differences in checking BP in the six strata. The lowest rate of checking BP was reported from the southern PHCs at 18.3% and the highest at 32.3% for southern CHCs.

Table 3.5.5: Recording of BP by Region

BP Recorded	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	65	**19.1**	45	**13.5**	22	**11.0**	132	**15.2**
No	285	80.9	289	86.5	178	89.0	752	84.8
Total	350	100	334	100	200	100	884	100

While 26.5% of the patients reported that their BP was checked, only 15.2% had their BP recorded in the files (Table 3.5.5).
Recording BP was found to be the highest in the northern region at 19.1%, which was significantly higher than the other two regions (χ^2 = 6.9, p= 0.03).

Table 3.5.6: Recording BP by Type of HC

BP Checking	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	30	**13.0**	102	**16.1**	132	**15.2**
No	183	87.0	569	83.9	752	84.8
Total	213	100	671	100	884	100

Table 3.5.6 shows better performance of PHCs at about 16% of BP recording compared with only 13% at CHCs. However, this difference was not found to be significant (χ^2 = 1.4, p=0.24) .

Table A3.5.8 shows recording BP at the stratum level where the north PHCs were the highest at 22.7% and south PHCs the lowest at only 8.6% The differences at stratum level were not consistent in any direction regionally or by type of health centers.

It is worth mentioning that expectations were in favor of CHCs, but this did not happen simply because CHCs do not provide much more advanced services than PHCs.

Table 3.5.7 demonstrates the agreement between BP checking and recording. In 43% of those having their BP checked, the treating physician failed to record it.

Table 3.5.7: Agreement Between Checking and Recording BP

BP Checking	BP Recording				Total	
	Yes		No			
	N	%	N	%	N	%
Yes	132	**57.4**	82	**42.6**	214	100
No	0	0.0	670	100.0	670	100
Total	132	**15.3**	752	84.7	884	100

3.5.2.4 Recording Blood Pressure During the Last Year

Table 3.5.8 : Recording BP At least Once Over the Last Year by Region

BP Recorded Once	Regions						National	
	North		Central		South			
Yes	128	**39.7**	92	**35.8**	47	**30.7**	267	**36.5**
No	212	60.3	196	64.2	120	69.3	528	63.5
Total	340	100	288	100	167	100	795	100

Recording blood pressure during the last year did not include data on the day of the survey. After excluding 89 patients who did not visit the health center over the last year, table 3.5.8 shows that 36.5% of the sampled individuals had their BP checked and recorded at least once over the last year. Despite the fact that the southern region showed the lowest rate of BP recording at about 31% compared with the north at almost 40%, difference was not significant (χ^2 =3.36 , p=0.19).

Table 3.5.9: Recording BP At least Once Over the Last Year by Type of HC

BP Recording	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	68	**38.8**	199	**35.7**	267	**36.5**
No	123	61.3	405	64.3	528	63.4
Total	191	100.0	604	100.0	795	100

The previous argument of lack of difference by type of health center in checking and recording the BP of the survey day holds true for recording BP over the past year. (χ^2 = 0.67 , p=0.41).

5.3.2.5 Overall Screening Indicator for Hypertension

Based on the results of recording the BP on the survey day and during the last year, a composite indicator of screening for hypertension for those aged 40 years and above was calculated. If BP was checked and recorded on the day of the survey or was recorded at least once over the last year, the patient was considered screened.

Table 3.5.10: Screening for Hypertension by Region

Screening	Regions						National	
	North		Central		South			
Yes	139	**40.6**	113	**36.8**	57	**30.3**	309	**37.1**
No	211	59.4	221	63.2	143	69.7	575	62.9
Total	350	100	334	100	200	100	884	100

Table 3.5.10 shows that overall about 37% of the sampled subjects were screened for hypertension at least once over the last year. As expected the differences among regions were not significant (χ^2 =4.8 , p=0.09). It is clear that adding the results of the day of the survey when physicians were alert of the study to the last year recordings did not change much. The overall screening prevalence based on recording BP measurements over the last year was 36.5%, while adding the day of survey increased it only to 37.1%.

Table 3.5.11: Screening for Hypertension by Sex

Screening	Male		Female		Total	
	N	%	N	%	N	%
Yes	104	**36.6**	205	**37.4**	309	**37.1**
No	218	63.4	357	62.6	575	62.9
Total	322	100	562	100	884	100

Table 3.5.11 probes into the screening prevalence by sex. It is clear that there was no difference between screening males and females (χ^2 = 1.57, p= 0. 21).

Table 3.5.12: Screening for Hypertension by Age Groups

Age Groups	Screening for Hypertension				Total	
	Yes		No			
	N	%	N	%	N	%
40-49	118	**31.0**	292	69.0	410	100
50-59	90	**43.0**	150	57.0	240	100
60-69	64	**42.3**	84	57.7	148	100
≥70	37	**41.4**	49	58.6	86	100
Total	309	**37.1**	575	62.9	884	100

When looking at screening practices by age as shown in table 3.5.12, it is evident that less patients were screened in the lowest age group, less than 50 years of age. The latter was significantly lower than other older age groups (χ^2 =12.65 , p= 0.006).

Table 3.5.13: Screening for Hypertension by Educational Level

Educational Level	Screening for Hypertension				Total	
	Yes		No			
	N	%	N	%	N	%
Illiterate	150	**37.2**	250	62.8	400	100
1-6 years	62	**36.2**	120	63.8	182	100
7-12 years	74	**40.5**	146	59.5	220	100
≥13	23	**30.9**	59	69.1	82	100
Total	309	**37.1**	575	62.9	884	100

In trying to see whether the educational level of the patient might have influenced the physician screening practice, table 3.5.13 points to some differences in different educational level. Nevertheless, the differences were not substantial to lead to statistical significance (χ^2 =2.8 , p= 0.43).

3.5.3 UNRWA

3.5.3.1 Introduction

The same tool for MoH was used to collect UNRWA data. Both sets of data were compared not for the sake of comparison itself but to determine how close the control and intervention sites were to each other especially regarding the main dependent variable under study.

A total of 200 patients were selected from 8 UNRWA health centers. Missing value were absent for all variables (Table A3.5.1) . Data will be weighted using the expansion weight only since no stratification was used.

3.5.3.2 Background Variables

Table 3.5.14: Overall Sample Characteristics (UNRWA)

Variable	Not W* Number	W %
Total	200	**100**
Sex		
Male	59	**27.7**
Female	141	**72.3**
Age Groups		
40-49	71	**38.4**
50-59	62	**31.7**
60-69	49	**21.8**
≥70	18	**8.1**
Education		
Illiterate**	90	**38.6**
1-6 years	62	**35.3**
7-12 years	39	**20.4**
≥13	9	**5.7**

* Weighted

** Only those with zero years of schooling

Description of the UNRWA sample is displayed in table 3.5.14. About 28% of the sample were males. The male/female ratio was about 1:3, compared with a ratio of 2:3 at MoH facilities. It was a consistent finding to have more females at UNRWA facilities than MoH.

The mean age of about 54 was close to the mean age of the MoH sample of 52.6 years. Age structure was not substantially different from that of MoH .

The average years of schooling was 4.25 years . The latter was more or less similar to MoH data at about 5 years. The illiteracy rate was 38.6%, which stresses further the closeness to MoH data.

3.5.3.3 Variables Related to Screening for Hypertension

Table 3.5.15: Screening for Hypertension Variables (UNRWA)

Variable	Response					
	Yes		No		Total	
	N	%	N	%	N	%
Checking BP during survey	105	**51.0**	95	49.0	200	100
Recording BP during survey	100	**47.4**	100	52.6	200	100
Recording BP once last year	156	**79.2**	39	20.8	195	100
Overall Screening	165	**81.7**	35	18.3	200	100

The frequency of checking BP was 51% of the target age group attending the health center during the survey day. The figure is almost double that of the MoH at 26.5%

The checked BP was recorded in 47.4% of the target group. The figure is almost triple that of MoH at 15.2. About 93% of those who reported their BP checked were found to have it recorded.

When analyzing the practice of screening over the last year, it was found that over 79% of target subjects had their BP checked and recorded blood pressure at least once over the last year. Again the latter figure is much higher than that of the MoH at 36.5%.

It was not surprising to find the overall practice of screening for hypertension over one year to be at about 82%.

The observed great difference between MoH and UNRWA practices in screening for hypertension will affect the design. Nevertheless, one can probe further into causes of such difference and try to apply the UNRWA model to improve the current practices at MoH. It is worth mentioning that picking up more hypertensives through screening at UNRWA was also associated with better management of cases as judged by the 16.6% of hypertensives have their blood pressure controlled as compared to MoH at only 11%(Section 3.9).

Appendix 3.5

Table A3.5.1 Listing of Variables and Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Region and Stratum	884	**0**	200	0
Type of Health Center	884	**0**	200	0
Age	884	**0**	200	0
Sex	884	**0**	200	0
Years of Schooling	884	**0**	200	0
Checking of BP on the Survey Day	884	**0**	200	0
Recording of BP on the Survey Day	884	**0**	200	0
Total Number of Visits Over the Last Year	884	**0**	200	0
Number of Times BP Was Recorded Over the last Year	884	**0**	200	0

Table A3.5.2: Mean Age by Region (MoH)

Region	Mean Age	95% CI	
		Lower	Upper
North	53.69	52.50	54.87
Central	52.63	51.68	53.59
South	50.66	48.96	52.37
National	**52.68**	**51.99**	**53.37**

Table A3.5.3: Distribution of Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
40-49	143	42.9	155	45.5	112	55.5	410	**46.3**
50-59	112	30.2	83	25.8	45	22.6	240	**26.9**
60-69	53	14.5	69	21.0	26	11.6	148	**16.9**
≥70	42	12.4	27	7.8	17	10.3	86	**9.9**
Total	350	100	334	100	200	100	884	**100**

Table A3.5.4: Distribution of Sex by Region (MoH)

Gender	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	134	43.0	115	36.8	73	40.6	322	**39.8**
Female	216	57.0	219	63.2	127	59.4	562	**60.2**
Total	350	100	334	100	200	100	884	100

Table A3.5.5: Years of Schooling by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**4.96**	4.38	5.53
Central	**5.46**	4.91	6.01
South	**4.35**	3.54	5.16
National	**5.08**	4.72	5.43

Table A3.5.6: Educational Categories by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	164	44.8	136	39.3	100	49.7	400	**43.2**
1-6 years	72	18.2	75	23.1	35	15.5	182	**19.9**
7-12 years	86	26.4	82	25.1	52	26.5	220	**25.8**
≥13	28	10.6	41	12.5	13	8.4	82	**11.1**
Total	350	100	334	100	200	100	884	**100**

Table A3.5.7: Distribution of Checking BP by Strata During the Survey Day (MoH)

Strata	Yes		No		Total	
	N	%	N	%	N	%
Central CHC	26	**23.6**	84	76.4	110	100
North CHC	10	**19.6**	43	80.4	53	100
South CHC	14	**32.9**	35	67.1	49	100
Central PHC	63	**27.2**	172	72.8	235	100
North PHC	76	**30.6**	211	69.4	287	100
South PHC	25	**18.3**	125	81.7	150	100
Total	214	**26.8**	670	73.2	884	100

Table A3.5.8: Distribution of Recording BP by Strata During the Survey Day (MoH)

Strata	Yes		No		Total	
	N	**%**	**N**	**%**	**N**	**%**
Central CHC	15	**11.9**	95	88.1	110	100
North CHC	6	**11.9**	47	88.1	53	100
South CHC	7	**10.8**	42	89.2	49	100
Central PHC	31	**14.1**	204	85.9	235	100
North PHC	59	**22.7**	228	77.3	287	100
South PHC	14	**8.6**	136	91.4	150	100
Total	132	**15.2**	752	84.5	884	100

Table A3.5.9: Recording BP At least Once Over the Last Year by Stratum (MoH)

Strata	Yes		No		Total	
	N	%	N	%	N	%
Central CHC	40	**43.7**	59	56.3	99	100
North CHC	22	**40.4**	31	59.6	53	100
South CHC	9	**28.8**	30	71.2	39	100
Central PHC	53	**29.4**	143	70.6	196	100
North PHC	106	**41.6**	175	58.4	281	100
South PHC	37	**29.7**	90	70.3	127	100
Total	267	**36.5**	528	63.5	795	100

3.6 Anemia of Children

3.6.1 Summary

This section aims at studying the proportion of children aged 6 months to 2 years visiting health centers for monitoring growth and development and getting their hemoglobin checked and recorded at least once as well as determining the prevalence of anemia among those children.

Data on anemia came from the records on growth and development. A total of 867 children from 87 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers were chosen by systematic random sample from the population of children who registered for the service for the first time during the period 1/1-30/4/1997. Data was collected from the existing records where hemoglobin or packed cell volume results done at the age of 6-24 months were transformed by midwife data collector into a special form prepared for this purpose (Annex 2). Anemia was considered to be present when hemoglobin value was less than 11 g/dl. The data was weighted to satisfy the two stage stratified cluster sampling method using relative weight for MoH data and expansion weight for UNRWA data

Table 3.6.1: Prevalence of Anemia Among Children Aged 6-24 Months by Group

Group	Utilization of Hb Testing %	Hb Mean	Anemia %
MoH (Intervention	37.8	11.39	25.4
UNRWA (Control)	99	11.14	30

Out of the total of 867 records in 87 MoH facilities only 328 in 71 facilities had hemoglobin values recorded in their files. As shown in table 3.6.1 less than 38% of children aged 6-24 months in MoH facilities had their hemoglobin tested and documented. This unexpectedly small number of children affected further analysis, where data on anemia should be interpreted with caution in terms of representativeness and generalizability.

Almost one fourth of children with hemoglobin recorded were found to have hemoglobin less than 11g/dl and thus considered anemic. The highest prevalence of anemia was found in the north (31%) and the lowest in the central region (21%).

3.6.2 Ministry of Health

3.6.2.1 Introduction

Please note that all tables with A3.6.x numbering appear in Appendix 3.6 at the end of this section, otherwise tables are incorporated in the text.

Anemia of children is considered a common disease of children in Jordan. Nevertheless, national studies pointing to the national prevalence are lacking.

This section uses the same sample of records for growth and development visits (section 3.2) and aims at:

- Determining the proportion of children aged 6 months to 2 years visiting health centers for monitoring growth and development and getting their hemoglobin checked and recorded at least once (measure of utilization).
- Determining the prevalence of anemia among children aged 6-24 months (proxy measure of health status).

Data on anemia came from the records for growth and development. A total of 867 children from 87 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers were chosen by systematic random sample from the population of children who registered for the service for the first time during the period 1/1-30/4/1997. Data was collected from the existing records where hemoglobin or packed cell volume results at the age of 6-24 months were transcribed by midwife data collector into a special form prepared for this purpose (Annex 2). When more than one result was available, the test done when the child's age was closest to 12 months was chosen.

Hemoglobin value of 11g/dl was considered a cutoff point to determine the presence or absence of anemia according to WHO criteria. Anemia was classified further by severity: severe (less than 7 g/dl), moderate (7-10 g/dl) and mild (10-11 g/dl).

Table A3.6.1 shows the valid number and the percentage of missing values for records with valid hemoglobin data. The missing values for anemia variable itself comprised about 62.2% of all growth and development monitoring records(Table A3.6.2). This means that 37.8% % of children attending growth and development clinics had their hemoglobin checked and recorded at least once between 6-24 months of age. This piece of data shows how the figures of anemia reported by MoH are not representative of all children in the target age group.

Table A3.6.2 shows the distribution of missing values by region, where the north had 55% missing records followed by the center at 64.5% and the south at 70.5%. The distribution of missing values by stratum (Table A3.6.3) shows pronounced variations among strata with 32% for north CHCs and as high as 73.3% for south PHCs. Upon further analysis of the missing values at Governorate level, more pronounced variations were observed with Jarash having only 20% missing records and Mafraq having 97.5% missing. Over 18% (16 out 87) of health centers in the sample had no

single valid record on hemoglobin and about 27% of heath centers had 90% or more of missing values.

Having such a large proportion of records with missing data on hemoglobin can definitely affect the analysis especially when we know that 18% of the primary sampling units were missing from the analysis. If a separate sample for anemia of children other than that of growth and development was chosen, it would have solved only part of the problem. A sample of children with available hemoglobin values will not solve the issue since those who had no hemoglobin results might share certain characteristics affecting their anemia status.

Table 3.6.2: Missing Records for Hemoglobin by Appropriateness of Growth and Development Monitoring

Growth & Development Visits	Status of Hb Data				Total	
	Valid		Missing			
	N	%	N	%	N	%
Appropriate	103	**33.0**	65	**13.4**	168	21.3
Inappropriate	225	67.0	474	86.6	699	78.7
Total	328	100	539	100	867	100

The above idea is supported by the findings presented in Table 3.7.2. Those with valid values for Hb had 33% of their growth and development visits appropriate while the figure about 3 times less at 13.4% for those with missing values ($\chi^2 = 47$, $p < 0.0001$). One can conclude that children with missing values for hemoglobin are less frequent users of MCH services at MoH.

Nevertheless, there are a lot of other unavailable factors that can be shared by the low users of MCH services making them more or less anemic than the rest of MoH users thus affecting the overall picture of anemia among children.

From this point forward analysis will be restricted to 328 records with valid values for hemoglobin but still comparing these records with the missing records as appropriate. Furthermore, counts represent the unweighted values while means and proportion are calculated from weighted values using adjusted weight to account for the study design and missing values.

3.6.2.2 Background Variables

Table 3.6.3 gives an overall description of the sample characteristics. The representation of the south in regions and strata was found lower than expected not only because south had the highest figures of missing values but also because records had lower weight. Overall CHCs and PHCs were presented proportional to expected sizes

Males constituted about 55% of the selected children with no obvious differences among regions with χ^2 = 0.4 and p= 0. 8 (Table A3.6.4)

The mean age of screening for anemia 13.1 Months (95% CI:12.7-13.6). only 64.7% were screened between 9-15 months of age.

Literacy rate among mothers was 94.9% ranging from 99.2% in the north to 92.4% in the south. Literacy rate for fathers was 96 % ranging form 98.5% in the north to 93.9% in the center. Description of educational levels by region is presented in Tables A3.6.5 and A3.6.6.

Table A3.6.7 shows mean income by regions. The national income mean was 165.8 JDs ranging from 170.8 JDs in the north to 159.3 JDs in the south. The lowest reported income was 50 and the highest 1000. Table A3.6.8 shows that differences in the first four quintiles were small moving from 100 JDs for the first quintile and going only to 200 JDs for the fourth quintiles and having 90% of the respondents with less than 250 JDs a month. Table A3.6.9 shows the majority of respondents (66.2%) had income between 100 and 199 JDs. Only 6.5% were in the income category 300 JDs or more and 12.2% less than 100 JDs a month.

Table 3.6.3: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	328	**100**
Region		
North	148	**33.4**
Central	126	**54.1**
South	54	**12.5**
Stratum		
Central CHCs	46	**17.0**
North CHCs	34	**6.5**
South CHCs	18	**5.6**
Central PHCs	80	**37.1**
North PHCs	114	**26.9**
South PHCs	36	**6.9**
Total CHCs	98	**29.1**
Total PHCs	230	**70.9**
Sex		
Male	180	**54.8**
Female	148	**45.2**
Age of Screening		
<9 months	40	**10.5**
9-15 months	202	**64.7**
>15 months	86	**24.8**
Educational level (Mother)		
Illiterate	15	**5.1**
Less than Secondary	111	**36.5**
Secondary	115	**40.2**
Higher Education	55	**18.3**
Educational level (Father)		
Illiterate	12	**4.0**
Less than Secondary**	118	**39.7**
Secondary	115	**38.7**
Higher Education	52	**17.5**
Income		
<100 s	32	**12.2**
100-199	174	**66.2**
200-299	40	**15.1**
≥300	17	**6.5**

* Weighted

** Combines both elementary and secondary education.

3.6.2.3 Anemia of Children

Due to the large number of missing values for this variable, results should be interpreted with caution especially with levels less than national.

The mean hemoglobin for the overall national sample was 11.39 g/dl with small difference between the upper and lower 95% CI (Table 3.6.4). Differences in means of hemoglobin among regions were very small.

Table 3.6.4: Mean Hemoglobin (g/dl) by Region

Region	Mean Hb	95% CI	
		Lower	Upper
North	**11.32**	11.29	11.35
Central	**11.42**	11.39	11.44
South	**11.45**	11.41	11.49
National	**11.39**	11.37	11.40

Table A3.6.10 shows the results at the stratum level. The highest hemoglobin mean was at central CHCs (11.73 g/dl) and the lowest at northern PHCs (11.26 g/dl). Differences in means of strata were significant only for north CHCs and PHCs compared with others (F=95, p<0.0001).

Table 3.6.5: Distribution of Anemia by Region

Anemia	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	46	**33**	29	**20.9**	12	**25.9**	87	**25.4**
No	102	68.7	97	79.1	42	74.1	241	74.6
Total	148	100	126	100	54	100	328	100

Anemia defined as hemoglobin values less than 11g/dl was found in 25.4% of the national sample (Table 3.6.5). The highest prevalence of anemia was observed in the north at 33% and the lowest in the central region at 20.9%. The differences among regions were of statistical significance (χ^2 = 151, p< 0.0001). Figures coming from MCH reports of 1999 showed a lower overall prevalence at about 20% ranging from 9% to 46% in different governorates.

Table A.3.6.11 shows the distribution of anemia by stratum where central CHCs had the lowest rate of anemia at 16.7% and northern PHCs the highest at 32.7%

Overall 20.4% of the sample were found to have mild anemia with hemoglobin values between 10 and 11 g/dl. Those with moderate anemia between 7 and 10 g/dl constituted 5% of the sample (Table 3.6.6). No children with severe anemia were noted.

Table3.6.6: Distribution of Anemia by Severity

Severity of Anemia	Number	W %
Moderate	18	**5.0**
Mild	69	**20.4**
Absent	241	**74.6**
Total	328	100

When the mean hemoglobin was analyzed by type of health center it was found to be 11.55 and 11.28 for CHCs and PHCs respectively (F=2.4, p= 0.017).

Table 3.6.7 shows the comparison of the levels of anemia by type of health center. Anemia prevalence was generally better in CHCs 23% than in PHCs 26.6%.

Table 3.6.7: Distribution of Anemia by Type of HC

Anemia	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	22	**23.0**	65	**26.6**	87	**25.4**
No	82	77.0	159	74.1	241	74.9
Total	104	100	224	100	328	100

The mean hemoglobin for males and females was 11.28 and 11.48 g/dl respectively. Table 3.6.8 shows that males are more anemic at 28.6% compared with 20.6%.

Table3.6.8: Anemia Status by Sex

Anemia	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Yes	55	**28.6**	32	**20.6**	87	25.0
No	125	71.4	116	79.4	241	75.0
Total	180	100	148	100	328	100

No further analysis of anemia by income and education was done because the number of children goes down further by the missing values of these variables. We will still use the data on background variables for comparison of the pretest with posttest data.

3.6.3 UNRWA

3.6.3.1 Introduction

Data was collected from a total of 200 records. Table A3.6.1 shows the valid number of records for each variable. Only 2 (1%)of the growth and development records were lacking data on hemoglobin. Data on income and education does not appear in this section because UNRWA records do not have it. Data will be weighted using the expansion weight only since there was no stratification.

It is clear that utilization of MCH services for checking hemoglobin at least once for children aged 6-24 months in UNRWA facilities at 99% is almost three times higher than that of MoH at about 37.8%.

3.6.3.2 Background Variables

Sex of the child is the only available background variable. Table 3.6.8 shows that the distribution of sex was very similar to that of MoH with males constituting 47.7% of the respondents. Mean age of screening of children was 11,2 months. About 74% were screened during 9-15 months of age.

Table 3.6.8: Sex Distribution (UNRWA)

Sex	Count	Weighted %
Male	93	**47.7**
Female	107	**52.3**
Total	200	100.0

3.6.3.3 Anemia Variable

Mean hemoglobin for UNRWA sample was 11.14 g/dl with narrow 95% confidence interval. The minimum reported value was 7.8 g/dl and the maximum was 13.4 g/dl . The mean Hb concentration was less than that of MoH at 11.39 g/dl

Table 3.6.9: Mean Hemoglobin (UNRWA)

Mean Hemoglobin	95% CI	
	Lower	Upper
11.14	11.11	11.16

Table 3.6.10 shows that the prevalence of anemia was 30% which was again higher than that of MoH at 25.4%. More females (34.4%) were found to be anemic than males (26.2%)

Table3.6.10: Distribution of Anemia Status by Sex (UNRWA)

Anemia	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Yes	28	**26.2**	38	**34.4**	66	**30.0**
No	64	74.8	68	65.6	132	70.0
Total	92	100	106	100	198	100

Table 3.6.11 looks at the severity of anemia. Almost one third of the anemic children had mild anemia while the rest had moderate anemia. No severe anemia cases were reported.

Table 3.6.11: Distribution of Anemia by Severity (UNRWA)

Severity of Anemia	Number	W %
Moderate	22	**10.1**
Mild	44	**19.9**
Absent	132	**70.0**
Total	198	100

Appendix 3.6

Table A3.6.1: Listing of Variables and Missing Records For Records with Available Hemoglobin Data

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Sex	328	**0.00**	198	**0.00**
Monthly Income	263	**19.80**	NA*	NA
Mother's Education	296	**9.75**	NA	NA
Father's Education	297	**9.45**	NA	NA
Hemoglobin**	328	**0.00**	198	**0.00**
Total Number of Records with Hb	**328**		**198**	

*NA: Not applicable because UNRWA records do not have the required information.

** The number of anemia records as well as the total number of records was based on the growth and development monitoring records with valid hemoglobin results. Out of the total 867 records only 328 showed Hb results with almost 62.2% of missing values. For UNRWA, the total records were 200 and the response for hemoglobin was 198 with only1% missing values.

Table A3.6.2: Distribution of Respondents and Missing Values for Anemia Variable by Region Based on Growth and Development Records (MoH)

Respondents	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Valid	148	45.0	126	35.5	54.00	29.5	328	37.8
Missing	181	**55.0**	229	**64.5**	129.00	**70.5**	539	**62.2**
Total	329	100.0	355	100.0	183.00	100.0	867	100

Table A3.6.3: Distribution of Respondents and Missing Values for Anemia Variable by Stratum (MoH)

Strata	Valid Values		Missing Values		Total	
	N	%	N	%	N	%
Central CHC	46	41.8	64	**58.2**	110	100
North CHC	34	68.0	16	**32.0**	50	100
South CHC	18	37.5	30	**62.5**	48	100
Central PHC	80	32.65	165	**67.3**	245	100
North PHC	114	40.86	165	**59.1**	279	100
South PHC	36	26.7	99	**73.3**	135	100
Total	328	37.8	539	**62.2**	867	100

Table A3.6.4: Child's Sex by Region (MoH)

Sex	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	84	**56.8**	67	**53.2**	29	**53.7**	180	**54.9**
Female	64	**43.2**	59	**46.8**	25	**46.3**	148	**45.1**
Total	148	100	126	100	54	100	328	100

Table A3.6.5: Educational Level of Mothers by Region (MoH)

Educational Category	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	2	0.8	9	7.6	4	5.3	15	**5.1**
< Secondary	44	36.4	44	37.7	23	31.9	111	**36.5**
Secondary	59	44.8	43	39.8	13	30.8	115	**40.2**
> Secondary	24	17.9	18	14.9	13	31.9	55	**18.3**
Total	129	100	114	100	53	100	296	**100**

Table A3.6.6: Educational Level of Fathers by Region (MoH)

Educational Category	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	2	1.5	7	6.1	3	5.7	12	**4.0**
< Secondary	47	36.2	45	39.5	26	49.1	118	**39.7**
Secondary	60	46.2	41	36.0	14	26.4	115	**38.7**
> Secondary	21	16.2	21	18.4	10	18.9	52	**17.5**
Total	130	100	114	100	53	100	297	100

Table A3.6.7: Distribution of Mean Income by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**170.79**	144.99	196.58
Central	**163.49**	140.93	186.04
South	**159.31**	135.44	183.18
National	**165.83**	151.23	180.43

Table A3.6.8: Quintiles, 90 and 95 percentiles of Income (MoH)

Q_1	Q_2	Q_3	Q_4	90^{th} %	95^{th} %
100	120	150	200	250	396

Table A3.6.9: Income Categories by Region (MoH)

Monthly Income in JDs	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<100 s	10	**8.9**	15	**14.6**	7	**14.6**	32	**12.2**
100-199	80	**71.4**	61	**59.2**	33	**68.8**	174	**66.2**
200-299	15	**13.4**	20	**19.4**	5	**10.4**	40	**15.2**
≥300	7	**6.3**	7	**6.8**	3	**6.3**	17	**6.5**
Total	112	100	103	100	48	100	263	100

Table A3.6.10: Mean Hemoglobin (g/dl) by Stratum (MoH)

Stratum	Mean Hemoglobin	95% CI	
		Lower	Upper
Central CHC	**11.73**	11.70	11.76
North CHC	**11.54**	11.47	11.61
South CHC	**11.49**	11.42	11.55
Central PHC	**11.27**	11.25	11.30
North PHC	**11.26**	11.23	11.29
South PHC	**11.42**	11.36	11.47
Total	**11.39**	11.37	11.40

Table A3.6.11: Distribution of Anemia by Stratum (MoH)

Strata	Anemia					
	Yes		No		Total	
	N	%	N	%	N	%
Central CHC	9	**16.7**	37	83.3	46	100
North CHC	8	**25.5**	26	74.5	34	100
South CHC	3	**32.6**	15	67.4	18	100
Central PHC	20	**22.8**	60	77.2	80	100
North PHC	38	**32.7**	76	67.3	114	100
South PHC	9	**20.5**	27	79.5	36	100
Total	87	**25.0**	241	75.0	328	100

3.7 Anemia of Pregnancy

3.7.1 Summary

This section aims at studying anemia of pregnancy as well as utilization of hemoglobin testing during pregnancy. The prevalence of anemia among women in general and among pregnant women in particular is thought to be high in Jordan.

Data on anemia came from the same 840 MoH and 200 UNRWA records for the antenatal postnatal section. Subjects were chosen by systematic random sample from the population of pregnant women who had their first antenatal visit during the period from 1/1/-30/4/1999.

Data was collected from the existing records and transcribed by midwife data collector into a special form prepared for this purpose (Annex 3). The data was weighted to satisfy the two stage stratified cluster sampling method using relative and expansion weight for MoH data and expansion weight only for UNRWA data.

Overall, 739 out of the selected 840 (88%) records were found to have data on hemoglobin. The mean hemoglobin value was 11.6 g/dl for MoH clients and about 25% were found to be anemic (Table 3.8.1).

Table 3.7.1: Prevalence of Anemia Among Pregnant Women by Group

Group	Utilization of Hb Testing %	Hb Mean	Anemia %
MoH (Intervention	88	11.6	24.7
UNRWA (Control)	96.5	11.1	33.2

Anemia of pregnancy was found to be negatively associated with the level of education of both the pregnant herself and her husband.

Data failed to demonstrate any other statistically significant associations with age, stratum, region, type of the health center as well as income. These findings are partly explained by the more or less homogeneity of pregnant women attending antenatal-postnatal care at MoH facilities and by nutritional factors and iron supplementation.

3.7.2 Ministry of Health

3.7.2.1 Introduction

Please note that all tables with A3.7.x numbering appear in Appendix 3.7 at the end of this section, otherwise tables are incorporated in the text.

Anemia is considered a common disease of pregnant women in Jordan. The prevalence of anemia among women in general was reported by UNICEF* to vary from 10.5% during first trimester to 42.5% during the third trimester.

This section uses the same sample of records for antenatal-postnatal care (section 3.3) and aims at:

- Determining the proportion of pregnant women attending antenatal care who had their hemoglobin checked and recorded at least once during as a measure of utilization of hemoglobin testing
- Measuring the prevalence of anemia during pregnancy as a proxy measure of health status of women.

Data was collected from the same records that were used in section 3.3 on antenatal-postnatal visits. A total of 840 pregnant women from 88 MoH (intervention) health centers and 200 from 8 UNRWA (control) health centers were chosen by systematic random sample from the population of pregnant women records who had their first antenatal visit during the period from 1/1/-30/4/1999. Data was collected from the existing records where the last hemoglobin or packed cell volume result was transcribed by a midwife data collector onto a special form prepared for this purpose (Annex 2).

Hemoglobin value of 11g/dl was considered a cutoff point to determine the presence or absence of anemia according to WHO criteria. Anemia was classified further by severity; severe (less than 7 g/dl), moderate (7-10 g/dl) and mild (10-11 g/dl).

Table A3.7.1 shows the valid number and the percentage of missing values for each variable. It is worth mentioning that only 739 records had hemoglobin checked and reported during pregnancy. The missing values for the background variables in table A3.7.1 were restricted to the available anemia records. Income appeared only in 76% of cases while missing education data was less than 2.5%.

Tables A3.7.2 and A3.7.3 show the distribution of missing values of hemoglobin based on antenatal-postnatal records by region and stratum. Only 88% of women attending antenatal care got their hemoglobin checked and reported. The observed differences in the proportion of missing values were not found to be of statistical significance at both regional and stratum level with χ^2 =2.6 , p=0.27 and χ^2 =8 , p=015 respectively. This stresses the fact that missing values were distributed more or less at random with no special clustering. Taking into account the oversampling of

* Prevalence and determinants of anemia and iron deficiency anemia among Jordanian women 15-49 years of age. 1995-UNICEF.

health centers (89 centers instead of 45) and the absence of clustering of missing values for hemoglobin, the available 739 records are sufficient to make generalization at all levels.
From this point forward analysis will be restricted to 739 records with valid values for hemoglobin but still comparing these records with the missing records as appropriate. Furthermore, counts represent the unweighted values while means and proportion were calculated from weighted values using relative and expansion weight to account for the study design.

3.7.2.2 Background Variables

Table 3.6.2 summarizes the sample background variables. The mean age of subjects was about 26 years with a minimum of 16 and a maximum of 46 years (Table A3.7.4) The difference in mean age by region was not found to be significant (F=0.98, p= 0.38). The mean age of subjects with hemoglobin data was almost identical to the mean of those having missing values (t=0.2, p=0.84).

The majority of women (65.6%) were in the age group 20-29 while about 9% were below the age of 20 and less than 2% were above the age of 39 years. (Table A3.7.5).

Tables A3.7.6 shows the mean income by regions. The national mean of the sample income was 154. The lowest reported income was 30 and the highest 1100. There was no statistically significant difference of income means by region (F=0.84 and p=0.43). Table A3.7.7 shows that differences in the first four quintiles were small moving from 106 JDs for the first quintile and going only to 180 JDs for the fourth quintiles and having 95% of the respondents with less than 280 JDs a month. Table A3.7.8 shows that the majority of respondents (75.9%) had income between 100 and 199 JDs. Only 4.3% were in the income category 300 JDs or more and 8.4% less than 100 JDs a month. The above data indicates that attendants of MoH centers are mainly of low to middle income. Again no significant differences were found between respondents and non-respondents regarding income (t=1.6, p=0.12).

Literacy rate among the overall sample of pregnant women was 95.2% ranging from 96.6% in the north to 91.6% in the south. Literacy rate for spouses was 96.3% ranging form 97.2% in the north to 95.3% in the south. No statistically significant differences were noted between literacy rate of pregnant women and their spouses at the national and regional levels. Detailed description of educational levels is presented in Tables A3.7.9 and A3.7.10. Furthermore, no differences were found between respondents and non-respondents for the hemoglobin variable (for example χ^2 = 0. 72, p= 0.87 for women's education).

Table A.3.7.11 shows the income means by educational categories for both pregnant women and their husbands, the differential is evident but not quite large. The mean income was 130, 143, 153 and 179 for illiterate, less than secondary, secondary and higher education for pregnant women respectively. The difference between the lowest and the highest groups was less than 50 JDs.

Table 3.7.2: Overall Sample Characteristics

Variable	Not W* Number	W %
Total	739	**100**
Region		
North	283	**43.8**
Central	311	**41.5**
South	145	**14.7**
Stratum		
Central CHCs	101	**17.4**
North CHCs	47	**10.0**
South CHCs	31	**4.6**
Central PHCs	210	**24.1**
North PHCs	236	**33.8**
South PHCs	114	**10.1**
Total CHCs	179	**32.0**
Total PHCs	560	**68.0**
Age (years)		
<20	66	**8.8**
20-29	477	**65.6**
30-39	179	**23.6**
≥40	13	**1.9**
Income		
<100	47	**8.3**
100-199	423	**75.9**
200-299	65	**11.5**
≥300	27	**4.3**
Education (Pregnant)		
Illiterate	34	**4.8**
Less than Secondary**	226	**31.3**
Secondary	313	**43.9**
Higher Education	149	**20.0**
Education (Husband)		
Illiterate	26	**3.7**
Less than Secondary	281	**39.6**
Secondary	255	**35.3**
Higher Education	160	**21.4**

* Weighted

** Combines both elementary and secondary education categories.

3.7.2.3 Anemia of Pregnancy by Region and Type of HC

The mean hemoglobin for the overall national sample was 11.64 g/dl with a small difference between the upper and lower 95% CI (Table 3.7.3). The maximum reported hemoglobin was 15.6 and the minimum was 8 g/dl. Despite that the mean hemoglobin for the north was lower than the other two regions by less than 0.4 g/dl, the difference was statistically significant (F=6.96, p=0.001). No difference was noted between the central and southern regions in this regard.

Table 3.7.3: Mean Hemoglobin (g/dl) by Region

Region	Mean Hb	95% CI	
		Lower	Upper
North	**11.43**	11.3	11.55
Central	**11.75**	11.62	11.88
South	**11.8**	11.59	12.02
National	**11.62**	11.53	11.7

Table A3.7.12 shows the results at the stratum level. The highest hemoglobin mean was at southern CHCs (11.87 g/dl) and the lowest at northern CHCs (11.4 g/dl). Differences in means of strata were significant only for north CHCs and PHCs compared with others (F=32, p<0.0001). This difference was reflected at the regional level.

Anemia defined as hemoglobin values less than 11g/dl was found in about 25% of the overall records (Table 3.7.4). Some observed regional differences did not show significance (χ^2=5.13, p=0.08). In contrast differences at the stratum level were significant (χ^2=107, p<0.0001) with the central CHCs having the lowest percentage of anemics at 15.3% and the north PHCs having the highest percentage at 29.4% (Table A 3.7.13). The overall figure of anemia was close to that reported by MCH Directorate of MoH at about 23%.

Table 3.7.4: Distribution of Anemia by Region

Anemia	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Yes	80	**28.7**	70	**22**	29	**20.2**	179	**24.7**
No	203	71.3	241	78	116	79.8	560	75.3
Total	283	100	311	100	145	100	739	100

Overall 19.5% of the sample were found to have mild anemia with hemoglobin values between 10 and 11 g/dl. Those with moderate anemia between 7 and 10 g/dl constituted 5.2% of the sample. No pregnant women with severe anemia, less than 7 g/dl were observed.

Table 3.7.5 : Distribution of Anemia by Severity

Severity of Anemia	Number	W %
Moderate	33	**5.2**
Mild	146	**19.5**
Absent	560	**75.3**
Total	739	100.0

When the mean of hemoglobin was analyzed by type of health center it was found to be 11.7 and 11.6 for CHCs and PHCs respectively (Table 3.7.6) with no statistical significance (t=1, p=0.32).

Table 3.7.6: Mean Hemoglobin by Type of HC

Region	Mean Hb	95% CI	
		Lower	Upper
CHCs	11.68	11.53	11.82
PHCs	11.58	11.48	11.69
Total	11.62	11.53	11.70

The above argument remained valid when comparing the levels of anemia by type of health center(Table 3.7.7). Although the CHCs in general looked better at 20.6% anemic patients compared with 26.7%, the difference was not significant (χ^2 =3.3 , p= 0.07).

Table 3.7.7: Anemia by Type of HC

Anemia	Type of HC				Total	
	CHC		PHC			
	N	%	N	%	N	%
Yes	38	**20.6**	141	**26.7**	179	**24.7**
No	150	79.4	410	73.3	560	75.3
Total	188	100	551	100	739	100

3.7.2.4 Anemia of Pregnancy by Utilization of Antenatal Care

Table 3.7.8 shows the differences in anemia status among appropriate and non-appropriate users of antenatal care. The figures are close to each other concluding that anemic and non anemic women have the same rate of utilization of antenatal visits (χ^2 = 0.5, p= 0.48). The mean number of antenatal visits for the two groups was about 5 visits.

Table 3.7.8: Distribution of Anemia by Antenatal Care

Anemia	Appropriateness of Antenatal Visits				Total	
	Appropriate		Inappropriate			
	N	%	N	%	N	%
Yes	109	**25.6**	70	**23.2**	179	24.7
No	342	74.4	218	76.8	560	75.3
Total	451	100.0	288	100	739	100

As stated above missing records on hemoglobin were found to be randomly distributed over strata and region and had no associations with age, education or income. It was found that the mean number of antenatal visits for those with missing Hb values and valid Hb records was 2.46 and 4.84 visits respectively (t=-11.6, p<0.0001). Table 3.7.9 illustrates clearly that only about 3% of those using the antenatal care appropriately had missing Hb values while the inappropriate users had over 23% of hemoglobin data missing (χ^2 = 82.6, p<0.0001). This finding hints that

Table 3.7.9 : Missing Records for Hemoglobin by Appropriateness of Antenatal Visits

Antenatal Visits	Status of Hb Data				Total	
	Missing		Valid			
	N	%	N	%	N	%
Appropriate	15	**3.1**	451	96.9	466	100
Inappropriate	86	**23.4**	288	76.6	374	100
Total	101	11.7	739	88.3	840	100

missing values might be due to the fact that users did not take the test rather than that the providers did not ask for or did not record it.

The above findings of low utilization of antenatal care by those with missing Hb values point to the fact that this group might be different from the rest of the users of MoH services in their anemia status. Definitely, this fact will affect one way or another the overall picture of anemia during pregnancy. It is very difficult to predict the relationship depending on whether women go to other providers or not. Excluding pregnant women with risk factors (see section 2.4.2.3) might have affected the above figures of anemia during pregnancy.

Finally, failure to relate hemoglobin readings to the trimester of pregnancy might have affected the overall picture.

3.7.2.5 Anemia of Pregnancy by Background Variables

Table 3.8.10 shows no difference in the mean age of anemic and non-anemic being at about 26 years (t= 0.51, p=0.61).

Table 3.7.10: Anemia Status by Mean Age

Anemia	Mean Age	95% CI	
		Lower	Upper
Yes	26.40	25.60	27.20
No	26.16	25.70	26.62
Total	**26.22**	25.82	26.62

In analyzing the anemia status by age group, table 3.7.11 shows that women in the older category had the highest prevalence of anemia at almost 36%. Because the number of women in the older age category was small the observed difference was not of statistical significance (χ^2 =1.4 , p=0.71).

Table 3.7.11: Anemia Status by Age Groups

Anemia	Age Group							
	<20		20-29		30-39		≥40	
	N	%	N	%	N	%	N	%
Yes	15	**21.2**	114	**25.2**	45	**24.7**	5	**35.7**
No	51	78.8	363	74.8	134	75.3	8	64.3
Total	66	100	477	100	179	100	13	100

The monthly income means for anemic and non-anemic groups were about 144 and 155 JDs respectively. The 11 JDs higher income mean for non-anemic was not statistically significant (t=-1.67, p=0.095). This was expected since there was no noticeable income differences among respondents.

Pregnant women with higher education had the lowest rate of anemia at 15.9% that was statistically different from the other the categories (χ^2=8, p=0.045).

Table 3.7.12: Anemia Status by Pregnant's Education

Anemia	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	10	**26.5**	60	**28.6**	70	**24.8**	32	**15.9**
No	24	73.5	166	71.4	243	75.2	117	84.1
Total	34	100	226	100	313	100	149	100

Table 3.7.13 shows the status of anemia by educational level of the husbands. The results were consistent with those for women. While the prevalence of anemia in women with illiterate husbands was about 31%, it was just about 16% for women married to husbands with higher education (χ^2=8.7, p=0.034). It is quite evident that education irrespective of the income negatively influences the prevalence of anemia.

Table 3.7.13: Anemia Status by Husband's Education

Anemia	Educational Category							
	Illiterate		< Secondary		Secondary		Higher Education	
	N	%	N	%	N	%	N	%
Yes	7	**30.8**	64	**24.7**	70	**28.5**	31	**16.1**
No	19	69.2	217	75.3	185	71.5	129	83.9
Total	26	100	281	100	255	100	160	100

3.7.3 UNRWA

3.7.3.1 Introduction

Data was collected from a total of 200 records for antenatal visits . Table A3.7.1 shows the valid number of records for each variable. The missing values for age variable was absent based on the 193 records showing hemoglobin results. Based on the original antenatal records only 3.5% of hemoglobin data were missing. In other words 96.5% of pregnant women attending antenatal care had their hemoglobin checked and recorded. Data on income and education will not appear in this section because UNRWA records do not have it. Data will be weighted using the expansion weight only because no stratification was used.

3.7.3.2 Background Variables

Age of the women is the only available background variable. Table A3.7.14 summarizes the data on age groups. The mean age was found to be 25.7 with minimum of 16 and maximum of 43. Over 60% of women were in the age group 20-29 and very few (1.5%) were above the age of 40. The above age figures were not similar to those of MoH.

3.7.3.3 Anemia Variables

The mean hemoglobin concentration was found to be 11.1 g/dl with a minimum of 8.6 and a maximum 13.5 g/dl. Anemia was found in 33.2% of the sample (Table 3.7.14). The prevalence of mild anemia was about 25% and the moderate was 8%.

Table 3.7.14: Anemia Status (UNRWA)

Anemia	Count	Weighted %	Cumulative
Moderate	12	**8.0**	8.0
Mild	42	**25.2**	**33.2**
No Anemia	139	66.8	100.0
Total	193	100	

The mean hemoglobin was lower than that of the overall MoH at 11.6 g/dl. Furthermore, the prevalence of anemia was significantly higher than that of the MoH at 24.7% ($\chi^2 = 11.7$, p=0.0008).

Appendix 3.7

Table A3.7.1: Listing of Variables and Missing Records for Anemia of Pregnancy

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Income	562	24	NA*	NA
Age	735	0.5	200	0.00
Pregnant's Education	722	2.3	NA	NA
Husband's Education	722	2.3	NA	NA
Anemia**	739	0.00	193	0.00
Total Number of Records	739		193	

* Not Applicable to UNRWA records

** The number of anemia records as well as the total number of records was based on the antenatal records with hemoglobin results. Out of the total 840 antenatal records only 739 showed Hb results with almost 12% of missing values. For UNRWA, the antenatal records were 200 and the response for hemoglobin was 193 with only 3.5% missing values.

Table A3.7.2: Distribution of Missing Values for Anemia Variable Based on Antenatal-postnatal Records by Region (MoH)

Respondents	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Missing	47	**14.2**	36	**10.4**	18	**11.0**	101	**12.0**
Valid	283	85.8	311	89.6	145	89.0	739	88.0
Total	330	100	347	100	163	100	840	100

Table A3.7.3: Distribution of Missing Values for Anemia Variable Based on Antenatal-postnatal Records by Stratum (MoH)

Strata	Missing Values		Valid Values		Total	
	N	%	N	%	N	%
Central CHC	9	**8.2**	101	91.8	110	100
North CHC	3	**6.0**	47	94.0	50	100
South CHC	2	**6.1**	31	93.9	33	100
Central PHC	27	**11.4**	210	88.6	237	100
North PHC	44	**15.7**	236	84.3	280	100
South PHC	16	**12.3**	114	87.7	130	100
Total	101	**12.0**	739	88.0	840	100

Table A3.7.4: Distribution of Mean Age by Region (MoH)

Region	Mean Age	95% CI	
		Lower	Upper
North	**26.46**	25.88	27.03
Central	**26.24**	25.57	26.92
South	**25.67**	24.71	26.62
National	**26.25**	25.85	26.65

Table A3.7.5: Distribution of Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<20	21	7.1	32	10.8	13	8.3	66	**8.8**
20-29	191	68.4	190	61.3	96	69.4	477	**65.6**
30-39	65	22.6	82	25.6	32	21.3	179	**23.6**
≥40	5	1.9	6	2.3	2	0.9	13	**1.9**
Total	282	100	310	100	143	100	735	**100**

Table A3.7.6: Distribution of Mean Income by Region (MoH)

Region	Mean Y.S.	95% CI	
		Lower	Upper
North	**149.17**	138.94	159.39
Central	**157.83**	147.33	168.33
South	**158.40**	142.92	173.88
National	**154.34**	147.75	160.93

Table A3.7.7: Quintiles, 90 and 95 percentiles of Income (MoH)

Q_1	Q_2	Q_3	Q_4	90^{th} %	95^{th} %
106.4	130.0	150.0	180.0	200.0	280.0

Table A3.7.8: Income Categories by Region (MoH)

Monthly Income in JDs	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<100 s	15	6.27	21	10	11	11.8	47	**8.3**
100-199	189	81.18	157	71	77	71.1	423	**75.9**
200-299	21	9.59	35	13	9	13.2	65	**11.5**
≥300	8	2.95	13	6	6	3.9	27	**4.3**
Total	233	100	226	100	103	100	562	**100**

Table A3.7.9: Educational Level of Pregnant Women by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	10	3.4	14	5.1	10	8.4	34	**4.8**

< Secondary	84	30.2	95	32.3	47	31.8	226	**31.3**
Secondary	129	47.7	130	44.1	54	31.8	313	**43.9**
> Secondary	55	18.7	62	18.5	32	28.0	149	**20.0**
Total	278	100	301	100	143	100	722	**100**

Table A3.7.10: Educational Level of Husbands by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	8	2.8	11	4.4	7	4.7	26	**3.7**
< Secondary	106	39.4	115	38.6	60	43.0	281	**39.6**
Secondary	105	37.5	102	33.6	48	33.6	255	**35.3**
> Secondary	58	20.3	74	23.5	28	18.7	160	**21.4**
Total	277	100	302	100	143	100	722	**100**

Table A3.7.11: Income Means by Educational Categories (MoH)

Region	Mean Income Pregnant	95% CI		Mean Income Husband	95% CI	
		Lower	Upper		Lower	Upper
Illiterate	130.48	111.96	149.01	125.16	91.72	158.59
< Secondary	142.58	131.80	153.36	136.59	130.96	142.22
Secondary	152.66	145.19	160.13	153.24	144.61	161.88
Higher Education	178.85	164.19	193.52	190.95	173.71	208.19

Table A3.7.12: Mean Hemoglobin (g/dl) by Stratum (MoH)

Region	Mean Number of Visits	95% CI	
		Lower	Upper
Central CHC	**11.83**	11.77	11.89
North CHC	**11.4**	11.32	11.49
South CHC	**11.87**	11.72	12.02
Central PHC	**11.69**	11.63	11.75
North PHC	**11.43**	11.39	11.48
South PHC	**11.77**	11.7	11.84

Table A3.7.13: Distribution of Anemia by stratum (MoH)

Strata	Anemia					
	Yes		No		Total	
	N	%	N	%	N	%
Central CHC	17	15.3	84	84.7	101	100
North CHC	11	26.8	36	73.2	47	100

South CHC	6	21.0	25	79.0	31	100
Central PHC	53	26.9	157	73.1	210	100
North PHC	69	29.4	167	70.6	236	100
South PHC	23	19.5	91	80.5	114	100
Total	179	24.7	560	75.3	739	100

Table A3.7.14: Age Groups (UNRWA)

Age Groups	**Count**	**Weighted %**
<20	25	**12.50**
20-29	123	**61.50**
30-39	49	**24.50**
≥40	3	**1.50**
Total	200	**100.00**

3.8 Status of Diabetes Control

3.8.1 Summary

This section aims at studying the status of control of diabetes among users of MoH facilities. The relatively high prevalence of diabetes in Jordan in addition to the devastating complications dictate the urgent need to have a baseline data on diabetes control.

Data was collected from a total of 1190 diabetic individuals who were MoH service users in 89 health centers and 203 diabetics who were UNRWA users in 8 health centers. Data was collected from UNRWA users as a control group. The status of control of DM was based on glycosylated hemoglobin readings (HbA_{1c}) that reflect the control of the disease over the last 2-3 months. Background and other disease related variables were collected by interviewing subjects followed by drawing a blood sample for HbA_{1c} measurement.

Ranging from a few months to 30 years, the average duration of diabetes was 7 years. Over two thirds of the sample (70%) reported having diabetes for more than three years. The average BMI for the sample was found to be at the cutoff point (30.12 Kg/m^2). While 82% of the sampled diabetics were overweight or obese, significant difference was found between males and females in terms of obesity.

Table 3.8.1: Status of Control of Diabetes Mellitus

Group \ Status of Control	Good %	Fair %	Poor %
MoH (Intervention)	**35.7**	**21.2**	**43.1**
UNRWA (Control)	**17**	**21.9**	**61.1**

It is significant, and yet disturbing, to find that over 43% of the diabetics using MoH facilities were in the poor control category, meaning that they are more prone to develop complications for this very common disease in the country.

The central region had the lowest percentage of the poorly controlled (39.6%) followed by the southern region at 41.1% with the northern region having the highest at 48.2%. The higher proportion of poorly controlled in the north was of statistical significance. BMI, age, sex, employment status, did not seem to be associated with the status of control of DM while the mean duration of the disease was significantly higher and mean years of schooling was significantly lower in the poorly controlled.

Although the status of control was found to be associated with disease duration and years of schooling, other factors that were not included in this study might play a significant role in the control of diabetes. Example of such factors are knowledge of the disease, medication, family history, complications, status of physical activity and nutrition. Therefore, other studies of a more comprehensive nature are recommended.

3.8.2 Ministry of Health

3.8.2.1 Introduction

Please note that all tables with A3.8.x numbering appear in Appendix 3.8 at the end of this section, otherwise tables are incorporated in the text.

A mixture of health problems that is common in both developing and industrialized countries burdens the health care delivery system in Jordan. One of the most common chronic conditions prevailing in the Jordanian community is Diabetes.

The prevalence of diabetes mellitus in Jordan is relatively high. The National Morbidity Study showed that 14% of those above 25 and almost 25% of those above the age of 40 were diabetics. Ajlouni et al[*] reported a prevalence of 13.4% in a suburban community in Jordan. Various late complications of diabetes are directly affected by the status of control of the disease as was clearly indicated in the results of "Diabetes Control and Complications Trial" published in 1993[**]

This section aims at determining the status of control of diabetics among users of MoH facilities. Data was collected from a total of 1190 diabetic patient in 89 health centers using the questionnaire shown in annex 6.1. An additional form (Annex 6.2) was used for blood collection and recording the result of glycosylated hemoglobin. The expected number was 1157 with the intention to collect 13 records from each health center. Data collectors were asked to collect data from few additional persons whenever possible to account for possible loss of specimens. The additional 33 cases were spread all over the six strata. Furthermore, in few remote health centers data collectors did not manage to find the planned 13 persons so that shortages were filled by having the additional respondents from health centers with higher patient load. Table A3.8.1 shows the valid and missing number of records for each of the variables including the dependent (HbA_{1c}). A complete response for the main dependent variable (HbA_{1c}) was observed and less than 2.6% missing values for the rest of variables. The missing values for BMI was mainly due to exclusion of those under 18 years of age.

The following classification for the HbA_{1c} variable was used to determine blood sugar control levels:

- Good Control $\Rightarrow \leq 6.7\%$
- Fair Control $\Rightarrow$ 6.8%-7.6%
- Poor Control $\Rightarrow > 7.6\%$

Those falling under fair and good control were considered under controlled group leaving only the third category of poor control to the uncontrolled group.

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[*] Ajlouni K., Jaddou H., and Batieha A. (1998). Diabetes and impaired glucose tolerance in Jordan: prevalence and associated risk factors. J Intern Med 1998 Oct;244(4):317-23

[**] The trial was launched in 1981 by the National Institute of Diabetes, Digestive and Kidney Diseases

The **Body mass index (BMI)** was used to assess patients' status of obesity. Known for its simplicity, the index correlates to fatness and can be applied to both men and women. BMI was calculated using the conventional formula (weight*10,000 /height^2) where weight is in Kg and height in centimeters.

Table 3.8.2: Categories of BMI

Category	Value (Kg/m^2)
Underweight	<18.5
Normal	18.5-24.99
Overweight	25-29.99
Obesity I	30-34.99
Obesity II	35-39.99
Obesity III	≥40

BMI of 30 Kg/m^2 was considered the cutoff point between obesity and non-obesity. BMI of 25 Kg/m^2 was considered the cutoff point between normal and overweight. BMI was calculated for those who were above 17 years of age. Table 3.8.2 demonstrates the definition of the 6 categories of BMI. It is clear from the table that overweight and obesity are not mutually exclusive, since obese persons are also overweight

From this point forward the counts represent the unweighted values while means and proportions are calculated from weighted values using expansion and relative weights to account for the study design. Expansion weights were used with the analysis at the stratum level while relative weights were used for other levels that were larger than the stratum (national, regional etc.).

3.8.2.2 Background Variables

Numbers and percentages of respondents distributed by the three regions of Jordan and the six strata as well as other control variables are shown in Table 3.8.3.

The mean age of subjects was about 55.14 years with a minimum of 5 and a maximum of 90 years. Mean age of subjects (Table A3.8.2) was different between northern and southern regions only (F=4.3, p=0.013).

The majority of subjects (over 72%) were in the age group 50 years and above and about one third were in their fifties. Just 2.5% were below the age of 30. Differences among regions are shown in table A3.8.3

The first age group (<30) can be roughly considered as Type I diabetics while the second and third groups as Type II. Type I diabetes is known to constitute about 5% of all diabetics. The lower representation of Type I diabetes can be partly explained by the preference for hospital outpatient clinics by this group of patients mainly due to irregular availability of insulin at community health centers. Type I diabetics can not survive without insulin while Type II group are mainly treated with diet and oral hypoglycemic drugs that are more readily available in health centers.

The gender distribution was in favor of females (59.6%) as shown in table A3.8.8. This finding is mostly a reflection of more availability of females at the time of the study rather than higher prevalence of diabetes among females in Jordan. No significant difference among regions in terms of sex of diabetics was found (χ^2 =1.2, p=0.55).

All data on education excluded those below 18 years of age who were mostly school children. Mean years of schooling are shown in Table A3.8.2. Less than 5 years of schooling was observed in all regions with no significant difference (F=2.03, p=0.13).

Almost 48% of all subjects were illiterate (Table A3.8.5). This fact explains the low mean of years of schooling. The high illiteracy rate among patients in the sample is mainly due to the age structure. About 88% of the illiterate patients were in the age group of 50 years and above and almost no body in the age group of less than 30 years.

Another important factor for high illiteracy rate seems to be related to the abundance of females in the sample as mentioned earlier. The mean years of schooling for males was 7.54 (95%CI: 7.06, 8.02) compared with just 2.2 (95%CI: 1.94, 2.50) for females (t=18.8, p<0.0005). Further examination of the data in Table A3.8.9 makes the discrepancies between males and females educations clearer. Only 18% of the males were illiterate, as opposed to more than 68% of the females. Almost 16% of the males in the sample had higher education, when compared to less than 3% of the female. This observed difference was undoubtedly significant (χ^2 =306, p<0.0005). The relatively low socio-economic status of subjects attending MoH facilities might be another secondary factor affecting the display of low education in the sample.

Table 3.8.3: Overall Sample Characteristics (MoH)

Variable	Not W* Number	W %
Total	1190	**100**
Region		
North	427	**38.2**
Central	464	**46.7**
South	299	**15.1**
Stratum		
Central CHCs	152	**18.7**
North CHCs	65	**4.9**
South CHCs	68	**6.6**
Central PHCs	312	**28.2**
North PHCs	362	**32.4**
South PHCs	231	**9.3**
Total CHCs	285	**30.2**
Total PHCs	905	**69.8**
Age Groups		
<30	39	**2.5**
30-39	64	**5.9**
40-49	229	**19.3**
50-59	397	**33.1**
60-69	322	**26.6**
=>70	136	**12.5**
Sex		
Male	466	**40.4**
Female	724	**59.6**
Education		
Illiterate**	563	**48**
1-6 years	264	**21.3**
7-12 years	248	**22.8**
≥ 13 years	91	**7.9**
Occupation		
Professionals***	112	**10.4**
Skilled Workers	237	**22.2**
Unskilled Workers	128	**10.2**
Housewives	666	**56.2**
Students	18	**1.0**
Employment Status		
Employed	345	**32.7**
Unemployed	898	**67.3**

* Weighted
** Only those with zero years of schooling.
*** Refer to page 16 for defining occupational categories.

Housewives were the most abundant category (56.2%) despite the fact that this category included only females. Generally, 92% of the females were in the category of housewives. Moreover, over 90% of the housewives in the sample had less than 7 years of schooling. Therefore,

the whole category of housewives can be added to the "unskilled" category making it almost two thirds of subjects of the sample. Table A3.8.6 looks at the distribution of occupational categories by region.

Almost one third of the sample was identified as employed. The employment rate was not found different among the three regions of the country (χ^2 =4.12, p=0.13). While over three quarters of the males in the sample were employed, less than 5% of the females were so (Table A3.8.8). The significance of this difference is evident (χ^2 =644, p<0.0001). This finding is a reflection of the high proportion of housewives among females.

3.8.2.3 Duration of the Disease

As shown in Table A3.8.2 the average duration of the disease was over 7 years and ranging from few months to 30 years. The average duration of the disease in the three regions was not significantly different (F=1.9, p=0.14).

Table 3.8.4: Disease Duration Categories by Region (MoH)

Disease Duration	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<4	121	27.4	146	32.1	103	33.7	370	**30.6**
4-6	90	23.0	98	24.0	70	24.2	258	**23.6**
7-10	106	25.0	111	23.2	58	20.2	275	**23.5**
>10	107	24.6	105	20.7	66	21.9	278	**22.4**
Total	424	100	460	100	297	100	1181	100

Table 3.8.4 shows the categories of disease duration distributed by region. While 22% of the subjects reported having a disease duration of more than 10 years, about 70% had diabetes for more than 3 years.

3.8.2.4 Body Mass Index

The overall mean for BMI was found to be 30.12 Kg/m^2, which is almost at the cutoff point between overweight (25-29.99) and obesity (30-34.99). As seen from Table A3.8.2 differences between regions were minimal and of no significance (F=2.9, p=0.05).

Table 3.8.5 portrays the distribution of BMI categories by region. Less than 18% were found to have normal BMI while over 34% were overweight but not obese. Grade I obesity was noted in about 31% of the respondents and over 5% of the subjects were extremely obese. No statistically significant differences were noted in BMI categories among regions even with the breakdown into six categories (χ^2 =14.3, p=0.158).

Taking into consideration that a BMI of 25 and more in a person who is 18 years and above is considered a risk factor for developing Type II diabetes, the figure of 82% of overweight (including obesity) is self-explanatory.

Table 3.8.5: Body Mass Index by Region (MoH)

Obesity	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Underweight	2	0.4	2	0.4	4	2.3	8	**0.7**
Normal	76	17.5	73	16.6	57	18.9	206	**17.3**
Overweight	151	35.6	157	33.2	92	33.7	400	**34.2**
Obesity I	134	32.1	137	30.5	84	29.1	355	**30.9**
Obesity II	44	10.6	60	13.0	32	9.7	136	**11.6**
Obesity III	18	3.8	27	6.4	18	6.3	63	**5.4**
Total	425	100	456	100	287	100	1168	100

Overall, 48% of the sample was obese (Table 3.8.6) and no difference among regions was noted in this regard (χ^2 =1.69, p=0.431). The figures are slightly lower than those reported by Ajlouni et al* for diabetics while it was close to the overall figure of obesity (49.7%). Because the latter study was carried out in 4 towns only, the difference can be explained by the difference in the sampling universe and sample size. The fact that over 82% of the respondents were either overweight or obese and the absence of differences among regions can partly be explained by the assumption that obesity is a major risk factor for Type II diabetes.

Table 3.8.6: Obesity by Region (MoH)

Obesity Status	*Regions*						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Obese	196	**46.7**	224	**49.9**	134	**45.1**	554	**48.0**
Not Obese	229	53.3	232	50.1	153	54.9	614	52.0
Total	425	100	456	100	287	100	1168	100

Table 3.8.7: Obesity by Sex (MoH)

Obesity Status	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Obese	148	**32.6**	406	**58.2**	554	**48.0**
Not Obese	309	67.4	305	41.8	614	52.0
Total	457	100	711	100	1168	100

Table 3.8.7 shows that 32.6% of males were obese, as opposed to 58.2% of the females. This difference was statistically significant (χ^2 =74.4, p<0001). Again the obesity figures for diabetics in this study are very close to the overall results of Ajlouni *et al** (32.7% for males and 59.8% in females).

* Ajlouni K., Jaddou H., and Batieha A. (1998). Obesity in Jordan. Int J Obes Relat Metab Disord, 22 (7): 624-8.

3.8.2.5 Glycosylated Hemoglobin

The average national mean of HbA_{1c} was 7.55 %, which is almost at the cutoff point of poor control (Table 3.8.8). Means of HbA_1c were found to be statistically different between regions (F=3.6, p=0.027). The differences were found to be due to the slightly higher value in the north compared with the other two regions.

Comparing the means of HbA_1c for users of CHCs and PHCs showed a significantly lower figure in CHCs at 7.37% (t=-2.9, p=0.004). This fact did not actually hold true for all strata as shown in table 3.8.8 where the northern CHCs showed the highest figure, around 8%, and was significantly higher than northern PHCs. The results for southern CHCs and PHCs were not found to be different. In the central region, CHCs showed significantly lower values than PHCs. This difference was sufficient to offset the opposite difference in the north and to make an overall difference in favor of CHCs.

Table 3.8.8: Means of HbA_{1c} by Selected Variables (MoH)

Variable	HbA_1c %	95% CI upper	95% CI lower
National	**7.55**	*7.46*	7.63
Region			
North	**7.69**	7.55	7.83
Central	**7.48**	7.35	7.61
South	**7.39**	7.19	7.60
Strata			
Central CHC	**7.12**	7.02	7.22
North CHC	**8.03**	7.83	8.22
South CHC	**7.57**	7.42	7.72
Central PHC	**7.70**	7.62	7.79
North PHC	**7.64**	7.57	7.72
South PHC	**7.30**	7.16	7.44
Type			
CHC	**7.37**	7.22	7.52
PHC	**7.62**	7.52	7.72
Sex			
Male	**7.53**	7.39	7.66
Female	**7.56**	7.45	7.67

Nationally, over 43% of the sampled patients had diabetes with poor control status and a little over one third had good control of their blood sugar (Table 3.8.9). Poorly controlled diabetics were the highest in the north at 48.2% and lowest in the central region at 39.6%.

The differences between regions in terms of status of control were statistically significant (χ^2 =7.88, p=0.019). The northern region was totally responsible for that difference, since the southern and central regions did not show statistical difference (χ^2 =0.12, p=0.73).

Diabetic clients of CHCs had a lower figure of poor control at about 38% compared with about 45% in PHCs where the difference was significant (χ^2 =4.9, p=0.026) in terms of controlled (fair and good) versus uncontrolled (poor). This result might be explained by the availability of specialists at CHCs in the central region providing better care to patients, in comparison with the CHCs in other regions, which are mainly run by GPs.

Table 3.8.9: HbA_{1c} Categories by Selected Attributes (MoH)

Variable	Category	Status of Control of DM						Total	
		Good Control		Fair Control		Poor Control			
		N	%	N	%	N	%	N	%
Region	North	142	32.2	81	19.6	204	**48.2**	427	100
	Central	172	37.1	104	23.2	188	**39.6**	464	100
	South	120	40	58	18.9	121	**41.1**	299	100
	National	434	35.7	243	21.2	513	**43.1**	1190	100
Type	CHC	111	39.6	57	22.2	117	**38.2**	285	100
	PHC	323	34.0	186	20.8	396	**45.2**	905	100
Sex	Male	176	36.0	96	21.5	194	**42.5**	466	100
	Female	258	35.4	147	21.0	319	**43.6**	724	100
Age Group	<30	11	30.0	9	20.0	19	**50.0**	39	100
	30-39	32	36.6	16	31.0	16	**32.4**	64	100
	40-49	70	27.1	48	24.5	111	**48.5**	229	100
	50-59	139	38.2	86	21.8	172	**40.0**	397	100
	60-69	123	36.2	60	19.4	139	**44.4**	322	100
	≥70	57	41.2	24	14.9	55	**43.9**	136	100
Emp. Status*	Employed	126	**34.8**	64	**20.7**	155	**44.4**	345	100
	Unemployed	289	**35.6**	167	**21.5**	342	**42.8**	798	100
Occupation	Professionals	48	41.5	20	22.0	44	**36.6**	112	100
	Skilled	88	35.0	49	21.0	100	**44.0**	237	100
	Unskilled	48	34.5	23	20.2	57	**45.4**	128	100
	Housewives	231	34.4	139	21.5	296	**44.2**	666	100
	Students	6	27.3	6	36.2	6	**36.4**	18	100
Education in Years	Illiterate	192	33.0	121	21.7	255	**45.3**	568	100
	1-6	104	37.6	42	16.1	126	**46.3**	272	100
	7-12	95	36.3	63	25.3	97	**38.5**	255	100
	>12	41	43.0	17	21.5	34	**35.5**	92	100
Disease Duration in Years	<4	173	45.2	80	24.4	117	**30.5**	370	100
	4-6	96	35.8	54	19.0	108	**45.2**	258	100
	7-10	76	27.1	62	24.5	137	**48.4**	275	100
	> 10	85	30.8	47	16.3	146	**52.9**	278	100
Obesity	Obese	207	32.0	123	20.4	284	**47.6**	614	100
	Not Obese	217	39.5	115	22.1	222	**38.4**	554	100

* Student category not included

The means of HbA_{1c} for males and females were found to be 7.53% and 7.56% respectively. As expected with the almost identical means there was no statistical difference (t = –0.4, p= 0.7). Furthermore, this fact was unchanged when analyzing the categories where 42.5% and 43.6% of the males and females respectively were in the status of poor control category (χ^2 =0.16, p=0.7).

When analyzing $HbA1_c$ categories by age groups as shown in table 3.8.9, no significant differences were found between the poorly controlled and controlled DM (χ^2 =8.3, p=0.14).

Similarly, no statistical difference was shown between employed and not employed in terms of diabetes control (χ^2 =0.3, p=0.59).

Table 3.8.9 shows that professionals and students had better control of their diabetes status than the rest of the groups. However, these observed differences in diabetes control for various occupational categories were not significant (χ^2 =2.9, p=0.57).

Mean years of schooling for good, fair and poor control were 4.7, 4.5 and 4 respectively with statistical significance between the poorly controlled and the other two groups (F=2.27, p=0.023). There was a decreasing tendency of the poor control status with the increase in the level of education from 45.3% in illiterates to 35.5% in highly educated group (Table 3.8.9). The observed difference was not found significant to generalize to the whole population of diabetics at the MoH facilities (χ^2 =6.9, p=0.074).

Looking at the status of control of DM by the duration of the disease in table 3.8.9, an increasing percentage of the poor control was associated with duration categories. Poorly controlled diabetics increased from 30.5% when the duration of the disease was less than 4 years to almost 53% for those with a long standing disease of more the 10 years duration. Comparing the poorly controlled versus the other two categories was found to be statistically significant (χ^2 =36.8, p<0.0005). The mean duration in years for good control and fair control categories was found almost identical at 6.6 years while the poorly controlled category had a mean of 8.3 with high statistical significance.

Obesity was found to be associated with the control of DM as seen in table 3.8.9. While only 38.4% of the non-obese were in poor control category, 47.6% of the obese were poorly controlled (χ^2 = 10.3, p= 0.001).

To probe further into variables that might have influenced the status of control for diabetes, a multiple linear regression analysis was performed. $HbA1_c$ was the dependent variable, while age, BMI, duration of the disease and years of schooling were the independent variables. The slope of the regression line was significantly different from zero for all of the 4 independent variables. Nevertheless, correlation between HbA_{1c} readings and each of the four variables was low. Table 3.8.10 Shows that duration of the disease had the highest correlation with the status of control for DM with correlation coefficient of only 0.14. BMI came the second, duration of the disease third and age in fourth and last place, in terms of correlation with the status of control for diabetes. Entering the rest of the three variables into the stepwise model

did not succeed to increase the overall correlation to more than 0.21, which is still pointing to low correlation.

Looking at the variance in $HbA1_c$ readings that can be explained by different combinations of the 4 independent variables as judged by R^2 value (Table 3.8.10), the results were not different from those of the correlation. Just about 2% of the variance can be explained by duration of disease in years. Adding all the variables in the model did not succeed to explain more than an additional 2% of the variance.

Table 3.8.10: Summary of Stepwise Regression

Model	R	R^2	Adjusted R^2
1	**0.140**	0.020	0.019
2	0.167	0.028	0.026
3	0.184	0.034	0.031
4	0.208	0.043	0.040
1) Duration of the disease in years only			
2) Duration of the disease + BMI			
3) Duration of the disease + BMI +Years of schooling			
4) Duration of the disease + BMI +Years of schooling + Age			
HbA_{1c} is the dependent variable			

In other words almost 96% of the variation in $HbA1_c$ should have been explained by other factors outside the above 4 variables. Taking into consideration that sex, job, occupation failed also to establish any association, definitely the most important variables affecting the state of control of diabetes were not studied in this sample. The main objective of this study was to compare the results of the pretest and posttest and look for any differences. Consequently, the status of physical activity, knowledge about the disease, medication, family history and complications are all important factors not tackled by this study.

3.8.3 UNRWA

3.8.3.1 Introduction

A total of 203 patients were selected in 8 health centers. Table A3.8.1 shows that missing values were nonexistent for the Glycosylated hemoglobin, age and sex. The rest of the variables had less than 5% missing values. Since there was no stratification for the UNRWA, the data was weighted using the expansion weight only. Whenever the UNRWA data was compared with national MoH data, the latter was again weighted using relative weights..

3.8.3.2 Background Variables

The age structure of the sample is displayed in Table 3.8.11. The mean age of 55.9 was close to the mean age of the MoH sample of 55.14 (F=0.38, p=0.54). Furthermore, the distribution of the age groups was very close to the MoH sample making the age structure of diabetics attending UNRWA and MoH centers more or less identical.

The females in UNRWA sample outnumbered the males more than twice as shown in table 3.8.11. The proportion of the females was significantly higher than that of MoH (χ^2 =19, p<0.000012).

Mean years of schooling barely reached 4 years, which is even lower than that of the overall MoH sample of 4.34 (Table A3.8.10). The categories of education displayed in table 3.8.11 show that 74.5% had less than 7 years of schooling and about 5% had higher education. Again the high illiteracy and low education rates were affected mainly by the age structure of the patients and female predominance.

Table A3.8.11 displays the categories of education by sex, which stresses the same fact that females are less educated.

Table 3.8.11 shows that only one fourth of the UNRWA sample was employed, which was not significantly lower than at the MoH (χ^2 =1.8, p=0.17).

Looking at the occupational categories displayed in Table 3.8.11, it is evident again that housewives were the most abundant at 62% while slightly over 5% were professionals.

Table 3.8.11: Overall Sample Characteristics (UNRWA)

Variable	Not W* Number	W %
Total	**203**	**100.0**
Sex		
Male	57	**30.9**
Female	146	**69.1**
Age Groups		
<30	39	**2.5**
30-39	64	**5.9**
40-49	229	**19.3**
50-59	397	**33.1**
60-69	322	**26.6**
=>70	136	**12.5**
Education		
Illiterate	84	**43.4**
1-6 years	64	**31.1**
7-12 years	43	**20.3**
≥ 13 years	10	**5.1**
Occupation		
Professionals	9	**5.2**
Skilled Workers	41	**20.9**
Unskilled Workers	15	**10.0**
Housewives	124	**62.3**
Students	4	**1.6**
Employment Status		
Employed	48	**25.4**
Unemployed	141	**74.6**

*Weighted

3.8.3.3 Duration of the Disease and Body Mass Index

The mean duration of the disease (Table A3.8.10) was 2 years longer in UNRWA patients (9.08) compared with MoH (7.39). This difference was found to be of high statistical significance (F=29, p<0.0005) mainly because fewer patients in the UNRWA sample had the disease for less than 4 years (Table 3.8.12).

The mean BMI of 33.42 (Table A3.8.10) was statistically higher than that of the MoH patients (30.12). This finding was consistent when looking at categories of BMI in Table 3.8.12. The difference can be partly explained

Table 3.8.12: Sample Characteristics of UNRWA Data

Variable	Not W* Number	W %
Disease Duration		
<4	49	**23.7**
4-6	40	**21.3**
7-10	55	**28.4**
>10	57	**26.6**
BMI Category		
Normal	24	**10.1**
Overweight	63	**30.3**
Obesity I	72	**37.8**
Obesity II	32	**16.4**
Obesity III	8	**5.4**

by overrepresentation of females in the UNRWA sample.

Table 3.8.12 shows that females were almost 70% more obese than the males. Nevertheless, it is still obvious that both males and females were more obese than their MoH counterparts. This might have happened because of the smaller sample in UNRWA patients.

3.8.3.5 Glycosylated Hemoglobin

The mean $HbA1_c$ was found to be very close to 8 %, which is within the poor control figures (Table A3.8.10). The minimum reported was 5.1%, the maximum 15.5%. The figure was found to be higher than that of the MoH sample of 7.55%. Females in the sample were responsible for such differences their mean $HbA1_c$ was 8.15 compared to 7.61 for the males.

Table 3.8.13 shows the categories of diabetes control, where the proportion of patients with poor control was 61.1%. As shown in Table 3.8.14, the difference in control status between males (51.3%) and females (65.4%) was obvious.

Table 3.8.13: Status of Control of DM for UNRWA

Control of DM	Count	Weighted %
Good Control	43	**17.0**
Fair Control	49	**21.9**
Poor Control	111	**61.1**
Total	203	100.0

No other significant findings were found when analyzing $HbA1_c$ by other variables. The only target for the final analysis after the posttest will be $HbA1_c$ values.

Table 3.8.14: HbA_{1c} Categories by Sex for UNRWA

Sex	Status of Control of DM						Total	
	Good Control		Fair Control		Poor Control			
	N	%	N	%	N	%	N	%
Male	13	18.8	17	29.9	27	**51.3**	57	100
Female	30	16.1	32	18.4	84	**65.4**	146	100

Appendix 3.8

Table A3.8.1: Listing of Variables and % of Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Age	1187	0.25%	203	0.00%
Sex	1190	0.00%	203	0.00%
Occupation	1160	2.59%	193	4.9%
Employment	1160	2.59%	193	4.9%
Duration of the Disease in Years	1181	0.76%	2	0.98%
Years of Schooling	1187	0.25%	2	0.98%
BMI	1168	1.8 %	199	1.8%
HbA1c	1190	0.00%	203	0.00%
Total Number of Records	**1190**		**203**	

Table A3.8.2: Means and Confidence Intervals for Selected Variables (MoH)

Attribute	Region			National
	North	Central	South	
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Age (years)	**56.34** (55.30,57.38)	**54.69** (53.71,55.66)	**53.50** (51.45,55.56)	**55.14** (54.46,55.82)
Years of Schooling	**4.08** (3.62,4.54)	**4.66** (4.21,5.11)	**3.98** (3.28,4.69)	**4.34** (4.04,4.63)
Disease Duration (years)	**7.80** (7.28,8.32)	**7.17** (6.70,7.64)	**7.04** (6.18,7.90)	**7.39** (7.07,7.71)
BMI (Kg/m2)	**29.80** (29.32,30.29)	**30.54** (30.04,31.05)	**29.63** (28.78,30.48)	**30.12** (29.80,30.45)

Table A3.8.3: Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<30	6	1.5	12	1.8	21	7.2	39	**2.5**
30-39	13	3.1	29	8.1	22	6.1	64	**5.9**
40-49	89	21.1	86	18.9	54	16.1	229	**19.3**
50-59	133	31.3	169	34.6	95	33.3	397	**33.1**
60-69	129	29.7	115	24.1	78	26.1	322	**26.6**
=>70	57	13.2	52	12.4	27	11.1	136	**12.5**
Total	427	100	463	100	297	100	1187	100

Table A3.8.4: Gender by Region (MoH)

Gender	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	163	40.5	184	39.3	121	43.9	466	**40.4**
Female	264	59.5	280	60.7	178	56.1	724	**59.6**
Total	427	100	464	100	299	100	1190	100

Table A3.8.5: Years of Schooling by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	221	51.4	200	45.5	142	47.7	563	**48.1**
1-6 years	84	18.3	106	22.2	74	26.9	264	**21.4**
7-12 years	86	23.2	106	23.1	56	20.1	248	**22.7**
≥13	31	7.1	44	9.1	16	5.7	91	**7.8**
Total	422	100	456	100	283	100	1166	**100**

Table A3.8.6: Occupation by Region (MoH)

Occupation	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Professionals	33	8.0	59	13.5	20	6.7	112	**10.4**
Skilled Workers	89	22.2	90	22.6	58	21.1	237	**22.2**
Unskilled Workers	50	11.1	35	7.0	43	16.1	128	**10.2**
Housewives	248	58.1	250	56.0	168	53.9	666	**56.2**
Students	2	0.7	7	0.9	9	2.2	18	**1.0**

Table A3.8.7: Employment by Region (MoH)

Employment Status	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Employed	110	26.8	151	37.2	84	33.7	345	**32.7**
Unemployed	310	73.2	283	62.8	205	72.3	898	**67.3**
Total	420	100	434	100	289	100	1143	100

Table A3.8.8: Employment by Sex (MoH)

Employment Status	Gender				National	
	Male		Female			
	N	%	N	%	N	%
Employed	314	**76.9**	31	**4.8**	345	**32.7**
Unemployed	113	23.1	685	95.2	898	**67.3**
Total	427	100	716	100	1143	100

Table A3.8.9: Educational Categories by Sex (MoH)

Categories of Education	Sex				National	
	Male		Female			
	N	%	N	%	N	%
Illiterate	73	**18.1**	490	**68.1**	563	**48.0**
1-6 years	140	**28.3**	124	**16.7**	264	**21.3**
7-12 years	169	**37.8**	79	**12.7**	248	**22.8**
≥13	74	**15.8**	17	**2.6**	91	**7.9**
Total	456	100	710	100	1166	100

Table A3.8.10: Means for selected variables (UNRWA)

Variable	Mean	95% CI	
		lower	upper
Age in Years	**55.94**	55.33	56.55
Years of Schooling	**3.93**	3.68	4.18
Disease Duration	**9.08**	8.67	9.50
BMI	**33.42**	32.32	34.52
HbA1c %	**7.98**	7.92	8.05

Table A3.8.11: Educational Categories by Sex (UNRWA)

Categories of Education	Sex				National	
	Male		Female			
	N	%	N	%	N	%
Illiterate	11	**22.4**	73	**53.7**	84	**43.9**
1-6 years	20	**35.5**	44	**29.8**	64	**31.5**
7-12 years	18	**29.8**	22	**14.5**	40	**19.3**
≥13	7	**12.3**	3	**2.0**	10	**5.2**
Total	56	100	142	100	198	100

Table A3.8.12: Obesity by Sex for UNRWA

Sex	Obesity Status				Total	
	Male		Female			
	N	%	N	%	N	%
Obese	19	**39.8**	93	**68.2**	112	**59.6**
Not Obese	36	60.2	51	31.8	87	40.4
Total	55	30.9	144	60.1	199	100

3.9 Status of Hypertension Control

3.9.1 Summary

This study aims at studying the status of control of hypertension among known hypertensive patients using MoH facilities. Hypertension is a serious disease which if left uncontrolled can lead to a wide variety of complications affecting mainly the heart, brain and kidneys. It poses a major public health challenge to public health authorities in developing countries. The disease has been found extremely prevalent in Jordan which emphasizes the importance of control of hypertension in order to prevent or minimize complications.

A total of 1148 hypertensive subjects at 89 MoH facilities and 198 subjects at 8 UNRWA facilities were interviewed and their BP recorded. UNRWA was included as a control group. WHO guidelines of 1999 served the basis for classification of hypertension. Any subject with blood pressure readings that fell in any of the three grades of hypertension was considered in uncontrolled status.

Ranging from a few months to 41 years, the average duration of hypertension for subjects at MoH facilities was 6.4 years. About 37% reported having their hypertension diagnosed during the last 3 years. The average BMI for the sample was found to be within the obesity range at 31.72 Kg/m^2. While 88.5% of the sampled subjects were overweight or obese, significant difference was found between males and females in terms of obesity.

Table 3.9.1 shows that only 11% of the hypertensive users of MoH facilities were well managed and able to bring their blood pressure to the normal values.

Table 3.9.1: Summary of the Status of Control of Hypertension

Group	Status of Control of Hypertension (%)			
	Controlled BP	**I Grade Hypertension**	**II Grade Hypertension**	**III Grade Hypertension**
MoH (Intervention)	**11**	**28.6**	**33**	**27.4**
UNRWA (Control)	**16.6**	**39.8**	**26.3**	**17.3**

The control of hypertension was the best in the central region (13.8%) and worst in the north (7.4%). At the stratum level, central CHCs were the best with about 18% of controlled subjects while southern PHCs were the worst at less than 7% of controlled.

Age, sex, employment status, occupation, duration of the disease and body mass index did not show any association with the status of disease control. Only education was positively associated with control of hypertension where control increased from less than 10% in illiterate and reaching almost 19% with the highest education category.

It is quite evident that this very common chronic disease needs more attention at all levels, given that good control of the disease almost equals to no disease.

3.9.2 Ministry of Health

3.9.2.1 Introduction

Please note that all tables with A3.9.x numbering appear in Appendix 3.9 at the end of this section, otherwise tables are incorporated in the text.

Hypertension occupies a major role in the etiology and development of coronary heart disease and stroke. It specifically poses a major public health challenge to public health authorities in developing countries where the health system is already loaded with other more evident health problems. The severity of elevated blood pressure is related to coronary heart disease and stroke. Moreover, the complexity of hypertension control and management lies within the multiple risk factors that commonly affect individuals with high blood pressure.

The Jordanian Ministry of Health reported a national prevalence rate of hypertension of 32%[*] among those aged 25 years and above. By projecting an explosion of non-communicable diseases (NCDs) in developing countries by year 2015, the WHO included the figure of 4:1 as a ratio for deaths from NCDs to deaths from infectious and parasitic diseases for the Middle East. The WHO further identifies the Eastern Mediterranean region as a classic example of countries in the middle of an epidemiological transition, with increasing rates of obesity that is accompanied by an increasing prevalence of diabetes and hypertension[**]. Thus the control of hypertension (third level of prevention) is essential to face the high prevalence of the disease to prevent or minimize the consequences.

This study aims at studying the status of control of hypertension among known hypertensive patients using MoH facilities. A total of 1148 hypertensive subjects at 89 MoH facilities were interviewed and their BP recorded during the survey day using the questionnaire shown in annex 7. The expected number of respondents was 1157 for MoH and 200 for UNRWA since it was intended to collect 13 and 25 records from each health center respectively. The shortages happened because in some health centers data collectors did not manage to find the planned 13 persons during the days of the survey due to the small load of patients. Table A3.9.1 shows the valid and missing number of records for each of the main variables. It is clear that missing values for various variables were either absent or negligible. The reported two missing readings for blood pressures happened because either the diastolic or systolic BP was missing in two records making the valid records for the main variable 1146.

[*] Jordan Morbidity Survey: Study design & risk factors study, Volume 1. Ministry of Health, 1996.

[**] Non-communicable disease: WHO experts Warn against inadequate prevention, particularly in developing countries. WHO Fact Sheet N 106. 1996.

Table 3.9.2 shows the categories of blood pressure according to WHO 1999 guidelines. It is worth mentioning that borderline is a subgroup of grade I hypertension. Extensive data from many randomized controlled trials have shown the benefit of treating hypertension.

Table 3.9.2: Categories of BP Control

Categories BP Control		Systolic	Diastolic
Optimal		<120	<80
Normal		<130	<85
High Normal		130-139	85-89
Grade I	Grade I	140-159	90-99
	Borderline	**140-149**	**90-94**
Grade II		160-179	100-109
Grade III		≥180	≥110
Grade I = Mild Hypertension – Borderline is a subgroup of Grade I Grade II = Moderate Hypertension Grade III = Severe Hypertension			

The target blood pressure for the management of hypertension is considered a systolic < 140 mmHg and diastolic < 90 mmHg. Thus a systolic blood pressure reading exceeding 139 mmHg and/or a diastolic reading exceeding 89 mmHg is considered uncontrolled blood pressure.

The **Body mass index (BMI)** was used to assess patients' status of obesity. Known for its simplicity, the index correlates to fatness and can be applied to both men and women. BMI was calculated using the conventional formula (weight*10,000 /height^2) where weight is in Kg and height in centimeters.

Table 3.9.3 shows the classification of BMI categories. BMI of 30 Kg/m^2 was considered the cutoff point between obesity and non-obesity. BMI of 25 Kg/m^2 was considered the cutoff point between normal and overweight.

Table 3.9.3: Categories of BMI

Category	Value (Kg/m^2)
Underweight	<18.5
Normal	18.5-24.99
Overweight	25-29.99
Obesity I	30-34.99
Obesity II	35-39.99
Obesity III	≥40

From this point forward the counts represent the unweighted values while means and proportions are calculated from weighted values using expansion and relative weights to account for the study design. Expansion weights were used with the analysis at the stratum level while relative weights were used for other levels that were larger than the stratum (national, regional etc.).

3.9.2.2 Background Variables

Table 3.9.4 summarizes the background characteristics for the MoH sample of subjects. About 49% of the subjects came from the central region, 37% from the north and 14% from the south. About 30% of the subjects came from CHC while the rest from PHCs.

The mean age of subjects was about 57 years and the median 58 with a minimum of 21 and a maximum of 90 years. As shown in Table A3.9.2 the mean age of subjects was similar across all regions (F=0.6, p=0.5).

While almost 80% of the sample was above 50 years age, about 16% were over 70 years of age. Even though the age was broken down into 4 groups, the difference across regions as shown in table A3.9.3 was absent (χ^2 =8.4, p=0.2).

About two thirds of the sample were females. As shown in table A3.9.4 no significant difference related to gender constitution among the three regions was found (χ^2 =0.9, p=0.6).

As shown in Table A3.9.2, the overall mean years of schooling was lower than 4 years (3.7 years). The central region was found to be significantly higher than the north and south (F=3.6, p=0.027) at 4.1 years compared with 3.3 years for the other 2 regions.

Almost 55% of all subjects were illiterate. This fact explains the low mean for years of schooling. The high illiteracy rate among sample subjects was mainly due to the age structure. About 93% of the illiterate subjects were in the age group of 50 years and above.

As mentioned earlier, the abundance of females in the sample is another important factor that can be related to the distribution of years of schooling. The mean years of schooling for males was 6.49 compared with just 2.25 for females (t=13.5, p<0.0005). Looking further at Table A3.9.6 makes the discrepancies between male and female education clearer. While only 26% of the males were illiterate, over 70% of the females were so. Furthermore, while almost 13% of the males in the sample had higher education, less than 3% of the female were in this group.

Housewives were the most abundant occupational category (60.3%). Almost 90% of the housewives in the sample had less than 7 years of education and a mean of 1.6 years of

Table 3.9.4: Overall Sample Characteristics (MoH)

Variable	Not W* Number	W %
Total	1148	**100**
Region		
North	418	**36.6**
Central	452	**49.3**
South	278	**14.1**
Stratum		
Central CHCs	149	**18.3**
North CHCs	65	**5.2**
South CHCs	70	**6.7**
Central PHCs	303	**30.9**
North PHCs	353	**30.6**
South PHCs	208	**8.3**
Total CHCs	284	**30.2**
Total PHCs	864	**69.8**
Age Groups		
<50 years	253	**21.3**
50-59 years	385	**32.7**
60-69	333	**30.2**
≥ 70 years	173	**15.8**
Sex		
Male	386	**34.5**
Female	762	**65.5**
Education		
Illiterate**	631	**54.9**
1-6 years	245	**20.3**
7-12 years	201	**18.2**
≥ 13 years	71	**6.6**
Occupation		
Professionals***	85	**7.8**
Skilled Workers	232	**21.8**
Unskilled Workers	118	**10.1**
Housewives	713	**60.3**
Employment Status		
Employed	280	**27.7**
Retired	144	**11.5**
Unemployed	724	**60.8**

* Weighted

** Only those with zero years of schooling.

*** Refer to page 16 for defining occupational categories.

schooling. Therefore, the whole category of housewives can be safely added to the "unskilled" category making it over 70% of subjects followed by skilled workers at 21.8% and professionals at 7.8%. Tables A3.9.7 shows the occupational category by region.

About 28% of the sample were employed and 12% were retired. Taking into account the age structure and the abundance of housewives, the above figures seem reasonable. The employment rate was not found different among the three regions of the country (χ^2 =4.26, p=0.372) as shown in table A3.9.8.

While over 96% of the males in the sample were either employed or retired, only about 9% of the females were employed or retired (Table A3.9.9). Significant difference for this variation was evident (χ^2 =844, p<0.0005). Again this is a reflection of the high proportion of housewives.

3.9.2.3 Duration of the Disease

As shown in Table A3.9.2 the average duration of the disease was 6.4 years ranging from a few months to 41 years. The average duration of the disease in the three regions was more or less similar with the north being significantly lower than the central region only.

Table 3.9.5 shows the categories of disease duration where about 63% had the disease for more than 3 years and less than 15% for more than 10 years. The disease duration categories were consistent across all regions (χ^2 =9.33, p=0.165).

Table 3.9.5: Disease Duration Categories by Region (MoH)

Disease Duration	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
0-3	178	41.5	161	34.2	109	36.4	448	**37.1**
4-6	105	26.6	120	29.8	66	24.1	291	**27.8**
7-10	80	19.9	92	19.9	57	23.5	229	**20.4**
>10	52	12.0	79	16.2	46	16.0	177	**14.6**
Total	415	100	452	100	278	100	1145	**100**

3.9.2.4 Body Mass Index

The overall mean for BMI was found to be within grade I of obesity (31.67 Kg/m^2). As seen from Table A3.9.2 differences between regions were negligible; no statistical significance difference was found(F=0.64, p=0.53).

Table 3.9.6 portrays the detailed categories of BMI by region. Less than 12% had normal weight while over 30% were overweight but not obese. Grade I obesity was noted in about 30% of the respondents and over 7% were extremely obese. Even with the breakdown into five categories, no statistically significant differences were found between regions (χ^2 =6.09, p=0.64). The first category (underweight) was excluded from the analysis because of cells with zeros.

Table 3.9.6: Body Mass Index by Region (MoH)

BMI Category	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Underweight			2	0.5			2	**0.3**
Normal	49	10.5	40	10.4	40	16.0	129	**11.2**
Overweight	127	32.1	120	29.5	81	30.2	328	**30.5**
Obesity I	126	29.0	162	31.1	77	25.3	365	**29.5**
Obesity II	82	21.4	87	21.0	56	20.4	225	**21.1**
Obesity III	34	7.1	40	7.4	24	8.0	98	**7.4**
Total	418	100	451	100	278	100	1147	**100.0**

Over 58% of the sample were obese (Table 3.9.7) with no difference noted between regions in this regard (χ^2 =1.75, p=0.42). BMI 25 Kg/m^2 and above is considered a risk factor not only for developing hypertension but also for poor control of the disease. The fact that less than 12% of hypertensives enjoy normal BMI should be considered seriously within the non-communicable disease control program at MoH.

Table 3.9.7: Obesity by Region (MoH)

Obesity	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Obese	242	**57.6**	289	**59.9**	157	**54.3**	688	**58.3**
Not Obese	176	42.4	162	40.1	121	45.7	459	**41.7**
Total	418	100	451	100	278	100	1147	100

Table 3.9.8 shows that 46% of males were obese compared to 65% of the females. This difference was statistically significant (χ^2 =25, p<0.0005).

Table 3.9.8: Obesity by Sex (MoH)

Obesity Status	Sex				Total	
	Male		Female			
	N	%	N	%	N	%
Obese	192	**46.2**	496	**64.6**	688	**58.2**
Not Obese	193	53.8	264	35.4	457	41.8
Total	385	100	760	100	1145	100

3.9.2.5 Control of Blood Pressure (BP)

It is worth mentioning that all patients have been visiting health centers on regular basis to receive drugs, so they were under treatment. The detailed description of the status of BP control is shown in Table 3.9.9. The fact that 60% of the sampled subjects had a BP within the second or third grade of hypertension is an indication of failure of the current system of health centers to deal appropriately with this highly prevalent disease.

Table 3.9.9: Blood Pressure Control Categories by Region (MoH)

Status of Control of BP	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Optimal	3	1.0	20	3.7	0	0.0	23	**2.2**
Normal	8	1.9	20	4.4	10	6.2	38	**3.7**
High Normal	21	4.5	29	5.9	12	4.3	62	**5.1**
Grade I	116	27.6	159	28.2	53	32.7	328	**28.6**
Grade II	160	37.8	130	30.1	88	31.5	379	**33.1**
Grade III	111	27.3	124	27.8	80	25.3	315	**27.3**
Total	418	100	449	100	278	100	1146	**100**
Borderline	61	14.5	86	20.5	52	21.1	199	18.4

Table 3.9.10a shows that 89% of the overall sample have uncontrolled hypertension. The control of hypertension seems to be best in the central region (13.8%) and worst in the north (7.4%). Statistically, the central region had significantly higher proportion of controlled subjects than the other two regions (χ^2 =10.35, p=0.006).

Table 3.9.10a: Blood Pressure Control Categories by Region (MoH)

Status of Control of BP	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Controlled*	32	**7.4**	69	**13.8**	22	**10.5**	123	**11.0**
Uncontrolled	386	92.6	380	86.2	256	89.5	1023	**89.0**
Total	418	100	449	100	278	100	1146	100

**Borderline hypertension added to uncontrolled group*

Unlike Table 3.9.10a, Table 3.9.10b combines the borderline with the controlled group instead of uncontrolled. The percentage of controlled jumped from 11% to 29.4%.

Table 3.9.10b: Blood Pressure Control Categories by Region (MoH)

Status of Control of BP	Regions						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Controlled*	93	21.9	155	34.3	74	31.9	322	**29.4**
Uncontrolled	325	78.1	295	65.7	204	68.1	824	**70.6**
Total	418	100	450	100	278	100	1146	**100**

**Borderline hypertension added to the controlled group*

The results presented from this point forward are based on including borderline hypertension within the uncontrolled category as it should be.

Table 3.9.11 summarizes the status of control of hypertension by different variables. When probing the stratum level, central CHCs seemed to be doing the best with almost 18% controlled and southern PHCs the worst at 6.7%.

When looking at the status of control of Blood Pressure by type of the health center it becomes obvious that CHCs had more controlled subjects (15.4%) than their PHC

counterparts (9.2%). The difference was found to be statistically significant at (χ^2 = 9.5, p = 0.002). Going back to the break down by strata it becomes clear that most of the difference is due to the availability of more controlled subjects in the central CHCs. This might be partly explained by more availability of internists at central CHCs. Despite being labeled as CHCs some centers, especially outside the central region, are in reality bigger PHCs.

The control of hypertension for males and females was 11.6% and 10.7% respectively. No statistical difference was found between the two groups (χ^2 =0.23, p=0.64).

The mean age of controlled subjects was 57 years as opposed to 57.4 for uncontrolled subjects. The absence of a consistent age pattern with the status of control of hypertension is obvious with less controlled subjects in the youngest age group at less than 8% .

Employed subjects were found to have their blood pressure controlled at 1% less that the unemployed at 10.3% and 11.3% respectively. The observed difference was not significant (χ^2 =0.23, p=0.63).

Despite that professionals seem to have had the highest percentage of controlled hypertension at 15.6%. Differences among occupational categories were not found statistically significant (χ^2 =3.3, p= 0.35).

The mean years of schooling for controlled and uncontrolled were 4.7 and 3.6 respectively (t=2.2, p=0.02). The level of control increased with the level of education rising from less than 10% in illiterate and reaching almost 19% with the highest education category. The difference was found to be statistically significant (χ^2 =9.6, p=0.02).

The mean BMI for controlled and uncontrolled was very similar at 31.1 and 31.7 respectively (t=-.8 p=0.42). The distribution of hypertension control status by BMI categories shown in table A3.9.10 revealed no difference (χ^2 = 6, p=0.3). This might be due to the fact that the study dealt mainly with an obese population suffering from uncontrolled hypertension.

The mean duration of the disease for controlled group was 6.3 years while for the uncontrolled 7.2 years. This difference was not statistically different (t=1.5, p=0.14). The distribution of control status by the duration categories showed some differences among groups but not large enough to show significant results (χ^2 =3.5, p=0.3).

The overall 11% rate of control of hypertension is an alarming figure that has to be tackled seriously. The poor control of hypertension is a global problem. For example, in the US, the control rates of hypertension increased from 10% to 29% in 1976 and 1991 respectively and seemed to have leveled off during 1990s[*]

[*] *Detection and Control of High Blood Pressure in the Community: Do We Need a Wake-Up Call?* I. Meissner, JP. Whisnant, SG. Sheps, Hypertension, 1999, vol. 34, pp. 466--47

Table 3.9.11: Blood Pressure Control Status by Selected Attributes (MoH)

Attribute	Category	Controlled		Uncontrolled		Total	
		N	%	N	%	N	%
Stratum	Central CHC	27	**17.9**	122	82.1	149	100
	North CHC	6	**8.4**	59	91.6	65	100
	South CHC	7	**11.7**	63	88.3	70	100
	Central PHC	42	**11.7**	259	88.3	301	100
	North PHC	26	**7.2**	327	92.8	353	100
	South PHC	15	**6.7**	193	93.3	208	100
Type	CHCs	45	**15.4**	254	84.6	299	100
	PHCs	78	**9.2**	769	90.8	847	100
Sex	Males	47	**11.6**	339	88.4	386	100
	Female	76	**10.7**	684	89.3	760	100
Age Groups	<50	24	**7.8**	229	92.2	253	100
	50-59	48	**15.6**	335	84.4	383	100
	60-69	34	**9.2**	299	90.8	333	100
	≥70	17	**9.4**	156	90.6	173	100
Emp. Status	Employed	32	**10.3**	248	89.7	280	100
	Unemployed	94	**11.3**	735	88.7	866	100
Occupation	Professionals	12	**15.6**	73	84.4	85	100
	Skilled	26	**9.2**	206	90.8	232	100
	Unskilled	16	**12.9**	102	87.1	118	100
	Housewives	69	**10.7**	642	89.3	711	100
Education Categories	Illiterate	52	**9.7**	578	90.3	630	100
	1-6	35	**11.5**	210	88.5	245	100
	7-12	25	**12.0**	175	88.0	200	100
	>12	11	**18.7**	60	81.3	71	100
Obesity	Obese	75	**11.3**	611	88.7	686	100
	Not Obese	48	**10.8**	411	89.2	459	100
Disease Duration	0-3	47	**11.3**	400	88.7	447	100
	4-6	27	**8.8**	264	91.3	291	100
	7-10	26	**11.5**	203	88.5	229	100
	>10	23	**14.3**	153	85.7	176	100

3.9.3 UNRWA

3.9.3.1 Introduction

A total of 198 subjects were selected from 8 health centers. Table A3.9.1 shows that missing values were absent for all variables. The data was weighted using the expansion weight only since there was no stratification. UNRWA data was compared to that of the MoH not for the sake of comparison by itself but in order to determine how close the control and intervention sites were to each other.

3.9.3.2 Background Variables

Table 3.9.12 shows the UNRWA sample characteristics. The mean age of 56.49 years (Table A3.9.11) was close to the mean age of the MoH sample of 57.35. Like the MoH sample over three quarters of subjects were in the age group above 49 years.

The females in the UNRWA sample outnumbered the males almost 4 times at 21%. The proportion of the females was higher than that of MoH at 34.5%. This finding validates the previously made argument, which contests to the increased availability of females during the study period in UNRWA versus MoH health centers.

The average year of schooling was very low at 3.65 but still close to the MoH data at 3.93 (Table A3.9.11). The 46% illiteracy rate as well as the very few subjects with higher education makes the educational level of this sample not very different from that of MoH (Table A3.9.10).

Again the high illiteracy and low education rates were caused mainly by the age structure of the subjects as well as the female predominance. The mean years of schooling for males (6.07) were significantly lower than those of the females (3.02) with F=122 and p

Table 3.9.12: Sample Characteristics of UNRWA Data

Variable	Not W* Number	W %
Total	**198**	**100.0**
Age Groups		
<50 years	43	**24.3**
50-59 years	76	**39.3**
60-69 years	47	**20.4**
≥ 70 years	32	**16.0**
Sex		
Male	38	**20.8**
Female	160	**79.2**
Education		
Illiterate**	97	**45.8**
1-6 years	57	**31.2**
7-12 years	39	**21.7**
≥ 13 years	5	**1.3**
Occupation		
Professionals***	4	**1.2**
Skilled Workers	31	**16.9**
Unskilled Workers	8	**4.2**
Housewives	155	**77.7**
Employment Status		
Employed	25	**11.6**
Retired	14	**7.6**
Unemployed	159	**80.8**

* Weighted
** Only those with zero years of schooling.
*** Refer to page 16 for defining occupational categories.

<0.0005. The difference in the educational level between males and females is much clearer in Table A3.9.12.

Over 80% sample were unemployed, which is higher than that of MoH (about 60%).

3.9.3.3 Disease Duration and BMI

The mean duration of the disease was found to be at 6.9 years close to that of the MoH at 6.4 years. About one fifth of the subjects had a disease duration of more than 10 years and about one third, less than 4 years (Table 3.9.13).

The mean BMI of 33.21 was a little higher than that of the MoH subjects. Table 3.9.13 shows that 69% of the total sample, including 75% of the females and 46% of the males were obese. When looking at Table 3.9.13 one can figure out that about 94% of the sample was either overweight or obese.

Table 3.9.13: Sample Characteristics of UNRWA Data

Variable	Not W* Number	W %
Disease Duration		
<4	63	**30.5**
4-6	57	**28.7**
7-10	41	**20.8**
>10	37	**20.0**
BMI Category		
Normal	10	**6.4**
Overweight	52	**24.7**
Obesity I	58	**28.0**
Obesity II	59	**32.0**
Obesity III	19	**8.9**
Obesity		
Obese	136	**69.0**
Not obese	62	**31**

3.9.3.3 Control of Blood Pressure (BP)

The status of control of hypertension was found to be 16.6%, which was higher than that of MoH at 11% (Table 3.9.14).

Table 3.9.14: Status of Control of BP (UNRWA)

Status of Control of BP	Count	Weighted %	Cum.
Optimal	2	**1.3**	1.3
Normal	10	**6.5**	7.8
High Normal	16	**8.8**	**16.6**
Grade I	81	**39.8**	56.4
Grade II	53	**26.3**	83.7
Grade III	36	**17.3**	100
Total	198	**100**	

Within the uncontrolled group about 40% were in grade I level of hypertension, and about 17% in grade III level. Even within the uncontrolled group the level of control was better than that of MoH as seen from tables 3.9.9 and 3.9.14.

Table 3.9.15: Blood Pressure Control Status by Selected Attributes (UNRWA)

Attribute	Category	Controlled		Uncontrolled		Total	
		N	%	N	%	N	%
Sex	Male	4	**12.7**	34	87.3	38	100
	Female	24	**17.7**	136	82.3	160	100
Age Groups	<50	5	**12.1**	38	87.9	43	100
	50-59	16	**25.0**	60	75.0	76	100
	60-69	6	**15.9**	41	84.1	47	100
	≥70	1	**3.8**	31	96.2	32	100
Emp. Status	Employed	2	**11.1**	23	88.9	25	100
	Unemployed	26	**17.3**	147	82.7	173	100
Occupation	Professional	0	**0.0**	4	100.0	4	100
	Skilled	3	**14.3**	28	85.7	31	100
	Unskilled	2	**12.5**	6	87.5	8	100
	Housewives	23	**17.7**	132	82.3	155	100
Disease Duration	0-3	10	**17.1**	53	82.9	63	100
	4-6	9	**19.2**	48	80.8	57	100
	7-10	5	**15.9**	36	84.1	41	100
	>10	4	**12.8**	33	87.2	37	100
Education In Years	Illiterate	11	**13.7**	86	86.3	97	100
	1-6	7	**13.5**	50	86.5	57	100
	7-12	7	**28.5**	32	71.5	39	100
	>12	3	**60.0**	2	40	5	100
Obesity	Obese	14	**11.8**	122	88.2	136	100
	Not Obese	14	**27.4**	48	72.6	62	100
TOTAL		**28**	**16.6**	**170**	**83.3**	**198**	**100**

Although females seem to have had better control than males as shown in table 3.9.15, this finding proved statistically insignificant ($\chi^2 = 0.5$, p=0.48).

When looking at the control of hypertension by age groups, one can find that subjects in their fifties had the best control; the same finding was noted with MoH data. But again there was no obvious consistent pattern of control with age.

Employed subjects seem to have displayed better control of their blood pressure. But the observed difference was found to be insignificant ($\chi^2 = 3.3$, p=0.064). All of the small number of professionals (4 subjects) were in the uncontrolled category. Excluding the professional category from analysis the differences among the other occupational groups were not significant ($\chi^2 = 2.3$, p = 0.32).

The mean years of schooling for controlled and uncontrolled were found significantly different 4.6 and 3.5 respectively (t=3.2, p=0.001). Table 3.9.15 shows that the control status of blood pressure improved with the increase in the years of schooling.

The difference in mean for the duration of disease between the controlled group (5.2 years) and the uncontrolled (7.8 years) was statistically significant (t=-4.4, p<0.0005).

Distribution of control status by the duration categories where the observed differences were not significant

The mean BMI for the controlled hypertension group (32 Kg/m^2) was found significantly lower than that of the uncontrolled (33.5 Kg/m^2) ($t=-3.6$ $p<0.0005$). Table 3.9.15 shows that the observed difference in the control of hypertension from 11.8% to 27.4% for obese and not obese respectively was significant ($\chi^2 =50$, $p<0.0005$).

Appendix 3.9

Table A3.9.1: Listing of Variables and % of Missing Records

Variable Name	MoH		UNRWA	
	Valid Number	% Missing	Valid Number	% Missing
Age	1144	0.35%	198	0.00%
Sex	1148	0.00%	198	0.00%
Occupation	1148	0.00%	198	0.00%
Duration of the Disease in Years	1145	0.26%	198	0.00%
Years of Schooling	1148	0.00%	198	0.00%
BMI	1147	0.09%	198	0.00%
Blood Pressure	1146	0.17%	198	0.00%
Total Number of Records	**1148**		**198**	

Table A3.9.2: Means and Confidence Intervals for Selected Variables (MoH)

Attribute	Region			National
	North	Central	South	
	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)	Mean (95% CI)
Age (years)	**57.81** (56.75,58.87)	**57.09** (56.22,57.95)	**57.06** (55.40,58.72)	**57.35** (56.72,57.97)
Years of Schooling	**3.33** (2.89,3.78)	**4.11** (3.68,4.54)	**3.31** (2.57,4.05)	**3.71** (3.43,4.00)
Disease Duration (years)	**5.76** (5.27,6.26)	**6.85** (6.32,7.37)	**6.48** (5.69,7.28)	**6.40** (6.06,6.74)
BMI (Kg/m2)	**31.66** (31.11,32.20)	**31.81** (31.31,32.31)	**31.21** (30.28,32.15)	**31.67** (31.33,32.01)

Table A3.9.3: Age Groups by Region (MoH)

Age Groups	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
<50	93	22.2	94	20.6	66	21.6	253	**21.3**
50-59	120	28.7	165	34.7	100	35.8	385	**32.7**
60-69	126	30.4	138	31.2	69	26.5	333	**30.2**
≥70	76	18.7	55	13.6	42	16.0	173	**15.8**
Total	415	100	452	100	277	100	1144	**100**

Table A3.9.4: Gender by region (MoH)

Gender	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Male	136	32.9	159	35.7	91	34.6	386	**34.5**
Female	282	67.1	293	64.3	187	65.4	762	**65.5**
Total	418	100	452	100	278	100	1148	**100**

Table A3.9.5: Years of Schooling by Region (MoH)

Years of Schooling	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Illiterate	247	59.1	224	50.9	160	58.0	631	**54.9**
1-6 years	74	16.2	107	23.2	64	21.0	245	**20.3**
7-12 years	81	20.9	79	17.1	41	14.8	201	**18.2**
≥13	16	3.8	42	8.8	13	6.2	71	**6.6**
Total	418	100	452	100	278	100	1148	**100**

Table A3.9.6: Years of Schooling by Gender (MoH)

Categories of Education	Sex				National	
	Male		Female			
	N	%	N	%	N	%
Illiterate	97	**26.2**	534	**70.1**	631	55.0
1-6 years	119	**29.7**	126	**15.4**	245	20.3
7-12 years	120	**31.2**	81	**11.3**	201	18.2
≥13	50	**12.8**	21	**3.2**	71	6.5
Total	**386**	**100**	**762**	**100**	**1148**	**100**

Table A3.9.7: Occupation by Region (MoH)

Occupation	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Professionals	22	5.5	46	9.5	17	8.1	85	**7.8**
Skilled Workers	85	20.4	100	24.5	47	16.1	232	**21.8**
Unskilled Workers	42	10.5	40	8.6	36	14.3	118	**10.1**
Housewives	269	63.7	266	57.4	178	61.5	713	**60.3**
Total	418	100	452	100	278	100	1148	**100**

Table A3.9.8: Employment by Region (MoH)

Employment Status	Region						National	
	North		Central		South			
	N	%	N	%	N	%	N	%
Employed	91	22.6	124	32.2	65	25.3	280	**27.7**
Retired	57	14.3	53	9.0	34	13.0	144	**11.5**
Unemployed	270	63.2	275	58.8	179	61.7	724	**60.8**
Total	418	100	452	100	278	100	1148	**100**

Table A3.9.9: Employment by Sex (MoH)

Employment Status	Gender				National	
	Male		Female			
	N	%	N	%	N	%
Employed	228	**64.6**	52	**8.2**	280	**27.7**
Retired	139	31.9	5	0.7	144	11.5
Unemployed	19	3.5	705	91.1	724	60.8
Total	386	100	762	100	1148	100

Table A3.9.10: Distribution of Control of Hypertension by BMI Category (MoH)

BMI Category	Control of Hypertension				National	
	Controlled		Uncontrolled			
	N	**%**	**N**	**%**	**N**	**%**
Underweight	1	**0.6**	1	**0.2**	2	**0.3**
Normal	39	**11.8**	90	**10.9**	129	**11.2**
Overweight	84	**28.1**	244	**31.5**	328	**30.5**
Obesity I	108	**29.3**	256	**29.7**	364	**29.6**
Obesity II	72	**24.3**	152	**19.5**	224	**20.9**
Obesity III	18	**5.9**	80	**8.2**	98	**7.5**
Total	322	100	823	100	1145	100

Table A3.9.11: Means for Selected Variables (UNRWA)

Variable	Mean	95% CI	
		lower	upper
Age in Years	**56.49**	55.95	57.03
Years of Schooling	**3.65**	3.43	3.88
Duration	**6.92**	6.63	7.02
BMI	**33.21**	32.93	33.5

Table A3.9.12: Years of Schooling by Gender (UNRWA)

Categories of Education	Sex				National	
	Male		Female			
	N	%	N	%	N	%
Illiterate	8	23.2	89	51.7	97	**45.8**
1-6 years	15	34.4	42	30.4	57	**31.2**
7-12 years	12	37.3	27	17.6	39	**21.7**
≥13	3	5.1	2	0.3	5	**1.3**
Total	38	100	160	100	198	**100**

Table A3.9.13: Obesity by Sex (UNRWA)

Sex	Obesity Status				Total	
	Male		Female			
	N	%	N	%	N	%
Obese	17	**45.8**	119	**75.0**	136	**69.0**
Not Obese	21	54.2	41	25.0	62	31.0
Total	38	100	160	100	198	100

4. Recommendations

This section aims at listing the main recommendations related to the baseline evaluation data. Various PHCI project activities namely, training, quality assurance, management information system and health communication are designed to meet most of the proposed recommendations. Furthermore, some immediate actions have to be taken by the Ministry of Health.

1. A national strategy for chronic non-communicable diseases is urgently needed to improve the status of awareness, treatment, and control levels among the hypertensive and diabetic populations. The status of control of diabetes and hypertension, which are considered very common diseases in Jordan showed alarming figures. Of special concern is diabetes that can affect nearly every organ in the body. Both diseases are associated with significant morbidity and mortality related to complications. Improved control of the two diseases can prevent or delay complications. The strategy must establish a comprehensive network of public, private, professional, and voluntary groups involved in blood pressure and diabetes control activities, including screening and follow-up services, as well as public, patient, and professional education. Primary Health Care Initiatives, the Field Epidemiology Training Program and Disease Prevention and Control Directorate at MoH should be key players in developing such a strategy.

2. Review and institute policies and procedures necessary for early detection of anemia both during pregnancy and early childhood. Developing procedures and protocols to be used for correct diagnosis and treatment of anemia and its underlying causes is recommended. Anemia control and prevention programs should focus on high-risk groups. Maternal and child health programs should include a management component that can ensure monitoring of procedures and protocols pertaining to anemia control. Further efforts should be exercised to improve screening procedures for anemia among children and pregnant women. Screening of children at one year of age and pregnant women for the presence of anemia has to be enforced and well monitored. Increasing the awareness of both professionals and parents of children toward the importance of this procedure is essential.

3. Food fortification and iron supplementation strategies are major approaches that can be developed to control nutritional anemia. Food fortification programs can be used after identifying the suitable vehicle for delivery. The inclusion of a nutritional anemia control component in the maternal and child health programs can assist in monitoring and controlling the problem. Iron supplementation approaches have to be revised and restructured in order to ensure regular and constant availability of oral iron supplements in addition to health education to assure regular use of iron.

4. Recording systems should have clear evaluation schemes in order to facilitate correct monitoring of health problems. Monitoring recording systems can assist in producing accurate prevalence figures of health problems. Accuracy in reporting is essential for revealing changes and patterns of health problems. Training health workers in data management and in effective use of information is essential. Documentation of procedures and findings in patient's medical records has to be improved. Failure of recording BP in 43% of cases screened for hypertension shows the negligence of physicians that might be occurring with other procedures. Again failure to record the background information like income and education by staff working at MCH clinics for women and children with multiple visits is another example of poor documentation.

5. Create a management system whereby a set of standards is provided and ensured. Standards that cover all areas of primary health care service delivery should be reviewed and updated as needed. These standards should be made available to all health care providers and used in monitoring service provision.

6. Improve the quality of maternal and child health care services in order to ensure high quality care delivery. Performed at regular intervals, evaluation of maternal and child health services should be considered as part of assuring high quality care. Defining criteria and developing methods for assessing the quality of maternal and child health services are necessary. Developing follow up mechanisms is a necessary step for modifying maternal and child health services.

7. Screening mechanisms for hypertension among those aged 25 years and above have to be established with no delay. Screening is a simple procedure that can be applied to a prevalent disease in order to enable the prevention of serious complications. Effective treatment schedules can be made readily available once the disease is discovered.

8. Conduct research studies that explore the nature of anemia and its various correlates. Since at least the published national studies on the problem of anemia in Jordan are rare, such studies are essential in facilitating anemia prevention programs.

9. Assist the MOH in developing a health education scheme that targets common health problems. When working on this recommendation, it is suggested to allocate considerable attention to the problem of anemia, diabetes and hypertension. Furthermore, the low use of pills in face of almost 100% availability at health centers should prompt a wider and more comprehensive marketing of contraceptive pills.

10. Ways to improve the postnatal care at MCH facilities should be considered including outreach programs. Furthermore, missed opportunities for family planning during postnatal visits have to be considered seriously.

11. Improve the utilization of growth and development monitoring visits for children during second and third year of life. This can be achieved by improving health awareness of the community towards growth monitoring needs and benefits. Developing the outreach program at the MOH can add considerable value to this particular intent.

Annexes

Timely Vaccination

Section I. Identification Variables

1. Name of Health Center | 2. Code of Health Center

3. Type of Health Center ☐ Comprehensive ☐ Primary | 4. Governorate

5. Health Directorate | 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center | **9. Subject ID for Sample**

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Section II- Control Variables

10. Date of Birth		11. Gender ☐ Male ☐ Female	12. Family Monthly Income in JDs	

13. Mother's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

14. Father's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

Section III- Dates of Vaccination

Total Number of Children

15. Dates of Vaccination

Vaccination Dose	Hepatitis B	DTP	Poliomyelitis	Measles	MMR
1st					
2ed					
3rd					
4th					
Booster					

Date | Name of Data Collector | Signature

Name Field Supervisor | Signature

Name Office Supervisor | Date | Signature

Growth and Development Monitoring and Anemia

Section I. Identification Variables

1. Name of Health Center | 2. Code of Health Center

3. Type of Health Center ☐ Comprehensive ☐ Primary | 4. Governorate

5. Health Directorate | 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center | **9. Subject ID for Sample**

This cell is for office use only

Section II- Control Variables

10. Date of Birth | 11. Gender ☐ Male ☐ Female | 12. Family Monthly Income in JDs

13. Mother's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

14. Father's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

Section III- Growth Visits

Total Number of Children

15. Number of Growth and Monitoring Visits

First Year of Life | Second Year of Life | Third Year of Life

16. Hemoglobin at the age of one year | 17. PCV | 18. Date

Date | Name of Data Collector | Signature

Name Field Supervisor | Signature

Name Office Supervisor | Date | Signature

Antenatal, Postnatal Visits and Anemia of Pregnancy

Section I. Identification Variables

1. Name of Health Center ____ 2. Code of Health Center ____

3. Type of Health Center ☐ Comprehensive ☐ Primary 4. Governorate ____

5. Health Directorate ____ 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center ____ **9. Subject ID for Sample** ____

This cell is for office use only

Section II- Control Variables

10. Age ____ 11. Family Income in JDs ____

12. Women's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

13. Husband's Education ☐ Illiterate ☐ Elementary ☐ Preparatory ☐ Secondary ☐ College ☐ University

Section III- Antenatal Care Total Number of Women ____

14. Total Number of Antenatal Visits ____

Section IV- Postnatal Care

15. Postnatal Care ☐ Yes ☐ No 16. Family Planning Yes ☐ No ☐ 17. Decision Made ☐ Yes ☐ No

Section V- Anemia of Pregnancy

18. Last Hemoglobin Reading ____ 19. Last reading of PCV ____

Date ____ Name of Data Collector ____ Signature

Name Field Supervisor ____ Signature

Name Office Supervisor ____ Date ____ Signature

Use of Contraceptive Methods (Clients)

NOTE: Please do not forget that your first question to the selected subject is about her marital and pregnancy status .

Section I. Identification Variables

1. Name of Health Center ____ 2. Code of Health Center ____

3. Type of Health Center ☐ Comprehensive ☐ Primary 4. Governorate ____

5. Health Directorate ____ 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center ____ **9. Subject ID for Sample** ____

This cell is for office use only

Section II- Control Variables

Estimated Daily Load of MWRA ____

10. Age ____ 11. Number of Male Children ____ 12. Number of Female Children ____

13. Employment Status ☐ Employed ☐ Unemployed ☐ Retired ☐ Housewife

14. Occupation

☐ Legislators and Senior Officials ☐ Clerks ☐ Craft and Related Trade Workers

☐ Professionals ☐ Service Workers and Shop and Market Sales Workers ☐ Plant & Machine Operators and Related Workers

☐ Technicians and Associated Professionals ☐ Skilled Agricultural Workers ☐ Elementary Occupations

☐ Housewife ☐ Others Define ____

15. Women's Years of Schooling ____ 16. Husband's Years of Schooling ____

Section III- Contraceptive Use

17. Do You Currently Use Any Contraceptive Method? Yes ☐ No ☐ If yes,

18. What Method Of The Following Do You Use

☐ Pills ☐ Norplant ☐ Abstinence

☐ IUD ☐ Diaphragm, foam, ☐ Withdrawal

☐ Condom ☐ ♀ Sterilization ☐ Breastfeeding

☐ Injectables ☐ ♂ Sterilization ☐ Others:

19. What is the source of your contraceptive? ☐ This HC ☐ Other MoH HC ☐ Non-MoH HC

20. Do you have problems getting contraceptives? ☐ Yes ☐ No ☐ Not Sure

21. If Yes, specify the problem

☐ Non-availability ☐ Adverse Reactions

☐ Male Provider ☐ Others Specify:

☐ No Daily Provision ____

Date ____ Name of Data Collector ____ Signature

Name Field Supervisor ____ Signature

Name Office Supervisor ____ Date ____ Signature

Use of Contraceptive Methods (Providers)

Section I. Identification Variables

1. Name of Health Center ____ 2. Code of Health Center ____

3. Type of Health Center Comprehensive ☐ Primary ☐ 4. Governorate ____

5. Health Directorate ____ 6. Location Urban ☐ Rural ☐

7. Region North ☐ Middle ☐ South ☐

8. Health Center ID ____

Section II. Data on Contraceptives

9. What contraceptive method is available today at your center?

☐ Pills ☐ Injectables ☐ Others

☐ IUDs ☐ Norplant Specify: ____

☐ Condoms ☐ Diaphragm, foam, jelly

10. How frequent do you provide IUD insertion?

☐ Daily ☐ Twice a week ☐ Others Specify: ____

☐ Once a week ☐ Three times a week

11. Who usually does IUD insertion? ☐ A Female Dr. ☐ A Male Dr. ☐ Midwife

Date ____ Name of Data Collector ____ Signature

Name Field Supervisor ____ Signature

Name Office Supervisor ____ Date ____ Signature

Screening for Hypertension

NOTE: You can proceed filling the questionnaire only if the patient is not known to be hypertensive and he/she is over the age of 40

Section I. Identification Variables

1. Name of Health Center ____ 2. Code of Health Center ____

3. Type of Health Center ☐ Comprehensive ☐ Primary 4. Governorate ____

5. Health Directorate ____ 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center ____ **9. Subject ID for Sample** ____

This cell is for office use only

Section II- Control Variables

10. Age ____ 11Gender: ☐ Male ☐ Female 12. Years of Schooling ____

Section II- Hypertension Screening Estimated Load of >40 Years of Age ____

13. Has your BP been checked during today's visit? ☐ Yes ☐ No

14. Today's BP reading in patient's medical record ☐ Yes ☐ No

15. Number of visits documented over the last year ____

16. Number of times the BP was checked over the same period of time ____

Date ____ Name of Data Collector ____ Signature

Name Field Supervisor ____ Signature

Name Office Supervisor ____ Date ____ Signature

Status of Control of Diabetes

Section I. Identification Variables

1. Name of Health Center | 2. Code of Health Center

3. Type of Health Center ☐ Comprehensive ☐ Primary | 4. Governorate

5. Health Directorate | 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center | 9. Subject ID for Sample (office use only)

10. Name of the Patient | 11. Phone Number

12. Address

Section II- Control Variables

Expected Number of Diabetics During the Data Collection Period

13. Age | 14Gender: Male ☐ Female ☐ | 15. Years of Schooling

16. Weight in Kg | 17. Height in cm | 18. Duration of Diabetes in Years

19. Employment Status ☐ Employed ☐ Unemployed ☐ Retired

20. Occupation

- ☐ Legislators and Senior Officials
- ☐ Professionals
- ☐ Technicians and Associated Professionals
- ☐ Clerks
- ☐ Service Workers and Shop and Market Sales Workers
- ☐ Skilled Agricultural Workers
- ☐ Craft and Related Trade Workers
- ☐ Plant & Machine Operators and Related Workers
- ☐ Elementary Occupations
- ☐ Others — Specify

13. Employment Status ☐ Employed

Section III- Glycosylated Hemoglobin

21. HbA_{1c} Reading

Date | Name of Data Collector | Signature

Name Field Supervisor | Signature

Name Office Supervisor | Date | Signature

Blood Collection and Lab Form for Diabetes

Health Center Name | **Code of Health Center**

Governorate | **Directorate of Health**

Serial Number	Name	Date of Blood Collection	Name of & Signature of Physician	HBA1c Reading	Date of the Test	Name & signature of lab technician

Status of Control of Hypertension

Section I. Identification Variables

1. Name of Health Center | 2. Code of Health Center

3. Type of Health Center ☐ comprehensive ☐ primary | 4. Governorate

5. Health Directorate | 6. Location ☐ Urban ☐ Rural

7. Region ☐ North ☐ Middle ☐ South

8. Subject ID for Health Center | 9. Subject ID for Sample (office use only)

10. Name of the Patient | 11. Phone Number

12. Address

Section II- Control Variables

Expected Number of Hypertensives During the Period of Data Collection

13. Age | 14. Gender: Male ☐ Female ☐ | 15. Years of Schooling

16. Weight in Kg | 17. Height in cm | 18. Duration of Hypertension in Years

19. Employment Status ☐ Employed ☐ Unemployed ☐ Retired

19. Occupation

☐ Legislators and Senior Officials
☐ Clerks
☐ Craft and Related Trade Workers
☐ Professionals
☐ Service Workers and Shop and Market Sales Workers
☐ Plant & Machine Operators and Related Workers
☐ Technicians and Associated Professionals
☐ Skilled Agricultural Workers
☐ Elementary Occupations
☐ Others Specify

Section III- Blood Pressure Readings

20. Systolic BP | 21. Diastolic BP

Date | Name of Data Collector | Signature

Name Field Supervisor | Signature

Name Office Supervisor | Date | Signature