PRECONCEPTION CARE AND KNOWLEDGE ON EFFECT OF DIABETES MELLITUS ON PREGNANCY AMONG DIABETIC WOMEN ATTENDING THE DIABETIC CLINIC IN JIMMA UNIVERSITY SPECIALIZED HOSPITAL, SOUTH WEST ETHIOPA.

BY

GETACHEW AYANA (M.D)

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JIMMA, ETHIOPIA

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GETACHEW AYANA (MD)

ADVISORs:-

    WUBSHET GIRMA (MD, Asst Prof. OB/GYN)

    GURMESA TURA (PhD, Assistant Professor)

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JIMMA ETHIOPIA

Abstract

Background: Diabetes is the most common medical complication of pregnancy. Despite improved access and quality of antenatal care, women with pre-gestational diabetes and their fetuses are at increased risk of developing serious complications compared with the non-diabetic pregnant women, including spontaneous abortion, preterm labor, hypertensive disorders, and delivery by cesarean section. Preconception care is a key to prevent associated fetal and maternal morbidity and mortality. However the practice of preconception care is almost non-existent in developing countries and not studied in Jimma University Specialized Hospital.

Objective: To determine the status of preconception care and knowledge on the effect of diabetes on pregnancy among diabetic reproductive age group women attending the diabetic clinic of Jimma University Specialized Hospital, Southwest Ethiopia.

Methods: A cross-sectional study was conducted on all women of reproductive age attending the diabetic clinic of Jimma University Specialized Hospital, from Sep 1- Nov 31, 2014. Data were collected by trained two nurses and two medical interns using semi structured interviewer administered questionnaire and document review check list. Data were cleaned, edited, coded and entered to and analyzed by SPSS version 20.0. Bi-Variate and Multi variable binary logistic regression analysis was carried out to identify the independent factors for knowledge on the effect of diabetes on pregnancy. Odds ratios together with their 95%CI were used to show the magnitude and significance of the associations.

Result: Of the 122 respondents, 50% were diagnosed to have type 1 DM, and the other half type 2 DM. Majority 83(68%) were in the age group of 35-49 years with mean ($\pm$SD) of 35.8$\pm$7.4.The mean duration of diagnosis of diabetes was 5.7$\pm$ 4 years. Average recent glycemic level (FBS) was 168.4 $\pm$59.6 gm/dl. Less than half (47.5%) of the respondents had received information about preconception care and counseling. About a third (34.4%) had good care information on preconception care and 32.8% had good knowledge level on the effects of diabetes on pregnancy.

Conclusions: the status of preconception care information provision and knowledge level on the effects of diabetes on pregnancy were low. Promoting knowledge of diabetic women on maternal and fetal risks and preconception care and integration of preconception care information provision to diabetic educations are recommended. Health professionals should give emphasis to information provision and establishment of joint clinics.

KEYWORDS: preconception care, diabetes mellitus, level of knowledge;

Acknowledgment

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Acronyms

ACOG   American College of Obstetricians and Gynecologists.

DM   Diabetes Mellitus

HgA1c   Glycosylated Hemoglobin

JUSH   Jimma University Specialized Hospital.

NIH   National Institute of Health

PCC   Preconception Care.

SPSS   Statistical Package for Social Sciences.

WHO   World Health Organization.

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CHAPTER ONE: INTRODUCTION

1.1 Background

Diabetes mellitus (DM) is a global public health problem with expected 438 million diabetics by the year 2030 worldwide (1). In many areas around the globe, including the West as well as many developing and Middle Eastern countries, diabetes has become a major health burden affecting young adults and women in their reproductive age (2,3). Despite improved access and quality of antenatal care, women with pre-gestational diabetes and their fetuses are at increased risk of developing serious complications compared with the non-diabetic pregnant women, including spontaneous abortion, preterm labor, hypertensive disorders, and delivery by cesarean section (4,5).

Diabetes is the most common medical complication of pregnancy. Women can be classified as those who were known to have diabetes before pregnancy—*pregestational* or *overt*, and those diagnosed during pregnancy—*gestational* (1, 6).Pregnancy in individuals with known DM requires meticulous planning and adherence to strict treatment regimens. Intensive diabetes management and normalization of the A1C are essential for individuals with existing DM who are planning pregnancy. The most crucial period of glycemic control is soon after fertilization. The risk of fetal malformations is increased 4 - 10 times in individuals with uncontrolled DM at the time of conception (6, 7).

Many of the complications of DM during pregnancy can be prevented by optimizing maternal health in the preconception period. Glycemic control is one of the most important aspects of preconception care (PCC) (8, 9).Preconception care is the provision of biomedical, behavioral and social health interventions to women and couples before conception occurs, aimed at improving their health status, and reducing behaviors and individual and environmental factors that could contribute to poor maternal and Child health outcomes. Its ultimate aim is improved maternal and child health outcomes,in both the short and long term (7,10).

In addition, it established the following goals for improving preconception care:

1. Improve knowledge, attitudes, and behaviors of men and women related to
2. preconception health.
3. Assure that all women of childbearing age receive pre-conceptional care services—including evidence-based risk screening, health promotion, and interventions—that will enable them to enter pregnancy in optimal health.
4. Reduce risks indicated by a previous adverse pregnancy outcome through interconceptional interventions to prevent or minimize recurrent adverse outcomes.
5. Reduce the disparities in adverse pregnancy outcomes.

Women with diabetes, who receive preconception counseling have better preconception glycemic control and are more likely to have favorablePregnancy outcomes, including lower rates of congenital anomalies and spontaneous abortions (11-13).

However, other aspects such as folic acid supplementation, smoking cessation, screening and treatment of diabetes complications and discontinuing teratogenic medication, are as important for improving maternal and fetal outcomes (14).During counseling, questions may be answered regarding risk factors for complications and the plan for general management of diabetes in pregnancy. Planning for pregnancy should optimally be accomplished over several months. Glycosylated hemoglobin measurements are performed to aid in the timing of conception (7).

It is advised that any woman with diabetes between menarche and menopause be reminded of the importance of achieving euglycemia before conception. Counseling regarding using an effective contraceptive is needed until target A1C levels are established. It is advisable that when pregnancy is contemplated, the woman with preexisting diabetes consult with a team specializing in diabetes and pregnancy to ensure glycemic control and to identify complications of diabetes that need to be addressed prior to conception (15, 16).

1.2. Statement of the problem

Given the burden of maternal mortality and morbidity, it is important to cast light on the global picture of neonatal survival. Every year an estimated 3.6 million newborn infants also die in the first four weeks of life. Of these, maternal health complications contribute to at least 1.5 million neonatal deaths during the first week of life and 1.4 million stillborn babies (17, 19).

Because of the strong association between glycaemic control, as measured by glycosylated hemoglobin (HbA1c), and congenital anomalies, glycaemic targets are central to preconception care. Glucose and HbA1c levels are achieved through adequate nutritional therapy, insulin therapy and self-monitoring of blood glucose levels. An HbA1c level of less than 1% above the upper limit of normal is commonly recommended, with an even lower level within the normal range desirable if possible (17, 18).

An assessment of diabetes related complications is commonly recommended as part of determining the progression of diabetes. This includes investigations and examinations for retinal, renal and vascular complications. These assessments also provide an indication of how pregnancy may affect the progression of diabetes in the mother (17-20).

While there is a strong focus on glycaemic control, preconception care is multidisciplinary. The healthcare team should include an obstetrician, endocrinologist or other physician with diabetes in pregnancy experience, dietitian, diabetes educator and other health professionals as required. This approach is suggested to ensure adequate support from preconception through to the postnatal period in terms of diabetes and pregnancy complications but also to provide psychosocial support (17, 18).

Studies have shown that infants of women with pre-existent insulin dependent diabetes Mellitus have a 10-fold greater risk of a congenital malformation and a fivefold greater risk of being stillborn than infants in the general population. Significant associations

between pre-gestational diabetes and perinatal mortality and congenital malformations, as well as other neonatal and maternal morbidities, were also found in other studies (21-24).

Meta-analysis of 21 studies of Cochrane Database of Systematic Reviews 2010; done in developed nations, showed that preconception care was able to significantly reduce the occurrence of congenital malformations. However, the problem lies in the fact that, less than 30% of those with diabetes present for preconception care. Substantial number of women with diabetes do not access such preconception care interventions and continue to have unplanned pregnancies with deleterious results (25).

Anomalies of the cardiac, renal, and central nervous systems arise during the first 7 weeks of gestation, a time when it is most unusual for patients to seek prenatal care. Therefore, the management and counseling of women with diabetes in the reproductive age group should begin before conception. Unfortunately, it has been estimated that less than 20 percent of diabetic women in the United States obtain pre pregnancy counseling. Pre pregnancy counseling includes an assessment of vascular status and glycemic control (6, 7).

Counseling about potential pregnancy risks and preventative strategies must be provided before conception. By the time most women realize they are pregnant; 1 to 2 weeks after the first missed period; the fetal spinal cord has already formed and the heart is beating. Thus, many prevention strategies are ineffective if initiated at this time. It is estimated that up to half of all pregnancies are unplanned, and that these may be at greatest risk. (6 &17).

Preconception care for women with pregestational diabetes is associated with better outcomes. Although multidisciplinary clinics improve outcomes, <50% of women receive such care. Women who are heavier, younger and smokers, and who have a lower socioeconomic status, lower health literacy and a poor relationship with their healthcare provider, are less likely to receive preconception care. By discussing pregnancy prior to conception, healthcare providers may be able to improve outcomes by educating women about the importance of strict glycemic control, encouraging folic acid supplementation, discontinuing potentially harmful medications and reducing body weight (26).

When considering contraceptive options for women with diabetes mellitus, assessing both efficacy and safety is important. Efficacy is highest for long term contraceptive methods, somewhat less high for short-term hormonal therapies (for which daily, weekly, monthly or quarterly dosing may affect adherence and, thus, efficacy), and lowest for barrier or behavioral methods. Contraceptives that do not rely on active participation of the patient have the highest efficacy among contraceptive methods, as well as very high safety ratings for patients with diabetes mellitus, regardless of severity of disease. The Copper T 380A, the LNG-IUS and the sub dermal implant offer three excellent choices for patients (27).

According to study done in 2010 in USA on focus groups with 72 non-pregnant women stratified by chronic condition (diabetes, hypertension, obesity) showed; I. Knowledge about pregnancy risks related to chronic medical conditions was limited; II. Pregnancy intentions were affected by diabetes and hypertension; III. Knowledge about optimizing preconception health was limited; and IV. Lack of control over ability to avoid unintended pregnancy, including limited knowledge about how medical conditions might affect contraceptive choices. Also diabetic and hypertensive women had little knowledge about the *specific* complications they were at risk for, even among those who had previously experienced pregnancy complications (28).

According to Trends in Maternal Health in Ethiopia, December 2011; lower contraceptive use was reported among women who were exposed to high risk pregnancy compared to women without fertility-related risk. Contraceptive prevalence was 26.1% for women who fall in one or more fertility-related high risk pregnancy in 2011, and this was even lower at 23.3% for those who were exposed to two or more risks during the same period. In contrast, about 38% of the women without fertility-related risk were using some form of family planning in 2011 (29).

Women with chronic medical conditions are at increased risk for pregnancy-related complications. Yet little research has addressed how women with diabetes perceive their pregnancy-associated risks or make reproductive health decisions

CHAPTER TWO: LITERATURE REVIEW

2.1 Situation Overview

Diabetes continues to be an ever-increasing global problem. The prevalence of Type 2 DM continues to increase worldwide, especially in the developing countries. This in turn means more women of reproductive age in developing countries have diabetes; hence a greater number of pregnancies are complicated by the condition, putting both the mother and the fetus at an increased risk of morbidity and mortality. Diabetes in pregnancy is associated with elevated rates of miscarriage, pre-eclampsia, preterm labor and caesarean sections and higher rates of fetal congenital malformation like cardiovascular (52%), Musculoskeletal (12%), urogenital (8%), CNS (4%), gastrointestinal (2%) and others (21%). Optimal glycemic control during pregnancy may reduce these diabetes related risks, but what is now considered a more effective time to intervene is that before pregnancy (30-33).

According to exploratory study conducted in Brazil from March to July 2009, the average age of the women was 25.7 years old. While the predominant age was between 18 and 24 years old with 56 (52.8%) of the women. Among the 106 (100%) women with DM, 90 (84.9%) were type 1 DM and 16 (15.1%) were type 2 DM, 88 (83%) used insulin, 11 (10.4%) used oral anti diabetics and seven (6.6%) used both; 99 (93.3%) had received their diagnosis within the last 20 years and seven (6.6%) were diagnosed more than 20 years ago; the average time of diagnosis was 11.3 years. Forty (37.7%) women with DM received a fasting glucose test and 66 (62.3%) took the test at random. Blood glucose was altered (>100mg/dl) in 22 (55%) women who had the fasting glucose test and in 38 (57.5%) women who performed it at random (>140mg/dl); 16 (15.1%) reported a compromised target organ, which characterizes an important criterion of clinical eligibility in the choice of a contraceptive method for women with DM. Of the total number of women with DM, 56 (52.8%) reported at least one pregnancy. Of these, 46 (82.1%) became pregnant once or twice, and ten (17.8%) of them, three or more times. None had more than five pregnancies. Concerning parity, among the 56 (100%) women with history of pregnancy, four (7.1%) were nulliparous, that is, they became pregnant but had spontaneous abortion, and the other 52 (92.8%) experienced one to four

deliveries, with an average of 0.79 deliveries (SD=1.021). Among the 56 women with DM who had already become pregnant, 14 (25.0%) reported at least one abortion: 10 (71.4%) of these reported one abortion and four (28.6%) reported two abortions (34).

In a prospective cohort study done in Norwich, United Kingdom, between 1991 and 2002,38% women had pre pregnancy care. The pre pregnancy care group contained more primiparous women (54.7 vs. 40.6%) and fewer smokers (9.4 vs. 28.7%). They registered earlier (6.6 vs. 8.3 weeks) and had a lower HgA1C at the initial visit (6.5% vs. 7.6%). Adverse pregnancy outcomes and very premature deliveries were significantly lower in women who received pre pregnancy care (2.9 vs. 10.2%; and 5.0 vs. 14.2%) respectively. There were 28 (9.7%) spontaneous abortions, 13 (4.5%) congenital malformations, 5 stillbirths, and 2 neonatal deaths; perinatal mortality rate of 27 of 1,000 births (35).

According to prospective follow up study done in Ireland from 2008-2010, 61% had Type 1DM. There was an increase in the numbers attending preconception care; 28–52% (36).

In a prospective study done in Atlanta in 1996, 37% sought preconception care. Subjects tended to be older and were significantly more likely to be white, married, living with their partners, have higher levels of education, employed, and have higher family incomes. Of 57 subjects, 53 (93%) had type 1 DM and mean duration was 14.7 years (37).

From across sectional study done in Washington in 1999; although most women (79%) knew they should optimize their blood glucose levels before conception, fewer than half (41%) of their pregnancies were planned. Among the women with unplanned pregnancies, 35 (70%) used contraception less than half of the time. Of these, 17 (49%) said they did not use contraception because they did not think they could get pregnant. Five (10%) of the women with unplanned pregnancies said they were hoping to get pregnant but paid no attention to their diabetes control. Contraception failure as a cause of unplanned pregnancy was reported by 15(30%). Women with planned pregnancies had

significantly higher income and more education; were more likely to have private health insurance (38).

According to the study conducted in Brazil, among the 56 (100%) women with a history of pregnancy, only 20 (35.0%) reported that the pregnancy was planned. Of these, 19 (95.0%) reported that the couple planned the pregnancy and only one (5.0%) reported that a professional helped with the planning (34).

From the study conducted in Brazil; a total of 72 (67.9%) women reported they received some information concerning preconception care. Of these, 62 (86.1%) mentioned the DM monitoring service at the Integrated Hypertension and Diabetes Center as the source of information, ten (13.9%) reported some means of communication and five (6.9%) mentioned prenatal and maternity care. Of the 34 women who reported no information was received, 27 (79.5%) did not mention any care action and seven (20.5%) mentioned care actions focused on preconception based on personal experiences or those of their family members. the greatest amount of knowledge was related to the maintenance of glycemic control and blood pressure parameters within normal levels, mentioned by 72 (67.9%) and 71 (67%) of the participants, respectively. In relation to knowledge of women with DM concerning preconception care, 27 (25.5%) were unaware of all the required care. Among the women with DM who retained some knowledge, 64 (60.3%) acknowledged the risks of fetal malformation and miscarriage: 48 (45.3%) and 42 (39.6%) Women, respectively. Macrodome, stillbirth and weight gain above normal levels, respectively mentioned by 12 (18.8%), 4 (6.2%) and 2 (3.1%) women (25, 34).

A prospective study done in French in 2007 showed; the main reported sources of information about pregnancy were the diabetologist (78%) and/or specific leaflets (42%). Although 85% of the women declared having received information about preconception care, 48% were unaware of the risk of congenital malformations and 41% feared for neonatal diabetes. However, 82% of the women thought that a level of HbA1c below 7% was a target to achieve before conception. In multivariate analysis, onset of diabetes before the age of 15 was associated with the knowledge that diabetes may be associated

with complications during pregnancy; the use of contraception was associated with knowledge about preconception care; a high educational level was associated with knowledge that complications are avoidable and that good glycemic control is mandatory before conception (39).

In a cross-sectional study done at the University of Nigeria Teaching Hospital and Enugu state university teaching hospital in 2009; the mean age was 30.0 +_ 5.0 years. Of these, 43.1% of women had heard of preconception care. The respondent's awareness of preconception care and their ability to define the subject correctly increase significantly with their educational status and parity. However, there was a difference between knowledge and behavior. The practice of preconception care was not affected significantly by the parity of the patients. The majority believed that preconception care might improve the health of mother and child. The practice of preconception care is almost non-existent in developing countries (40).

2.2 Conceptual frame work
The concepts in this conceptual framework are developed after review of different literatures.
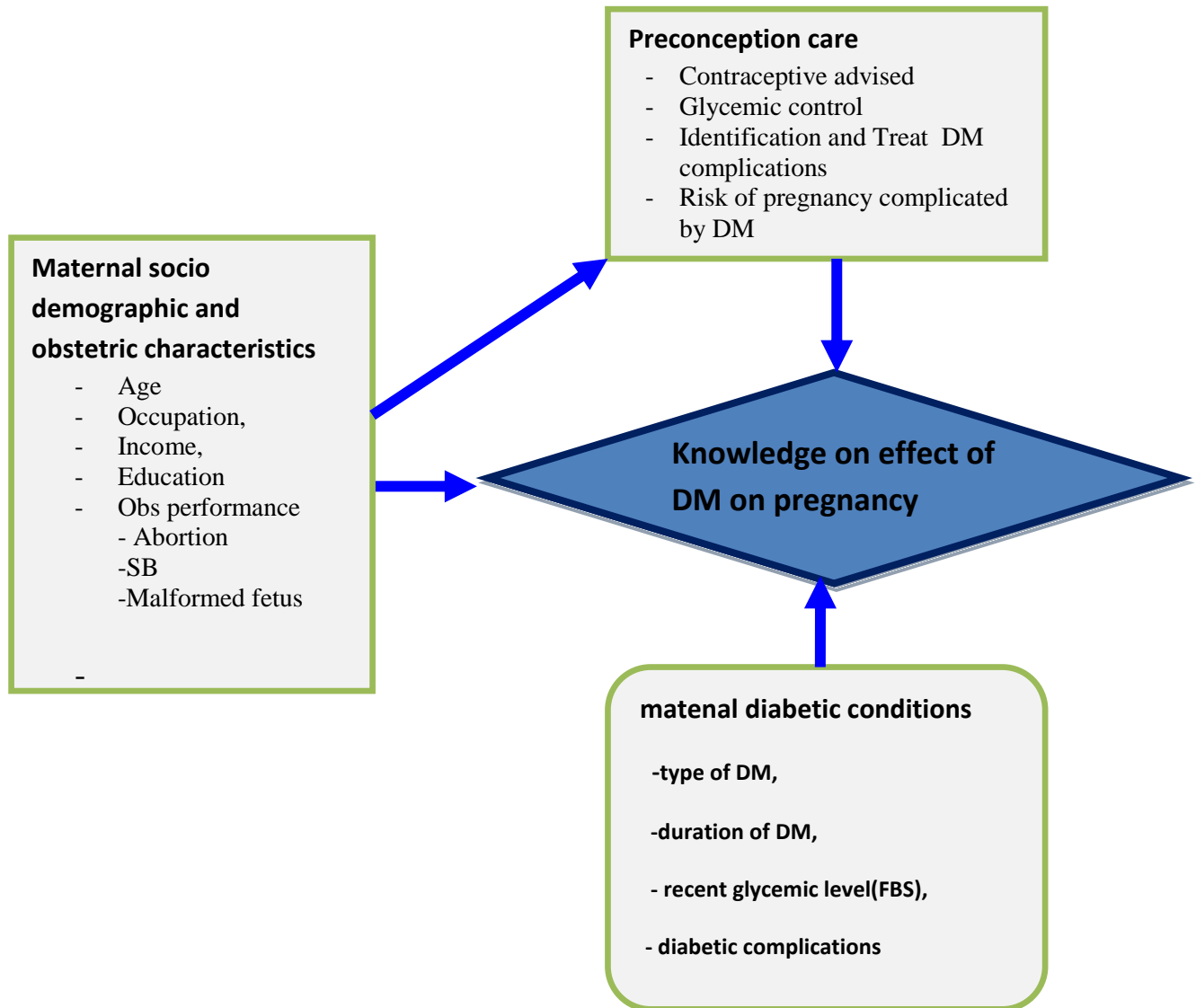
Figure 1: Conceptual frame work of the study, JUSH, July 2014, south west Ethiopia.

2.3 Significance of the study

In obstetric practice, DM is common medical condition which complicates pregnancy. DM poses documented effects to the maternal, fetal and neonatal outcome. However, studies have shown that preconception care has significant effect on prevention of DM associated complication to mother, fetus and neonate. But studies on the status of practice of preconception care are very scarce in developing countries, as well in Ethiopia. To the investigator's knowledge, no published studies on the status of preconception care and knowledge on the effect of DM on pregnancy among diabetic women in JUSH. Thus, this study is hoped to fill this gap.

The findings of this study will also help the clinicians to promote preconception care and improve pregnancy outcome. Furthermore, it will be helpful for all stakeholders working on obstetric care during their health planning that can be implemented at community level and institution level to decrease maternal and fetal complications associated with DM. It will also provide additional information for further research.

CHAPTER THREE: Objective

3.1 General objective

To determine the status of preconception care and knowledge on the effect of diabetes on pregnancy among diabetic women attending the diabetic clinic of Jimma University Specialized Hospital Southwest Ethiopia.

3.2 Specific objectives;

1. To determine the status of preconception care information provision among diabetic women attending the diabetic clinic of JUSH**.**
2. To assess the status of knowledge on the effect of diabetes on pregnancy among diabetic women attending the diabetic clinic of JUSH.
3. To identify factors associated with knowledge on the effect of diabetes on pregnancy among diabetic women attending the diabetic clinic of JUSH.

CHAPTER FOUR: METHODS AND MATERIAL

4.1 Study area and period

The study was conducted in Jimma University Specialized Hospital (JUSH) Diabetic clinic from SEP 1–NOV 31, 2014. JUSH is located 352kms Southwest of Addis Ababa in Jimma City. It is one of the oldest teaching hospitals in the country giving services to people living in Jimma zone and as a referral hospital in the South-West Ethiopia for about 15million population. It is also serving as a clinical post graduate specialty teaching hospital for Obstetrics and Gynecology, Internal Medicine, Pediatrics & Child Health since 2005 and for Ophthalmology and Surgery since 2007. The diabetic clinic is serving for about 974 patients on follow up. There are two follow up days weekly and usually diabetic education is given for clients on the follow up days.

4.2 Study design

Facility-based cross-sectional study was conducted.

4.3 Reference Population

All diabetic women 15 – 49 years attending diabetic clinic of JUSH.

4.4 Source population

All diabetic women 15 – 49 years attending diabetic clinic of JUSH from Sep 1 – Nov 31, 2014.

4.5 Study population:

All diabetic women 15 – 49 years attending diabetic clinic of JUSH from Sep 1– Nov 31, 2014 and included in this study.

4.6 Inclusion and exclusion criteria

Inclusion criteria

- Diabetic women 15-49 years presented for follow up to diabetic clinic during study period.

Exclusion criteria

- Diabetic women age less than 15 years or above 49 years.
- Diabetic women with repeat visit.
- Diabetic women on permanent contraceptive, for whom hysterectomy, oophorectomies done, and those whose husbands had vasectomies

4.7 Sample size determination

All diabetic women 15-49 years presented for follow up to diabetic clinic during study period that fulfilled inclusion criteria were included in the study.

4.8 Sampling technique.

All diabetic women 15-49 years presented for follow up to diabetic clinic during study period who fulfilled inclusion criteria were consequentially included in study without sampling.

4.9. Study variables

4.9.1. Independent variables

➢ **Maternal socio-demographic and obstetric factors**

- Age
- Address
- Marital status
- Ethnicity
- Religion
- Educational status
- Income
- Parity

➢ **Maternal Diabetic condition and PCC**

- Type of diabetes
- Chronic complications
- Recent FBS
- Home blood glucose monitoring
- Diabetic education attended
- Preconception care and counseling

4.9.2 Dependent variable

- Level of Knowledge on effect of DM on pregnancy

4.10   Operational definition and definition of terms

- **Reproductive age group** – age group from 15- 49 years

- **Parity** – number of deliveries after 28 completed weeks of gestational age.

- **Gravidity** –number of pregnancy experiences irrespective of the outcome **Abortion-**pregnancy loss which occurs before 28 weeks completed gestatio**n**

- **Stillborn**- deliver of dead fetus after 28weeks completed gestational age

- **Congenital malformation**- visible or diagnosed fetal structural deformity

- **Macrosomia** - delivery a fetus weighting more than or equals to 4000gms

- **Preterm delivery**-delivery of a fetus before completed 37weeks of gestational age

- **Preconception care** - Any intervention provided to women of childbearing age, regardless of pregnancy status or desire, before Pregnancy, to improve outcomes for women, newborns and children; like contraceptive usage, glycemic control prior to conception, identification and treatment of chronic complication and other related problems in diabetic mothers.

- **Contraceptive planning** - reproductive life planning for women to prevent an unintended pregnancy, possible risks to themselves and their fetus (abortion stillbirths, congenital anomaly, preeclampsia).

- **Level of knowledge on effect of DM on pregnancy;** liker's scaling was used to standardize;

- None = no risk was mentioned;
- Limited = at least one risk was mentioned;
- Moderate = two risks were mentioned;
- Substantial = at least three risks were mentioned
- Extensive = all potential risks were mentioned.
- Good knowledge = women having substantial or extensive knowledge were classified as having good knowledge. Women having None, Limited or Moderate knowledge were classified as having not good knowledge.

- **Level of PCC information provision to mothers ;**

- None - no PCC information was mentioned,
- Limited - at least one PCC information was mentioned
- Moderate - two PCC information were mentioned;
- Substantial- three PCC information were mentioned
- Extensive - all PCC information were mentioned;
- Good care information – women having extensive or substantial care information;

4.11. Data collection instruments and procedures

4.11.1. Data collection instrument

Semi structured questionnaire and document review guide were developed after reviewing related literatures, standard text books and management protocols based on the particular objectives. The instrument has four parts:

Part I: Socio demographic and obstetric characteristics

Part-II: Maternal diabetic conditions

Part III: preconception care information

Part VI: knowledge on effect of Diabetes on pregnancy information

4.11.2 Data collection procedures

Data were collected through face to face interview of subjects and review of documents using semi structured questionnaire and document review check list by trained six medical interns and two nurses (assistant data collectors) working at Diabetic follow up clinic recruited based on their previous data collection experiences.

4.12 Data Quality

The questionnaire was pre-tested on 10 cases two weeks before the actual data collection, to check words, adequacy of variable and orders of the questionnaire. Based on the result, possible amendments were done. One day intensive training was given for data collectors by principal investigator on how to fill the questionnaire and review the documents. The completed questionnaires were checked every day for completeness by principal investigator and correction was given for data collectors before the next day data collection.

4.13. Data processing and analysis

The data were edited, cleaned, coded and entered to SPSS for windows V. 20.0. Bi-Variate and Multivariable binary logistic regression analysis was done to identify variables having significant association with level of knowledge on effect of DM on pregnancy. All variables having $P<0.25$ during bi-Variate analysis were considered as candidates for multivariable binary logistic regression analysis to see the effect of the independent variables on the outcome variable and significance was declared at $P< 0.05$.

4.14, Ethical considerations

Ethical clearance was obtained from the Ethical Review Committee of the College of public health and medical sciences of Jimma University. Verbal informed consent was obtained from each participant before the interview by explaining the objective of the research. All the information collected from the study subjects was handled confidentially through omitting their personal identification, conducting the interview in private place and using the data for the research purpose only. Right to withdraw or refuse was also maintained.

4.15 Plan of dissemination

The result will be submitted to department of obstetrics and gynecology, Jimma University post graduate studies, JUSH and presented on scientific presentation auditorium. Further effort will be made for publication on local or international peer reviewed journals.

CHAPTER FIVE: RESULTS

5.1. Socio demographic characteristics

A total of 122 Diabetic mothers, who fulfilled the inclusion criteria, participated in the study. Majority 83(68%) of the mothers were in the age group of 35-49 years with mean (±SD) age of 35.8±7.4 years. Oromo was the dominant ethnic group 77(63.1%) and Muslim 74(60.7%) was the leading religious group. Half, 62(50.8%), of the respondents were housewives in occupation and 51 (41.8%) can't read and write. Most, 104(85.2%), were married and 78(63.9%) came from outside Jimma town (**Table 1).**

Table-1 Socio demographic characteristics of the respondents, JUSH, from September 1–November 31, 2014, Southwest Ethiopia.

Variables		Frequency (n=122)	Percent
Address	Jimma town	44	36.1
	Outside Jimma town	78	63.9
Age	15-19 yrs	3	2.5
	20-34 yrs	36	29.5
	35-49 yrs	83	68
Ethnicity	Oromo	77	63.1
	Amhara	30	24.6
	Tigrie	2	1.6
	Gurage	3	2.5
	Dawuro	5	4.1
	Others *	5	4.1
Religion	Muslim	74	60.7
	Orthodox	38	31.1
	Protestant	9	7.4
	Others	1	0.8
Occupation	House wife	62	50.8
	Civil servant	23	18.9
	Farmer	23	18.9
	Merchant	8	6.6
	Others	6	4.9
Marital status	Married/cohabitant	104	85.2
	Separated	4	3.3
	Divorced	6	4.9
	Widowed(sexually active)	8	6.6
Monthly income In Birr	<1000	62	50.8
	1000-2000	39	32.0
	>2000	21	17.2
Educational status	can't read and write	51	41.8
	read and write only	18	14.8
	grade 1-8	10	8.2
	grade 9-10	30	24.6
	grade >10	13	10.7

5.2 Maternal Reproductive performance

Regarding the reproductive performance of the mothers; more than a third 43(35.2%) had five or more deliveries, 27(22.1%) had history of spontaneous abortion, and out of105(86.1%) who had deliveries; 13(12.4%) had history of still birth(s), and 7(6.7%) had history of grossly anomalous fetus delivery (**Table 2**).

Table 2   Maternal Reproductive performance of the respondents, JUSH, from
              September 1– November 31, 2014, south west Ethiopia.

Reproductive History		**Frequency**	**Percent**
Parity	Nulliparous	17	13.9
	1	11	9.0
	2-4	51	41.8
	≥5	43	35.2
	Total	122	100
History of spontaneous abortion	No	95	77.9
	1	15	12.3
	2	12	9.8
	Total	122	100
Number of still births	No	92	87.6
	1	10	9.5
	≥2	3	2.9
	Total	105	100
History of having Grossly anomalous fetu	Yes	7	6.7
	No	98	93.3
	Total	105	100

5.3 Maternal Diabetic Conditions

Of all the respondents, similar number, 61(50%) and 61 (50%) were diagnosed to have type 1 DM and type 2 DM, respectively. For the majority, 101(82.8%), of the participants, the duration of DM, since diagnosed, was less than ten years. The mean duration of diabetes was **5.7 ± 4** years with minimum of 6 months and maximum of 21 years. Thirty two percent of respondents had any one of chronic complications of DM (hypertension, diabetic nephropathy, peripheral neuropathy and others), 102(83.6%) had attended health educations on Diabetes at least once. Only 21(17.2%) of mothers had home blood glucose monitoring accessibility. The mean recent glycemic level (FBS) was **168.4 ± 59.6 gm/dl** with the minimum **65 gm/dl** and the maximum being **362 gm/dl.** Among the diabetic drugs, insulin was being used by most of the respondents, 70 (57.4%) (**Table 3**).

Table 3   Maternal diabetic type, diabetic status and glycemic level of the respondents, JUSH, from September 1– November 31, 2014, south west Ethiopia.

Maternal Diabetic Condition		Frequency (n=122)	Percent
Type of DM	Type 1 DM	61	50
	Type 2 DM	61	50
Type of drug using	Insulin	70	57.4
	Oral euglycemic	41	33.6
	Both insulin & oral euglycemic agents	11	9
Chronic complication of DM	Yes	39	32
	No	83	68
Attended Diabetic education	Yes	102	83.6
	No	20	16.4
Home blood glucose monitoring	Yes	21	17.2
	No	101	82.8
Duration DM	<10	101	82.8
	10-20	20	16.4
	>20	1	0.8
Recent Glycemic Level(FBS)	<110	20	16.4
	>_110	102	83.6

5.4 Preconception care information

Among the respondents 58(47.5%) of mothers had received information about preconception care and counseling (PCC). For these the source of information was; DM follow up clinic 29(50%), prenatal and maternity care center 14(24.1%), some means of communication (radio, TV) 3(5.3%), and 11(18.9%) received from both DM follow up clinic and prenatal and maternity care centers (Figure 1).

Concerning Preconception care information provided, most 111(90%) of them were given education on glucose control and self-monitoring, 77(63.1%) were informed on how to identify, evaluate and treat DM complications, 46(37.7%) were informed of effects of DM on pregnancy, and 34(27.9%) were advised to use reliable type of contraceptive till optimum blood glucose level is achieved. Overall 9(7.4%) of respondents were not provided PCC information on the four care information mentioned, 33(27%) had limited care information, 38(31.1%) had moderate care information, 9(7.4%) had substantial care information, and 33(27%) had extensive care information. Of all 42(34.4%) had good PCC information   (Figures 2 & 3).
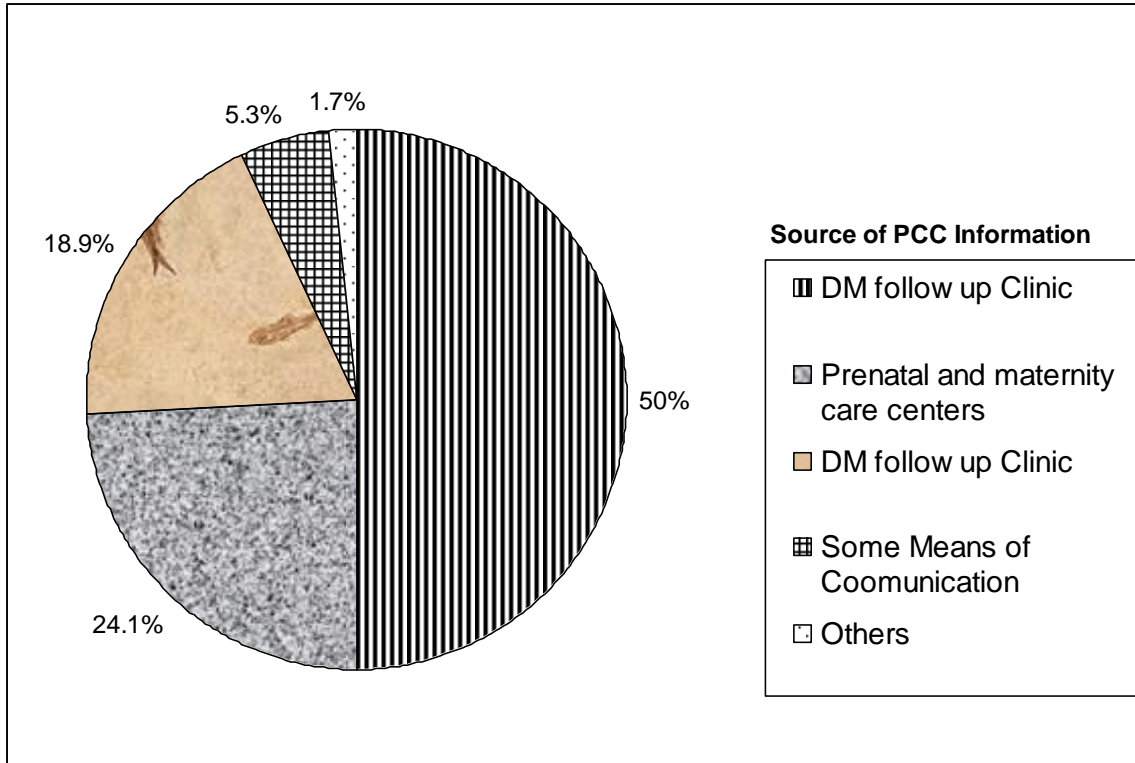
Figure.1 Source of information about PCC of the respondents, JUSH, from September 1–
November 31, 2014, south west Ethiopia.
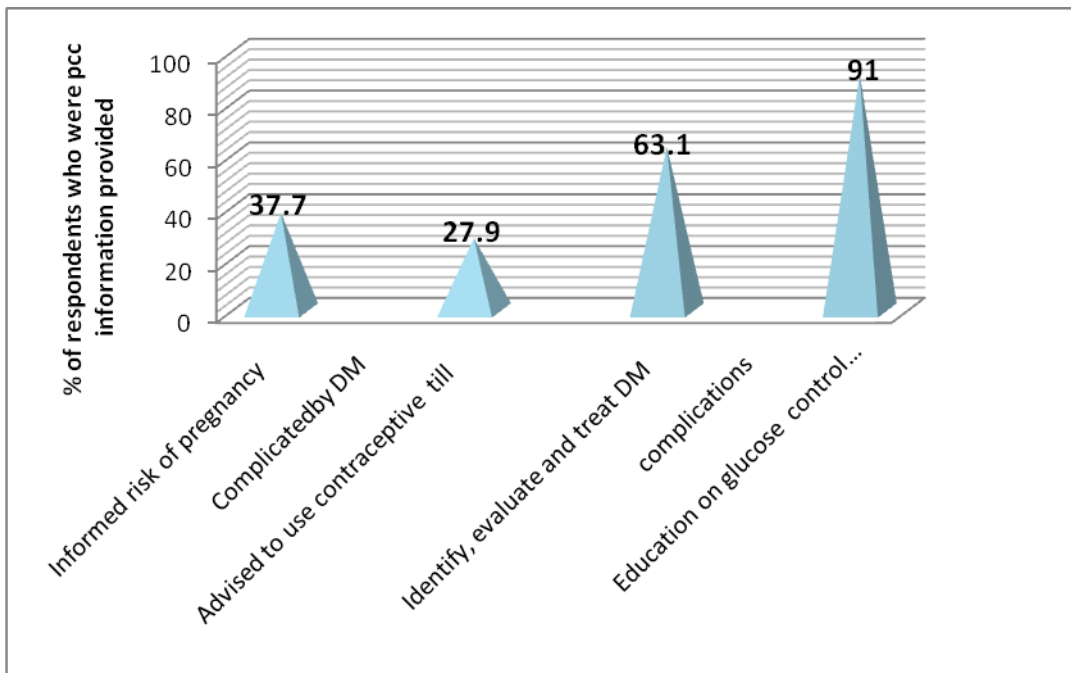
Figure **2** Preconception care counseling information provision of respondents, JUSH

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from September 1– November 31, 2014, south west Ethiopia.
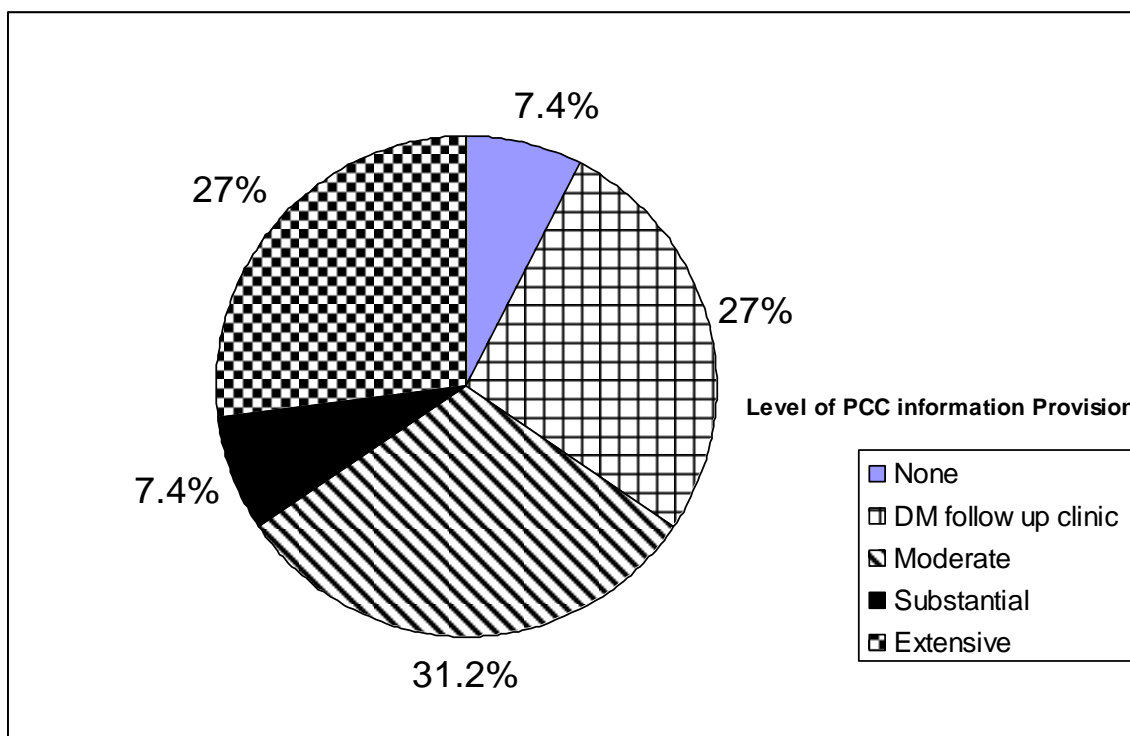
Figure. 3 Level of Preconception care and counseling information provision of respondents, JUSH from September 1– November 31, 2014, south west Ethiopia.

5.5 Knowledge on effect of DM on pregnancy

Among the respondents, 54(44.3%), 42(34.4%), 40(32.8%), 37(30.3%), 36(29.5%) and 26(21.3%) know that DM increases risk of big baby, difficult labor and delivery due to big baby, the need to achieve target blood glucose level before conception, abortion, still birth or IUFD, and congenital anomaly, respectively. Overall, nearly a third (32.8%) of the respondents were found to have good knowledge on the effects of DM on pregnancy (Figure4&5).

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Figure.4 Knowledge of the respondents on the effect of diabetes on pregnancy,
JUSH from September 1– November 31, 2014, south west Ethiopia.

Figure 5 Level of knowledge of the respondents on the effect of diabetes on pregnancy,
JUSH from September 1– November 31, 2014, south west Ethiopia.

5.6 Factors affecting knowledge on the effect of DM on pregnancy

Logistic regression analysis was done to identify factors associated with knowledge on the effect of DM on pregnancy. Maternal age, marital status, address of mother, occupation, parity, history of spontaneous abortion, history of stillbirth/IUFD, history of grossly anomalous fetus delivery, income, duration of DM and having chronic DM complication were not significantly associated with knowledge on the effect of DM on pregnancy. In bivariate analysis, educational status (COR= 6.5; 95%CI: 2.0, 21.0), attending diabetic education at DM clinic (COR= 5.3; 95%CI: 1.2, 24.3), received information about preconception care (COR= 17.96; 95%CI: 6.3,51.5), and provision of preconception care and counseling information were significantly associated with knowledge on the effect of DM on pregnancy. However, after adjusting in multivariate logistic regression analysis, provision of preconception care and counseling information was significantly associated with knowledge on the effect of DM on pregnancy. Women having PCC were 65 times more likely to have good knowledge as compared with those who have poor knowledge (AOR=65; 95%CI: 11.89, 354.97). (Table 4).

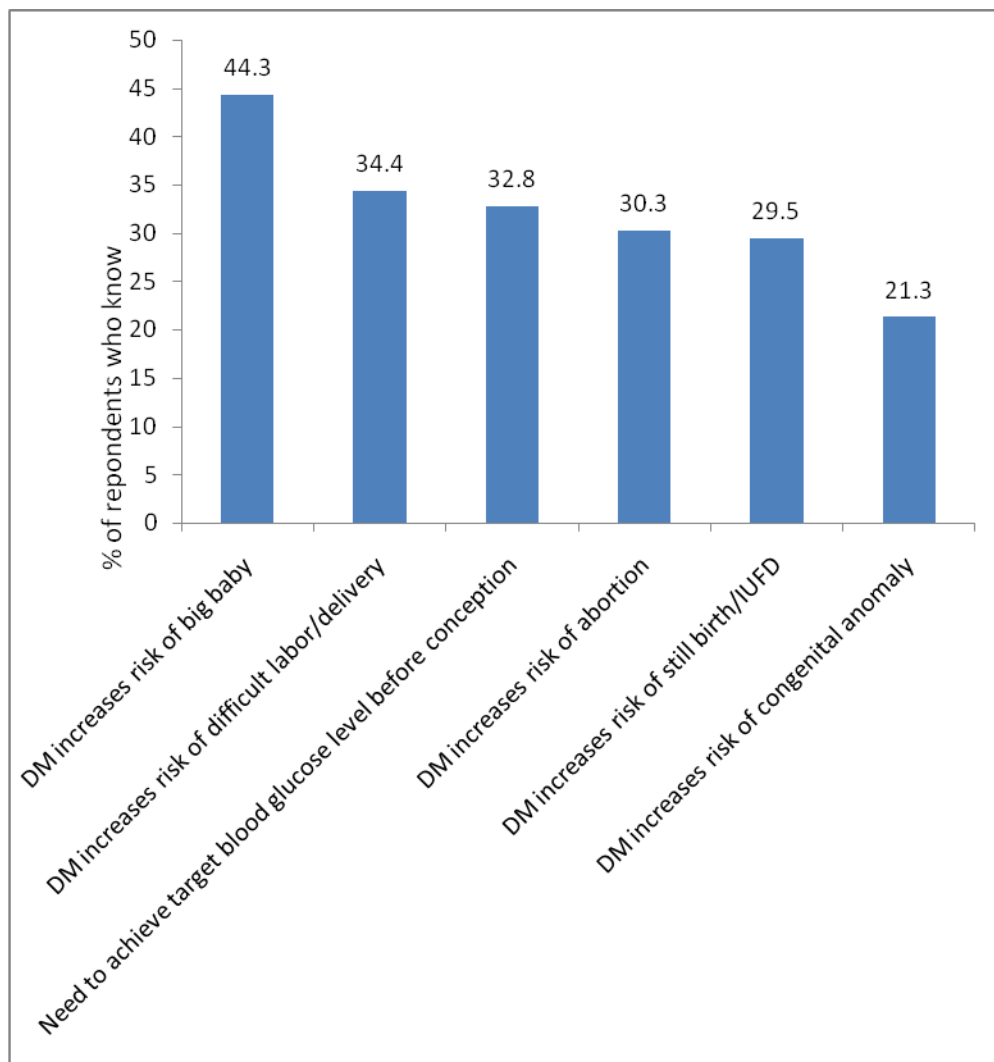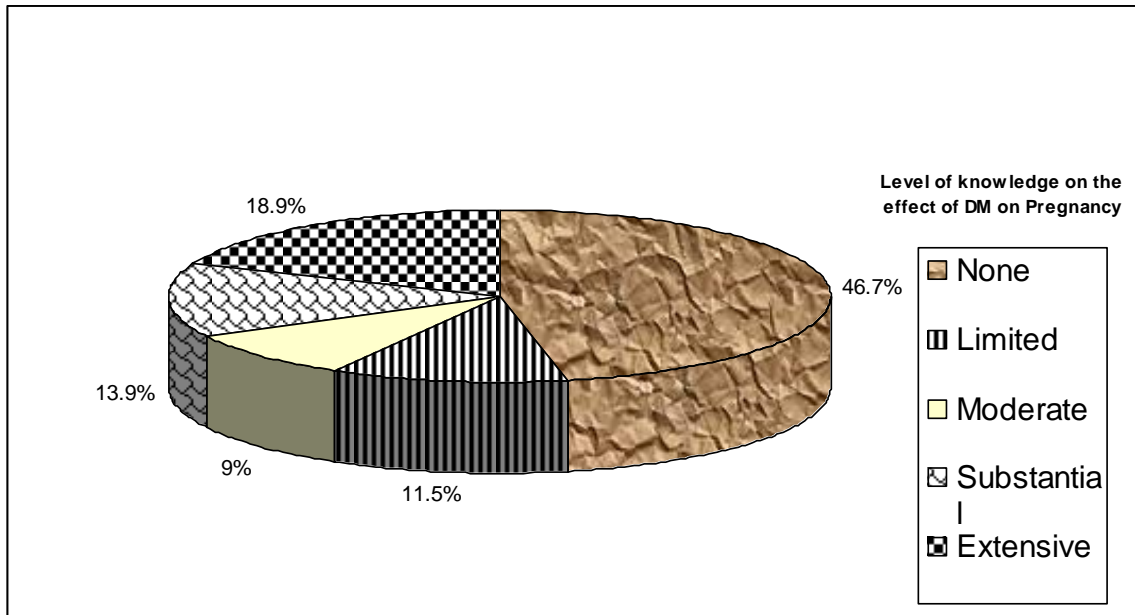Table 4 Factors associated with knowledge of the respondents on the effect of DM on pregnancy, JUSH from September 1– November 31, 2014, south west Ethiopia.

Variables		Knowledge of mothers on effect of DM on pregnancy		COR/95%CI	AOR/95%CI
		Not good	**Good**		
Educational status of mothers (N=122)	Can't read and write	39(76.50%)	12(23.50%)	1	1
	Read and write only	6(33.30%)	12(66.70%)	6.5 (2.0-21.0)	0.2(0.01-2.0)
	Grades 1-8	8(80.00%)	2(20.00%)	0.8(0.6- 4.4)	1.4(0.1- 19.4)
	Grades 9-10	20(66.70%)	10(33.30%)	1.6(0.6- 4.4)	0.1(0.001-1.6)
	Grades >10	9(69.20%)	4(30.80%)	1.4(0.2-5.5)	0.3(0.02- 3.1)
Attended DM education (N=122)	Yes	64(62.70%)	38(37.30%)	5.3(1.2-24)	0.8(0.1-6.3)
	No	18(90.00%)	2(10.00%)	1	1
Received information about PCC(N=122)	Yes	23(39.70%)	35(60.30%)	18(6.3-51.5)	1.8(0.3-11.0)
	No	59(92.20%)	5(7.80%)	1	1
History of spontaneous abortion (N=122)	No	67(70.50%)	28(29.50%)	0.52(0.2-1.3)	2.0(0.5-9.0)
	Yes	15(55.60%)	12(44.40%)	1	1
PCC counseling information provision (N=122)	not good	75(93.80%)	5(6.20%)	1	1
	good	7(16.70%)	35(83.30%)	75(22-253)	65(12- 355)
History of having grossly anomalous fetus (N=105)	Yes	2(28.60%)	5(71.40%)	5.2(0.95-28.0)	6.0(0.4-97.9)
	No	66(67.30%)	32(32.70%)	1	1

CHAPTER SIX: DISCUSSION

In Ethiopia, there is limited information about the status of preconception care and knowledge on the effect of DM on pregnancy. Thus this study has tried to assess the status of preconception care, status of knowledge on the effect of DM on pregnancy and associated factors. In this study, majority (68%) of the respondents are in the age group of 35-49 years with mean age of 35.8 years, and 50% are having type 1DM, 50% type 2DM, average age of diagnosis of DM was 5.7 years. when this finding is compared with reports like from Brazil, the predominant age was between 18 and 24 years 56 (52.8%) of the women and mean age was 25.7 years, 84.9% were type 1DM and 15.1% were type 2DM and average duration of diagnosis of DM was 11.3 years(34); there is significant discrepancy. But when compared with report from Nigeria; average age of mothers was 30±5 years (40); was comparable. These discrepancies can be attributed to high childhood obesity and diabetes mellitus, early diagnosis of DM based on risk assessment in developed countries, and also the ages of our respondents was more of based on estimation. The mean recent glycemic level (FBS) was 168.4 +_ 59.6 gm/dl with the minimum 65 gm/dl and the maximum 362 gm/dl, which implies poor glycemic control.

This study showed that 47.5% of mothers had received information about preconception care and counseling. This result is lower than a study done in France,85% (39), Brazil,67.9% (34). But comparable with the study done in Nigeria 43.1% (40). This discrepancy can be explained by the variation in concern & care given to diabetic mothers on preconception care and over all the compressive care given for mothers with chronic medical illness. Similarly with studies done in French (39) and Brazil (34), majority of respondents in this study received the information from Diabetic follow up clinic.

Concerning Preconception care actions, this study showed that mothers were provided Information on; (1) education on glucose control and self-monitoring (90%); (2) Identify, Evaluate and treat DM complications (63.1%); (3) Informed risk of pregnancy complicated by DM (37.7%); (4) advised to use Contraceptive till optimum blood glucose level achieved (27.9%), and off all 34.4% of respondents had good care and counseling information level. This is comparable with reports from Brazil 30% (34),

Atlanta 37% (37). but when we compare it with large scale studies done in developed countries involving advanced preconception care actions, like in Canada <50% (26), from met analysis of Cochrane data base reviews in developed nations <30% (25), USA <20% (6,7) and Ireland 52% (36). This variation can be attributed to sample size, duration of study, types of preconception care actions involved in the studies. Therefore, a significant number of women with DM are getting pregnant without proper planning and knowledge concerning required preconception care actions.

The finding of this study on status of knowledge on effect of DM on pregnancy also showed that; 32.8% acknowledged on need to achieve target blood glucose level before conception, which is less than the report from Washington in which most women (79%) knew they should optimize their blood glucose levels before conception (38), Brazil 67.9% (25, 34), French 82% (39). Thirty seven (30.3%) acknowledged on increased risk of spontaneous abortion which is less than report from Brazil 45.3% (34). About 21.3% of respondents acknowledged on increased risk of congenital anomaly of fetus. This is also less than finding from French 52% (39), Brazil 39.6% (34).

Women with DM presented the following levels of knowledge based on the scale adopted to assess their knowledge concerning effect of DM on pregnancy: None 46.7%, Limited 11.5%, Moderate 9%, Substantial 13.9%, and Extensive 18.9%, knowledge. This result is not similar with report from Brazil (34): None (39.6%), Limited (54.7%), Moderate (5.7%), and substantial & extensive (0%). This may be explained by the knowledge assessment questions used in the studies. Overall, majority of diabetic women (67.2%) from this study regarding their knowledge on effect of DM on pregnancy did not have good awareness. Similarly a study in USA on focused groups with 72 non pregnant women showed; (1) limited knowledge about pregnancy risks related to chronic medical conditions like DM, hypertension and obesity; (2) had little knowledge about the *specific* complications they were at risk for, even among those who had previously experienced pregnancy complications; (3) limited Knowledge about optimizing preconception health (28).

This reflects a lack of information provided to these patients by the health services. It is necessary to guide all women concerning the risks to which they are exposed, which can contribute to their adherence to care before and during pregnancy.

STRENGTHS OF THE STUDY

It can serve as baseline date for JUSH or for further studies.

LIMITATIONS OF THE STUDY

The study was conducted in a tertiary and teaching hospital, smaller sample size and short duration of the study; so it may not be a representative of the general population.

Limited literatures on similar studies, especially in developing countries to use for comparison.

CHAPTER SEVEN: CONCLUSION AND RECOMMENDATIONS
7.1. Conclusions

The study revealed that the status of preconception care information provision and status of knowledge on effect of DM on pregnancy.

Majority of mothers were between the ages of 35-49 years (68%) with mean age of 35.8 years.

Among the respondents 58(47.5%) of mothers had received information about preconception care and counseling.

The level of provision of preconception care and counseling information and knowledge on effect of DM on pregnancy for the studied women was deficient, indicating the need for women with DM to acquire information so their level of knowledge of maternal and fetal risks as well as preconception care is acceptable and they attain higher knowledge.

Significant numbers of women with DM are getting pregnant without proper planning and knowledge concerning required preconception care actions.

Diabetic education, receiving information about PCC, provision of PCC and counseling information and educational status are independent predictors of level of knowledge of diabetic mothers on the effect of DM on pregnancy.

7.2. Recommendations

1. Since there is diabetic education program at the diabetic follow clinic of JUSH, it should be integrated with provision of preconception care and counseling information.

2. Health professionals working in JUSH diabetic follow up clinic should provide information concerning preconception care to diabetic mothers as to increase their care seeking behavior and increase their knowledge on maternal and fetal risks associated with DM.

3. As preconception care is multidisciplinary approach to ensure adequate support and care, JUSH should establish and strengthen joint clinics to optimize and standardize the care provision.

4. Finally, farther more comprehensive and extended study should be carried to address other additional factors that may affect the PCC and the knowledge of diabetic mothers on maternal and foetal risks associated with DM by using larger sample size.

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QUESTIONNAIRE

JIMMA UNIVERSITY FACULTY OF MEDICAL SCIENCES, DEPARTMENT OF OBSTETRICS AND GYNECOLOGY, QUESTIONNAIRE FORMAT ON PRECONCEPTION CARE AND KNOWLEDGE ON EFFECT OF DIABETES ON PREGNANCY OF DIABETIC REPRODUCTIVE AGE GROUP WOMEN ATTENDING THE DIABETIC CLINIC OF JIMMA UNIVERSITY SPECIALIZED HOSPITAL, JIMMA, SOUTH WEST ETHIOPIA, JUL, 2014.
Consent form

Good morning/Good afternoon/Good evening. My name is_____ I am nurse /doctor professionally and now collecting data from diabetic mothers having follow up at diabetic clinic of JUSH for the research being conducted by Dr. Getachew Ayana (final year obstetrics and genecology resident) on **PRECONCEPTION CARE AND KNOWLEDGE ON EFFECT OF DIABETES ON PREGNANCY OF DIABETIC REPRODUCTIVE AGE GROUP WOMEN**. You are selected to be one of the participants in the study. The study will be conducted through interview and record review. Your name and other personal identifiers will not be recorded on data collection format and the information that you give us will be kept confidential and will also be used for this study purpose only. If a report of the result is going to be published, only summarized information of the total group will appear. The interview takes 15 minutes and   is voluntary and you have the right to participate, or not to participate or to refuse at any time during the interview. You will not face any problem if you do not agree to the information to be asked and you will not be also denied of getting any medical services from the hospital. The output of the study will be used in improving preconception care in diabetic mothers to improve perinatal outcome. If you have any questions about this study you may ask me or the principal investigator; Dr. Getachew Ayana (Mobile: 0931747753)

❖ Are you willing to participate in the study?
    1.   Yes   2. No
❖ Interviewer who certified that the informed consent has been given verbally from the respondents
 Name_____ Signature _____ Date _____
❖ Completeness checked by:
Name _____ Signature_____ Date_____

PART I – SOCIODEMOGRAPHIC AND OBSTETRIC INFORMATIONS

1. Age in years ……….. Card number………..

2. Address ………1) Jimma town   2) outside Jimma

3. Ethnicity   1) Oromo   2) Amhara   3) Tigrie

              4) Guragie   5) Dawro   6) others (specify)…………

4. Religion   1) Muslim   2) Orthodox

              3) Protestant   4) others (specify)………….

5. Occupation   1) House wife   2) Civil servant (employee)

              3) Farmer   4) Merchant

              5) Others (specify)…………….

6. Educational status   1) can't read & write   2) Read &write only

     3) Grade 1-8   4) Grade 9-10

     5) Grade >10 (specify)……………

7. Marital status ……..   1) Married/Cohabitation   2) Separated   3) Divorced

 4) Widowed (currently sexually active) 5) others (specify) ………

8. Reproductive history…………………………………………………………….

        8.1 Parity …………1) nullipara2) 1   3) 2-4   4) ≥5

        8.2 abortion ……… 1) no,   2) 1   3) 2   3) _> 3

        8.3 number of still births…….1) no   2) 1   3) _> 2

        8.4 history of having grossly anomalous fetus ………   1) yes,   2) no,

9. Income of the family per month _____Birr.

PART-II MATERNAL DIABETIC CONDITION

1. Type of diabetes …………….... 1) type 1   2) type 2

2. Duration of diabetes? ....   1) < 10 yrs ,   2) 10- 20 yrs,   3) > 20yrs,

3. Type of drug she is using,………1) insulin   2) oral euglycemic agent   3) both 1& 2

4. Does the woman have chronic Complication? ……………. 1) yes   2) no

5. Recent Glycemic level of the woman (recent **FBS) ……..**

6. Did the woman attended diabetic education sessions?   1) yes   2) no

7. Does the woman have Home blood glucose monitoring?   1) yes   2) no

Part III. PRECONCEPTION CARE

1. Has she received information concerning preconception care? ... 1) Yes,   2) no,

2. If yes to (Question no.1) where was the source of information?

    1) At diabetic follow up clinic,

    2) Some means of communication,

    3) Prenatal and maternity care center,

    4) Others (specify) ……………………….

3. **Was Preconception care and counseling information provided?**

    3.1 patients informed about risks of pregnancy complicated by diabetes? 1) Yes, 2) no,

    3.2 advised to use contraceptive till optimum blood glucose control is achieved? 1) Yes, 2) no,

    3.3 identify, evaluate and treat diabetic complications? ……………….1) yes,   2) no,

    3.4 educate on glucose control and self monitoring? …………… …1) yes,   2) no,

Part VI. KNOWLEDGE ON EFFECT OF DIABETES ON PREGNANCY

1. Effect on pregnancy

    1) Does Diabetes increase risk of abortion? ……... ……   1) yes,   2) don't know

    2) Does Diabetes result in still birth, IUFD? …………   1) yes,   2) don't know

    3) Does Diabetes increase risk of congenital anomaly? 1) yes,   2) don't know

    4) Does Diabetes increase risk of having big baby? ……1) yes,   2) don't know

    5) Does diabetes increase risk difficult labor and delivery? …1) yes, 2) don't know

2. Is it needed to achieve target blood Glucose level before conception?

        1) Yes,   2) no,

Name of data collector_____

        Signature_____

        Date_____

Declaration;

I, the undersigned, agreed to accept responsibility for the scientific ethical and technical conduct of the research project and for the provision of the required progress report as per terms and conditions of the collage of health sciences in effect at the time of grant are forwarded the result of this application.

Name of the student ---

    Signature ---------------------------------Date------------------------------

Approval of the advisors;

Name of the first advisor _____
    Signature _____–Date_____

Name of the second advisor --

    Signature ----------------------------Date --------------------------

Date of submission ---