KNOWLEDGE, ATTITUDES AND PRACTICES REGARDING IRON AND FOLIC ACID SUPPLEMENTATION AMONG PREGNANT WOMEN IN GUJRANWALA, PAKISTAN

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Anemia in pregnancy poses the risks of devastating outcomes on maternal as well as fetal health. The most prevalent adverse consequences of maternal anemia, particularly in developing countries are low birth weight infants, premature births, neonatal and under-5 childhood diseases and deaths as well as maternal morbidity and mortality. Most recent statistical data revealed that more than 50% of pregnant women were anemic in Pakistan in 2011. Despite the efforts and initiatives by Pakistan’s Maternal Newborn and Child Health program (MNCH) Pakistan is still lagging behind in meeting the Millennium Development Goals (MDGs) targets now Sustainable Development Goals (SDGs) of minimizing maternal, neonatal and childhood mortality. The consumption of iron and folic acid (IFA) supplements both in pregnant and non-pregnant women is very low in Pakistan with much lower rates in rural areas. To combat maternal anemia World Health Organization (WHO) suggested IFA supplementation, starting ideally before conception and continuing throughout the pregnancy. The aim of this study was to determine the knowledge, attitude and practices about IFA supplements among pregnant women.

This study employs phenomenographic qualitative study design, involving thematic structured in-depth interviews. This study was conducted in Gujranwala district of Pakistan with 12 pregnant women, using purposive sampling, as participants were recruited for interviews at the Gynecological department of District Headquarter Hospital (DHQ) Gujranwala. All interviews were conducted in local language. Interviews were recorded, transcribed and translated. Data analysis consisted of thematic content analysis, coding, categorization and clustering to answer the specific aims of the study.

Results show that even though pregnant women have some knowledge about anemia their knowledge about IFA supplementation is rather inadequate. Despite poor knowledge about IFA participants displayed a positive attitude toward IFA supplements. Few participants used IFA supplements however with poor compliance. Therefore, robust public health interventions are needed to enhance awareness and to improve compliance.
ACKNOWLDEGEMENT

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Contents

1. INTRODUCTION .................................................................................................................. 8

2. LITERATURE REVIEW ....................................................................................................... 10
   2.1 Anemia .......................................................................................................................... 10
       2.1.1 Signs and symptoms ............................................................................................. 11
       2.1.2 Causes of anemia ................................................................................................. 11
       2.1.3 Adverse effects of anemia ..................................................................................... 11
   2.2 Pregnancy and anemia .................................................................................................. 12
       2.2.1 Prevalence of anemia in pregnancy ................................................................... 13
       2.2.2 Prevention of anemia among reproductive age and pregnant women ............... 13
   2.3 Iron and folic Acid ........................................................................................................ 14
       2.3.1 Iron ....................................................................................................................... 14
       2.3.2 Folic Acid .............................................................................................................. 15
   2.4 IFA Supplementation ................................................................................................... 16
       2.4.1 Association between IFA supplements and maternal and child health ............. 17
       2.4.2 Factors influencing IFA supplements adherence ................................................. 19
   2.5 Maternal and Child Health in Pakistan ....................................................................... 20
   2.6 Knowledge, Attitudes & Practices on IFA supplements ............................................... 21

3. AIMS OF THE STUDY ........................................................................................................ 23

4. METHODOLOGY ................................................................................................................ 24
   4.1 Study design .................................................................................................................. 24
   4.2 Study setting .................................................................................................................. 24
   4.3 Study participants ........................................................................................................ 26
   4.4 Data collection ............................................................................................................. 27
       4.4.1 Data collection tool ............................................................................................... 27
       4.4.2 Data collection process ......................................................................................... 27
       4.4.3 Data analysis ......................................................................................................... 27
       4.4.4 Ethical consideration ............................................................................................ 28

5. RESULTS ............................................................................................................................ 29
5.1 Sociodemographic characteristics of participants ................................................................. 29
5.2 Knowledge ........................................................................................................................ 31
  5.2.1 Knowledge regarding anemia ..................................................................................... 31
  5.2.2 Familiarity with the term “Anemia” and perceptions about anemia ......................... 31
  5.2.3 Knowledge about causes of anemia in pregnancy .................................................... 32
  5.2.4 Knowledge regarding preventive measures for anemia ............................................ 32
  5.2.5 Knowledge about food sources of iron and folate ................................................. 33
5.3 Knowledge regarding IFA supplements ............................................................................ 33
  5.3.1 Perceptions ................................................................................................................ 33
  5.3.2 Knowledge regarding initiation of IFA supplements ................................................. 34
  5.3.3 Knowledge regarding the reasons for starting before conception ........................... 34
  5.3.4 Knowledge regarding the reason for continuation throughout pregnancy ............... 35
  5.3.5 Awareness about adverse outcomes if not taken and about the recommended dose ... 35
5.4 Attitudes toward IFA supplementation ............................................................................. 35
  5.4.1 Social and Religious influences ................................................................................. 36
  5.4.2 Sources of Information and Personal Experiences ................................................... 37
5.5 Practices .......................................................................................................................... 38
6. DISCUSSION ...................................................................................................................... 40
  6.1 Discussion of the findings .............................................................................................. 40
  6.2 Strengths and Limitations ............................................................................................ 42
  6.3 Implications for better practice and further research .................................................... 42
  6.4 Reliability and validity ............................................................................................... 43
7. CONCLUSION ................................................................................................................... 44
8. REFERENCES ..................................................................................................................... 45
9. APPENDICES ................................................................................................................... 54
Figure 1. Map of Pakistan

Figure 2. Map of district Gujranwala

Table 1. Hemoglobin levels to diagnose anemia

Table 2. Classification of anemia as public health significance

Table 3. General health statistics of Pakistan

Table 4. Sociodemographic characteristics and pregnancy history
**ABBREVIATIONS**

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Form</th>
</tr>
</thead>
<tbody>
<tr>
<td>DHQ</td>
<td>District Headquarter Hospital</td>
</tr>
<tr>
<td>DMHS</td>
<td>Demographic and Health Surveys</td>
</tr>
<tr>
<td>DOH</td>
<td>Department of Health</td>
</tr>
<tr>
<td>FALAH</td>
<td>Family Advancement for Life and Health</td>
</tr>
<tr>
<td>FAO</td>
<td>Food and Agriculture Organization</td>
</tr>
<tr>
<td>IFA</td>
<td>Iron and Folic Acid</td>
</tr>
<tr>
<td>IOM</td>
<td>Institute of Medicine</td>
</tr>
<tr>
<td>KAP</td>
<td>Knowledge Attitude and Practices</td>
</tr>
<tr>
<td>LHWs</td>
<td>Lady Health Workers</td>
</tr>
<tr>
<td>MDGs</td>
<td>Millennium Development Goals</td>
</tr>
<tr>
<td>MNCH</td>
<td>Maternal Newborn and Child Health</td>
</tr>
<tr>
<td>NIH</td>
<td>National Institute of Health</td>
</tr>
<tr>
<td>NTDs</td>
<td>Neural Tube Defects</td>
</tr>
<tr>
<td>PDHS</td>
<td>Pakistan Demographic and Health Surveys</td>
</tr>
<tr>
<td>RDA</td>
<td>Recommended Dietary Allowance</td>
</tr>
<tr>
<td>SDGs</td>
<td>Sustainable Development Goals</td>
</tr>
<tr>
<td>TBA</td>
<td>Traditional Birth Attendant</td>
</tr>
<tr>
<td>THF</td>
<td>Tetrahydrofolate</td>
</tr>
<tr>
<td>UNICEF</td>
<td>United Nation Children’s Fund</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organization</td>
</tr>
</tbody>
</table>
1. INTRODUCTION

Anemia adversely affects women and increases the risk of detrimental consequences on maternal as well as on fetus health. Half a billion of non-pregnant women suffer from anemia globally and 496 million of non-pregnant women aged 15 to 49 years were anemic in 2011. Moreover, 32.4 million pregnant women were anemic across the globe in 2011 (WHO 2014).

Anemia during pregnancy is linked with low birth weight, preterm birth, neonatal and childhood mortality under 5 years of age. Half of the world’s under-5 mortalities occur in Africa and Asia and 90% of neonatal deaths in Pakistan are attributed to preterm birth (UNICEF 2014). Anemia is a common public health problem in Pakistan with the percentage of 51% among pregnant women (UNICEF 2011). Furthermore, according to Pakistan Food Fortification Scoping Study one in five lactating women and one in three under-5 children had iron deficiency anemia in 2011 (Gaffey et al. 2014).

WHO suggested a standard daily dose of 30 to 60 mg of iron and 400 µg of folic acid supplements to prevent anemia in pregnancy. This recommended dose of iron and folic acid (IFA) should be commenced ideally before gestation with the earliest possible time and must be continued throughout the gestational period (WHO 2012). Pakistan's Demographic and Health Survey (PDHS) 2012/13 revealed low utilization of IFA supplements among Pakistani pregnant women with the much lower rates in rural areas. Data about IFA supplements for PDHS 2012-13 was collected from women, aged 15 to 49 who have had given birth in past five years preceding the survey. PDHS 2012-13 results showed that only 22% women consumed IFA supplements for 90 or more days, 8% consumed IFA supplements for 60 to 89 days, 14% consumed less than 60 days and 55% of percent of women did not consume IFA supplements at all during their previous pregnancy (PDHS 2013).

Various factors that influence the utilization and adherence to IFA supplementation are age, socioeconomic status, level of education, fear or experience of side effects, price, usage of health care services and provision of these supplements at health care centers (Kamau et al. 2018). Very few studies have been conducted about knowledge and factors that affect utilization of IFA supplements among Pakistani pregnant and non-pregnant women including participants from various districts (Hisam et al. 2014, Nisar et al. 2014a, Nisar et al. 2014b). No study regarding IFA supplementation has been conducted among pregnant women in Gujranwala district of
Pakistan. The aim of this study is to determine knowledge, attitude and practices about IFA supplements and knowledge about anemia among pregnant women in Gujranwala district of Pakistan.
2. LITERATURE REVIEW

2.1 Anemia

Anemia is a state in which erythrocytes’ count and size or hemoglobin concentration is lower than the defined cut-off value resulting in diminished supply of oxygen within the body and it is a sign of ill health and poor nutrition (WHO 2014).

Public health significance of nutritional anemia has been identified by WHO for more than five decades and the hemoglobin threshold values indicating anemia were first published in 1958 in a WHO Study Group report. The latest recommended cut-off values of hemoglobin for considering an individual as anemic according to his or her age living at the sea level is measured in grams per liter. Hemoglobin levels among various age groups including pregnant and non-pregnant women that indicate anemia are presented in table 1.

**Table 1. Hemoglobin levels (g/l) to diagnose anemia**

<table>
<thead>
<tr>
<th>Individual’s age</th>
<th>Non-anemia</th>
<th>Mild anemia</th>
<th>Moderate anemia</th>
<th>Severe anemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Children 6 to 59 months</td>
<td>110 or &gt;</td>
<td>100-109</td>
<td>70-99</td>
<td>Less than 70</td>
</tr>
<tr>
<td>Children 5 to 11 years</td>
<td>115 or &gt;</td>
<td>110-114</td>
<td>80-109</td>
<td>Less than 80</td>
</tr>
<tr>
<td>Children 12 to 14 years</td>
<td>120 or &gt;</td>
<td>110-119</td>
<td>80-109</td>
<td>Less than 80</td>
</tr>
<tr>
<td>Non-pregnant women of 15 years and above</td>
<td>120 or &gt;</td>
<td>110-119</td>
<td>80-109</td>
<td>Less than 80</td>
</tr>
<tr>
<td>Pregnant women</td>
<td>110 or &gt;</td>
<td>110-109</td>
<td>70-99</td>
<td>Less than 70</td>
</tr>
<tr>
<td>Men 15 years and above</td>
<td>130 or &gt;</td>
<td>110-129</td>
<td>80-109</td>
<td>Less than 80</td>
</tr>
</tbody>
</table>

(Source: WHO 2011)

Anemia prevalence as public health significance in a population is classified in three categories mild, moderate and severe depending on prevalence rate of anemia (WHO 2011).
Table 2. Classification of anemia as public health significance

<table>
<thead>
<tr>
<th>Public health significance</th>
<th>Prevalence of anemia in percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>4.9 or less</td>
</tr>
<tr>
<td>Mild</td>
<td>5.9-19.9</td>
</tr>
<tr>
<td>Moderate</td>
<td>20.0-39.9</td>
</tr>
<tr>
<td>Severe</td>
<td>40 or higher</td>
</tr>
</tbody>
</table>

(Source: WHO 2011)

2.1.1 Signs and symptoms

Anemia is characterized by general weakness, pallor of skin and conjunctivae and tiredness. In a severe anemic state, the symptoms can be varied to vertigo, difficulty in breathing, rough skin, tachycardia, syncope and even more alarming cardiac symptoms such as cardiac murmurs and angina pectoris (Lopez et al. 2016).

2.1.2 Causes of anemia

Anemia has the number of etiologies including iron deficiency, deficiency of other micronutrients particularly folate and vitamins B12, genetic disorders, high demands for iron in conditions like pregnancy, during menstruation, time of rapid growth and worm infestation. However, amongst these causes most prevalent cause is iron deficiency anemia. There are also certain diseases like malaria in pregnancy which can lead to severe anemia. (WHO 2014).

2.1.3 Adverse effects of anemia

Anemia has the negative influence on various body parts and functions. Iron plays an important role in brain functions and if there is a deficiency of iron it adversely affects the brain growth and functionality. It has been seen in laboratory animals that iron deficiency limits the brain functions and these findings in animals are applicable to humans as shown by different studies across the globe (WHO 2001). Studies in Chile (Walter et al. 1983), Costa Rica (Lozoff 1989), Guatemala (Lozoff et al. 1982) and Indonesia (Pollit et al. 1985) has shown slow psychomotor development and reduced cognitive performance of infants due to anemia. Poor psychomotor development and decreased cognitive ability have also been seen in anemic toddlers and school-aged children in Egypt (Lozoff et al. 1991), India (Seshadri & Gopaldas 1989), Indonesia (Soemantri 1989), Thailand (Pollit et al. 1989) and USA (Webb & Oski 1973).
Iron deficiency has also negative influence on the endocrine system. It interferes with thyroid hormones productions and functionality (Beard 1989). It has been seen that anemic individuals have diminished thyroid hormones production and become hypothermic more rapidly in cold temperatures (Martinez et al. 1984). Anemia also negatively influences the immune system. Anemia decreases the white blood cells capacity to kill the microorganisms. Populations in anemia prevalent areas have the diminished capacity to combat infectious diseases and have high rates of occurrence of infectious diseases. Anemia also impedes the growth in children most probably due to indirectly increased vulnerability to infections (WHO 2001). Iron deficiency increases the absorptive capacity of heavy metals in children and therefore poses anemic children to the higher risk of heavy metal poisonings such as lead and cadmium. Furthermore, anemia decreases the physical strength and reduces the working ability particularly in people who are involved in manual and heavy works such as agriculture and industry labourers. Moreover, anemia in gestation significantly increases maternal, fetal and neonatal morbidity and mortality (WHO 2001).

2.2 Pregnancy and anemia

Micronutrients deficiencies are very common among women. Females of reproductive age are particularly at high risk of developing iron deficiency due to the loss of blood through menstrual cycle and higher demands in pregnancy (Black et al. 2008).

Anemia in pregnant women is determined by hemoglobin concentration and generally, there is a reduction in hemoglobin in the second trimester by 5 g/l whereas pregnant women are considered anemic if their hemoglobin concentration falls below than 110 g/l in first and third trimester (WHO 2011). Low levels of hemoglobin during gestation are associated with adverse outcomes such as greater risk of infectious diseases, maternal and neonatal morbidity and mortality and moreover low levels of hemoglobin might have a negative impact on fetal growth and can have long-term harmful influence in later life (Rahmati et al.2017, WHO 2012).

Different studies have revealed that preterm birth as an outcome of maternal anemia might differ depending on the presence of anemia in different stages of pregnancy (Zhang et al. 2009). Secondary analysis of prospective data from 25 counties in China by Zhang and colleagues (2009) have shown that maternal anemia in the first trimester has an association with preterm
premature rupture of membranes. It was also shown that anemia in the third trimester has shown the reduced risk of spontaneous premature labour (Zhang et al. 2009).

An association between maternal anemia and perinatal mortality has not confirmed yet due to mixed results in various studies across the globe (Rasmussen 2001).

A meta-analysis on the association between maternal anemia and maternal mortality by Brabin et al. (2001) showed that there is a positive association between maternal anemia and maternal deaths depending on the severity of anemia. Maternal iron deficiency can have a negative influence on cognitive abilities of growing fetus but this harmful effect has only been seen in laboratory animals (Fleming 2002). There are limited studies in human beings (Alwan et al. 2015).

2.2.1 Prevalence of anemia in pregnancy

Anemia is not only a health concern in developing countries but it also occurs in developed countries. However, the percentage of anemic pregnant women is far greater in developing countries as compared to industrialized countries. The highest percentage of anemic women of childbearing age is among low-income countries. Among low-income countries, Central and West African and South Asian countries have the highest number of both anemic non-pregnant and pregnant women. 48% of reproductive age women and 56% of pregnant women are anemic in Central and West Africa. Whereas 47% of childbearing age females and 52% of pregnant women are anemic in South Asia (Stevens et al. 2013).

2.2.2 Prevention of anemia among reproductive age and pregnant women

World Health Assembly in 2012 declared the comprehensive plan on maternal, infant and young child nutrition which states the six global nutrition targets for 2025. In these targets, the second target was to minimize the rate of anemia in reproductive age women to 50% by 2025 (WHO 2014b). Because of effective global public health initiatives anemia prevalence has minimized by 12% across the globe between 1995 and 2011. Among pregnant women and it has reduced from 43% to 38% and in non-pregnant women it has decreased from 33% to 29%. However, this achievement is inadequate to meet 2025 target (WHO 2014a).

To prevent and control anemia in pregnant and reproductive age women, WHO has recommended public health protocols. These public health guidelines include fortification of
staple foods with iron, folic acid and other micronutrients. WHO also suggested prevention of infections particularly malaria and deworming. WHO also recommends intermittent IFA supplementation in reproductive age women residing in areas with the prevalence of anemia greater than 20%. It also suggests intermittent IFA supplementation in non-anemic pregnant females who are inhabitants of areas having anemia prevalence not more than 20%. Moreover, IFA supplements should be provided in areas where malaria is prevalent along with other public health strategies to preventive malaria (WHO 2014a).

2.3 Iron and folic Acid

2.3.1 Iron

The importance of iron for human health has been known from past centuries and used by Greeks, Romans, Hindus, and Egyptians as medicine but its requirement in hemoglobin synthesis was proofed with evidence in 1932 (Abbaspour et al. 2014). In humans the iron is present as either haem compounds bounded with proteins such as hemoglobin, myoglobin and haem enzymes and occur as non-haem compounds such as ferritin and flaving iron enzymes (Askwith & Kaplan 1998). Iron performs the variety of crucial functions in the body such as in the synthesis of proteins that transport oxygen most importantly hemoglobin and myoglobin. It has role in oxidation-reduction reactions and in the synthesis of iron-containing enzymes (Hurrel 1997). Iron is present as hemoglobin in red blood cells. Approximately two-thirds of iron in the body is found as hemoglobin and 25% as readily mobilizable iron store and 15% is present in muscles as myoglobin (IOM 2001). A normal healthy adult male contains approximately 4000 mg of iron. 2500 mg of which is present in red blood cells and 1000 mg is stored in spleen and liver. While the remaining is contained by different proteins such as myoglobin and cytochrome (Waldvogel-Abramowski et al. 2014).

Different types of proteins play role in transportation and metabolism of iron. Proteins like ferritin and transferrin help in iron transportation. Whereas iron regulatory proteins, hepcidin and matriptase regulate iron within the body. Proteins such as divalent metal transporter 1, ferroportin and transferrin receptors are involved in the cellular transportation of iron. Iron is mainly absorbed in the duodenum and upper part of the jejunum (Weiss 2009).

Iron is supplied through a number of foods either as haem iron or non-haem iron (Weiss 2009). Haem iron is present in myoglobin and hemoglobin in meat. Non-haem iron is present as iron
salts or attached to other proteins in foods. Iron is present in a variety of foods of plant and animal origin such as meat, fruits, vegetables, beverages, and nuts (FAO 2001).

The recommended dietary allowance (RDA) of iron is different in different age groups. RDA of iron is certainly high during menstruation and pregnancy. Among vegetarians the RDA of iron is 1.8 times higher than non-vegetarians due to high bioavailability of haem iron in animal sources. Among healthy boys and girls aged 14 to 18 years the RDA of iron is 11 mg and 15 mg respectively. Whereas RDA of iron among men and women aged 19 to 50 years is 8 mg and 18 mg respectively. During pregnancy the RDA of iron is 27 mg (IOM 2001). During pregnancy maternal iron demand is increased due to requirement of 300 to 350 mg of iron for embryo and placenta development. 500 mg of iron is also needed for increased maternal red blood cells and 250 mg for the blood loss during childbirth. Moreover, iron demand increases from 0.8 mg per day in the first trimester to 7.5 mg during the third trimester (Achebe et al. 2017).

2.3.2 Folic Acid
Folic acid is oxidized monoglutamate form of folate that is hardly present naturally. Folates occur in reduced forms as tetrahydrofolate (THF) in nature. The name folic acid is derived from Latin “foila” means leaf when it was prepared synthetically in 1941 from spinach leaves. Folates in foods are present mostly as polyglutamate form. Folates are absorbed in the body as monoglutamate form and the monoglutamate form is reduced to THF during absorption (Beck et al. 2012).

Intracellularly it is present as polyglutamate form and extracellularly in plasma as 5-methyl THF. About half of the total body folate is present in the liver. Folates play the vital role in various functions in the body. They act as acceptor and donor in one-carbon reactions that take place during the formation of essential biomolecules such as pantothenate and amino acids. Folates also take part in methylation reactions in gene expression and most importantly folates are involved in purine and pyrimidine synthesis which are required for DNA synthesis in the body (Beck et al. 2012).

Folate is present in variety of foods particularly in green leafy vegetables such as spinach, broccoli, cabbage, and lettuce. It is also present in animal products like liver, kidney, eggs, and fish. Moreover, peanuts, bran, wholemeal bread, banana and yeast extract also contain folate. Staple foods such as wheat flour and rice are also fortified with folic acid to prevent its
deficiency in some countries (Beck et al. 2012). The RDA of folate among men and women aged 19 and above is 400 micrograms. The body’s need for folate is higher in pregnancy and lactation. RDA of folate in pregnancy and lactation is 600 micrograms and 500 micrograms respectively (NIH 2018).

Deficiency of folate can lead to certain diseases. Most frequent and devastating outcomes of folate deficiency are congenital deformities such as neural tube defects (NTDs) (WHO 2015). Folate deficiency also results in megaloblastic anemia, abruptio placentae, spontaneous abortion, congenital heart defects, preterm birth. Moreover, in 2012 approximately quarter of a million neonatal deaths were attributed to congenital abnormalities (WHO 2015).

NTDs occurs due to the failure of the neural tube to close by the 28th day of embryonic life. There are two types of NTDs. The “Open” NTDs in which the brain or spinal cord tissue is not covered and the “Closed” NTDs in which the brain or spinal cord tissues are covered by another tissue. The “Open” NTDs can be either anencephaly or spina bifida cystia. The “Closed” NTDs includes encephalocoele and spina bifida occulta (Imbard et al. 2013).

NTDs are caused by various factors such as genetic, chromosomal abnormalities and folate and vitamin B12 deficiency. Insufficient folate slows down the DNA synthesis and erythrocyte formation and maturation, thus delaying and inhibiting the complete closure of neural tube (Rosenthal et al. 2011). In order to minimize the incidence of NTDs at population level WHO recommends folate levels in erythrocytes higher than 400 ng/L in childbearing age women (WHO 2015).

2.4 IFA Supplementation
Daily IFA supplementation is recommended in women of childbearing age and adolescent girls where anemia prevalence is 40% or higher (WHO 2016). The intermittent IFA supplements are recommended among the non-pregnant population where anemia prevalence is less than 20% (WHO 2012b).

WHO has endorsed daily oral IFA supplements for pregnant women. The dose of daily oral IFA supplements is 30 to 60 mg of elemental iron and 0.4 mg of folic acid. 30 to 60 mg of elemental iron is equivalent to 300 mg of ferrous sulfate heptahydrate, 180 mg ferrous fumarate or 500 mg of ferrous gluconate. This daily recommended oral IFA supplements must be started as early as
possible preferably prior to impregnation for the prevention of NTD’s (WHO 2012a). According to WHO the recommended dose of intermittent IFA supplements is 60 mg of elemental iron and 2.8 mg of folic acid where the prevalence of anemia is higher than 20% among the non-pregnant women. The frequency of intermittent IFA supplement is once a week among all menstruating girls and adult women (WHO 2016).

2.4.1 Association between IFA supplements and maternal and child health

To determine the influence of IFA supplements and postnatal care on neonatal mortality a retrospective study was conducted by Titaley and Dibley (2012). They reported no association between postnatal care and neonatal survival but results showed 51% reduction in the risk of early neonatal mortality with the use of antenatal IFA supplements.

Similarly, to measure the impact of antenatal IFA supplementation on childhood mortality a retrospective study by Nisar et al. (2015) showed a significant reduction in risk of early neonatal deaths by 49% and overall neonatal mortality reduction by 42%. They also reported the reduction of 32% and 48% in infant and under-5 mortalities, respectively, in Nepal.

Likewise, to investigate the influence of IFA supplements’ consumption during pregnancy on under-5 mortality pooled analysis of four consecutive Indonesia’s demographics and health survey was performed by Dibley et al. (2012). They reported a remarkable reduction of 34 % in risk of under-5 mortality among the mothers who used IFA supplements.

A systematic review to assess the impact of iron alone or iron along with folic acid on maternal and neonatal outcomes such as maternal anemia, low birth weight and preterm birth was conducted by Imdad & Bhutta (2012). Results from analysis of 18 studies that included iron versus no iron showed a reduction of 69% in anemia incidence in pregnancy for iron alone in intervention group. The results for iron along with folic acid were similar to iron alone and showed significant reduction in anemia incident in pregnancy. However, there was no statistically significant difference among daily or intermittent supplementation for both iron alone or in combination with folic acid based on the data from 3 studies included in the review. Moreover, results from 12 studies showed a significant reduction of 20% in the incidence of low birth weight because of iron supplements during pregnancy. Whereas the reduction in the incidence of preterm birth was not significant (Imdad & Bhutta 2012).
A double-blinded cluster randomized trial to assess the impact of daily IFA, multiple micronutrients (iron, folate, zinc, copper, selenium, iodine, vitamin A, thiamine, riboflavin, vitamin B6, vitamin B12, vitamin D, vitamin C, vitamin E and niacin) or folic acid alone on primary outcomes such as birth weight, gestational age and neonatal mortality was conducted by Zeng and colleagues (2008). This study comprises 5828 pregnant women and 4697 live births. They reported a significant increase in the birth weight of 42 grams in multiple micronutrient group in comparison with folic acid group. The length of gestational age increased 0.23 weeks in IFA group and in multiple micronutrient group gestational age was 0.19 weeks longer. There was also significant increase in hemoglobin concentration among pregnant women who consumed IFA and multiple micronutrients compared to women who consumed folic acid alone. The hemoglobin concentration in IFA and multiple micronutrients groups was increased by 5.0 g/l and 6.9 g/l, respectively. Results also showed significant reduction in neonatal mortality in IFA group (Zeng et al. 2008).

To measure the effect of iron and iron with folic acid on maternal anemia Yakoob et al. (2011) conducted a systematic review including 31 studies. They reported 73% reduction in the incidence of anemia among women who consumed iron or iron and folic supplements as compared to women who received placebo.

Similarly, to determine the influence of iron plus folic acid, folic acid alone and multiple micronutrients on maternal and infant health Liu and colleagues (2013) conducted a double-blinded randomized trial including 18775 nulliparous women. They reported a statistical significant reduction in maternal anemia in the third trimester in all three groups. However, there was no significant influence on perinatal mortality, low birth weight, infant mortality among women who were assigned to iron and folic acid or multiple micronutrients in comparison with mothers who took folic acid alone (Liu et al. 2013).

A systematic review and meta-analysis to evaluate the association between maternal iron use, no use or iron use with or without folic acid on maternal hematologic and negative outcomes of maternal anemia was conducted by Haider and colleagues (2013). They reported that iron users had 4.59 g/dl higher mean hemoglobin concentration than the control group. They also reported significantly decreased risk of maternal anemia and low birth weight. Moreover, they showed that iron with folic acid was associated with mean higher maternal hemoglobin concentration.
IFA supplements utilization during pregnancy has shown to be associated with reduction in neonatal mortality in different studies (Titaley and Dibley 2012, Nisar et al. 2015, Dibley et al. 2012). Studies (Imdad & Bhutta 2012, Zeng et al. 2008, Liu et al. 2013, Haider et al. 2013) has shown that IFA supplements usage during pregnancy decreases the risk of anemia incidence.

2.4.2 Factors influencing IFA supplements adherence

The consumption of IFA supplements is influenced by different factors, which can be divided into the client factors and provider factors. Client factors include sociodemographic characteristics like age, area of residence, socioeconomic status and education. Other client factors that influence utilization of IFA supplements are forgetfulness, side effects, cost, number of children and poor use of antenatal care services. Provider factors are shortage or lack of supplies at health care service points (Kamau et al. 2018).

To assess the factors influencing IFA supplements compliance among pregnant women in Ethiopia Gebreamlak et al. (2017) conducted an institutional based cross-sectional study including pregnant women who were in their third trimester and mothers in postnatal period. The total number of study participants was 626 including 557 pregnant women. Result showed good compliance with IFA supplements as 60 % of mothers used IFA supplements for four days per week. The higher level of compliance was present in women who receive health education, had attended secondary school and those who were employed (Gebreamlak et al. 2017).

To investigate the factors that have a negative influence on compliance with IFA supplements among Indonesian married women of childbearing age Titaley & Dibley (2015) conducted a secondary analysis of Indonesia’s demographics and health surveys of 2002/03 and 2007. They showed that the main factors of not using IFA supplements among these women were lack of knowledge, residence in the rural area, costs, low socioeconomic status and long travel distances from health care service points (Titaley & Dibley 2015). The factors that had a negative influence on compliance with IFA supplements among South Indian pregnant women were forgetfulness and either awareness or experience of associated side effects (Mithra et al. 2013).

To determine the sociodemographic factors that have negative influence with the compliance and the frequency of utilization of IFA supplements among Pakistani married women a study was conducted by Nisar et al. (2014a). They used cross-sectional data collected from 14 different districts in Pakistan having very poor health indicators. Data was collected by household survey.
done by Family Advancement for Life and Health (FALAH) project, aimed to improve maternal and child health in Pakistani communities. In total 6266 women were interviewed and only 2400 women reported of IFA supplements utilization at some stage during gestation. Results also indicated the factors that prevented women from taking IFA supplements were lack of education, low socioeconomic status, being resident of Dera Ghazi Khan district, advanced maternal age and poor use of antenatal care services (Nisar et al. 2014a).

2.5 Maternal and Child Health in Pakistan
Primary health care services involve maternal and child health in Pakistan. Pakistan launched Maternal, Newborn and Child Health (MNCH) program in 2006 at a national level, which was decentralized to provinces in 2010. By this program a new team of community midwives was introduced in Pakistan to strengthen the maternal and child health services. This program was also aimed to provide better facilities to previously existing lady health workers (LHWs) program. LHWs are involved in providing maternal and child health services such as antenatal care, immunization, family planning, growth monitoring, provision of IFA and other micronutrients as supplements without any charges during pregnancy etc. particularly in rural areas (PDHS 2013).

According to PDHS 2012/13 Pakistan is lagging behind the Millennium Development Goals (MDGs) 2015 which are now replaced by Sustainable Development Goals. Pakistan is not able to meet the goals set by Pakistan’s (MNCH) Program. The targets set by Pakistan’s MNCH program were minimizing under-5 mortality rate to 52/1000 live births and maternal mortality rate minimizing to 140 deaths per 100,000 live births. The current maternal mortality rate is 276 deaths per 100,000 live births. Whereas the neonatal mortality rate is 55 per 1,000 live births. Moreover, infant and the under-5 mortality rates are 74 and 89 deaths per 1,000 live births respectively. Neonatal mortality rate is stagnant and has not changed over last 20 years (PDHS 2013).

Maternal anemia is quite high in Pakistan and almost half of the pregnant women are anemic at any stage of their pregnancy in 2011 (UNICEF 2011). According to PDHS 2012/13, the use of IFA supplements percentage is significantly low across the Pakistan. Only about a quarter of women aged 15 to 49 consumed IFA supplements in past five years for 90 or more days and more than half of women did not consume any IFA supplements at all. The proportion of
utilization of IFA supplements is far less in rural areas than in urban areas. There is also high adherence among educated women (PDHS 2013). According to government of province Punjab, Pakistan almost half of the mothers are anemic in Gujranwala district. Moreover, infant mortality rate is 61/1000 live births, under 5 mortality rate 94/1000 and maternal mortality ratio is 236 per 100000 live births in Gujranwala district (DOH, Government of Punjab 2017).

2.6 Knowledge, Attitudes & Practices on IFA supplements

Knowledge, Attitude and Practices (KAP) surveys are used to gather information about what is known, perceived and practiced about the specific topic. In KAP surveys data are collected either by interview or pre-defined questionnaire and this data can be interpreted quantitatively or qualitatively. KAP surveys are helpful in determining why people are practicing anything and what are the promoters and barriers to their knowledge, practices, and attitudes (WHO 2008).

Knowledge refers to the “set of understandings, capacity for imagining or one’s way of perceiving”. Knowledge regarding health problem is useful but it does not mean that someone will act on this knowledge. Attitude is a “way of being, a position or tendencies to”. Practices or behaviors are actions of the person in response to particular stimulus (Gumucio et al. 2011).

Ouedraogo et al. (2015) conducted KAP study regarding IFA supplementation among pregnant women and health care providers in rural Niger. They collected data through individual home interviews and focus group discussion and from health care centers. They reported that among 72 pregnant women who were interviewed at home 96% of those women had knowledge of IFA supplements and 97% knew at least one health advantage of IFA supplements. They also reported that among women who had attended at least one antenatal visit only 65% of those had taken IFA supplements a day before the interview (Ouedraogo et al. 2015).

Tinago et al. (2017) conducted a qualitative study to assess the factors influencing IFA supplements utilization among Zimbabwean pregnant women. They reported that factors that influence the utilization of IFA during pregnancy are individual and environmental factors. Individual factors included knowledge regarding IFA, forgetfulness, side effects associated with IFA, misconceptions, and knowledge regarding pregnancy risk factors. Whereas environmental factors including family and social support, recommendations by health care providers and availability at health care services (Tinago et al 2017).
To know the role of maternal knowledge regarding pregnancy complications and family support on IFA supplement consumption Wiradnyani et al. (2016) performed secondary analysis of Indonesia’s DMHS 2002/03 and 2007/08. They reported that the mothers who had family support especially by husband and had knowledge about pregnancy-related risks which can result in negative outcomes. Results showed a positive influence of support on IFA consumption and those who had support they used more.

Hisam et al. (2014) conducted a cross-sectional study using closed ended questionnaire tool to investigate KAP regarding folic acid among child bearing age women. The study was conducted in Rawalpindi, Pakistan in which 400 married women participated. This study showed 43% of women knew about the need of folic acid in pregnancy. Results also revealed that only 40% of participant believed that folic acid deficiency can lead to anomaly in newborn. There was also a significant association between education level and practice of taking folic acid supplements by women (Hisam et al. 2014).

Nisar et al. (2014b) conducted a qualitative study in two districts including Islamabad as urban area and Swabi as rural Pakistan to determine the knowledge regarding IFA supplements among rural and urban pregnant and non-pregnant women. They also investigated knowledge about IFA supplements among LHWs providing services in rural areas and doctors working in urban tertiary care settings. The data were collected by in-depth interviews and focus group discussion. They reported that majority of participants were aware of IFA supplements. Rural women knew IFA supplements by names such as “tablets to provide strength or red tablets” whereas urban women knew trade names of IFA supplements. Women from urban setting were well aware that they IFA supplements are helpful in preventing anemia in pregnancy. All the LHWs and doctors had knowledge regarding IFA supplements and their positive effects on the body during pregnancy (Nisar et al. 2014b).

Vitale et al. (2009) conducted a cross-sectional study among Croatian women to determine the KAP regarding folic acid before and during pregnancy. They reported that 47.6% of women who participated in the study did not know what folic acid is. Only 21% of women consumed folic acid supplements specifically for pregnancy. They suggested that improvements in maternal healthcare education and fortification of staple foods are needed.
3. AIMS OF THE STUDY

The main aim of this study was to determine the knowledge, attitudes, and practices regarding IFA supplementation among pregnant women in Gujranwala, Pakistan.

Specific aims of the study are:

- To explore the knowledge about the concepts, recommendations, and advantages of IFA supplements.
- To understand the sources of information and social influences on consumption of IFA supplements.
- To determine knowledge of pregnant women about anemia and ways of prevention.
4. METHODOLOGY

4.1 Study design
A non-experimental cross-sectional qualitative descriptive phenomenographic study with the structured in-depth interviews was conducted. The qualitative research method is valid method to explore gaps in knowledge. It is useful in the development of the comprehensive and detailed image of an interaction of environment and actions. It is helpful in exploring new phenomena and synthesizing conceptual perceptions and understandings (Weiner et al. 2011).

4.2 Study setting
The study was undertaken in Gujranwala district of Pakistan. Pakistan is a country situated in Southern Asia. Pakistan shares its borders with Afghanistan, China, India, and Iran. The total area of Pakistan is approximately 796,095 sq km. According to provisional results of Pakistan’s national census, the approximated population of Pakistan is 207,774,000 (Central Intelligence Agency 2018).

Pakistan has four provinces Baluchistan, Khyber Pakhtunkhwa, Punjab, and Sindh. Punjab province is the most populated province in Pakistan. Majority of the inhabitants are living in rural areas and 39.7% live in urban area. More than 95% of the population practices religion Islam and rest are other minorities such as Christians and Hindus (Central Intelligence Agency 2018). The latest health statistics of Pakistan by WHO are presented in table 3 and map of Pakistan is presented in figure 1.

Table 3. General health statistics of Pakistan

<table>
<thead>
<tr>
<th>Statistics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Population (2015)</td>
<td>188,925,000</td>
</tr>
<tr>
<td>Life Expectancy at birth male/female (2015)</td>
<td>66/68</td>
</tr>
<tr>
<td>Probability of dying under 5 (per 1000 live births, 0)</td>
<td>Data not available</td>
</tr>
<tr>
<td>Probability of dying between 15 and 60 years male/female (per 1000 population)</td>
<td>179/142</td>
</tr>
<tr>
<td>Total expenditure on health per capita (Intl $ 2014)</td>
<td>129</td>
</tr>
</tbody>
</table>
Total expenditure on health as % of GDP 2.6
(2014)
(Source: WHO 2015)

Figure 1. Map of Pakistan

Gujranwala district is situated at 32° 11’ east latitude and 74° 9’ north longitude with Deska on the east, Nowshera Virkan in the west, Kamoki in north and Wazirabad in the south. It is one of the most populated cities in province Punjab, Pakistan. It is an industrial city having total district area of 3622 km² and growing swiftly with the population of 4,708,000 and 2329,000 rural
inhabitants and urban population was 2379,000 in 2014 (Minallah et al. 2016). The map of Gujranwala district is presented in figure 2.

Figure 2. Map of district Gujranwala

(Source: Minallah et al. 2016)

4.3 Study participants

Study participants were selected by purposive sampling. Purposive sampling is a non-random sampling technique where participants of certain population fulfilling the predefined criteria for instance awareness and experience about the phenomena, easy availability, geographical closeness, availability at the moment and readiness to participate in the study (Bernard 2002, Cresswell & Plano 2011, Spradely 2016).

The inclusion criteria were pregnant women with normal pregnancy without any complications being resident of Gujranwala district and willing to participate in the study. Women having obstetric problems and women participating in any other study were excluded from the study. Overall, 30 women were asked to participate in study. Overall, 12 women agreed to participate in the study. Education level of participants was divided into primary, secondary and tertiary level. Primary education was defined as up to 7 years of education in school, secondary education as up to 12 years of school education and tertiary education was defined as having completed
bachelor’s degree. Participants were considered as living in nuclear family if they were living with their children and husband whereas participants living with parents or/and brothers/sisters of husband were considered to belong to extended family. Participants were considered as employed if they were doing any kind of part time or full time work.

4.4 Data collection

4.4.1 Data collection tool
Data collection tool was in-depth structured qualitative interviews. The interview guide was developed including open-ended questions aiming to explore the participants’ knowledge, attitude, and practices regarding IFA supplements. Interview questions were developed in “Urdu” language which is national and common language in Pakistan.

4.4.2 Data collection process
Structured interviews were conducted from January 10, 2018 to January 30, 2018. The location was a Gynecological department at the public hospital in Gujranwala city named District Headquarter /Teaching (DHQ) Hospital Gujranwala. Before the actual data collection, pilot testing of interviews was done and some changes in the structured questionnaire were made accordingly. Each interview took almost 25 minutes and a separate room was provided by head nurse for data collection. The room was quite spacious and suitable for the privacy of the participant and there was no interruption in interviews. Interviews were recorded on the audio recorder. Along with the voice, the expressions and level of easiness with the interviewer were also noted. Interviews were conducted until data reached the point of saturation, where no new information was given by participants.

4.4.3 Data analysis
Data analysis was done firstly by verbatim transcription of recorded data. Recorded data were written and translated into the English language. It was double-checked for errors and grammatical mistakes by the language expert. Data was analyzed on thematic content analysis. Themes and codes were identified. On the basis of thematic content data was divided into three main thematic areas including knowledge, attitude, and practices.
4.4.4 Ethical consideration

Qualitative research often involves invading in private lives of individuals and collect data on lived experiences so it is very sensitive in nature and required the fulfillment of all ethical principles such as autonomy, anonymity, confidentiality and informed consent (Sanjari et al. 2014). Permission to conduct the study was granted by the administration and gynecological department of DHQ Hospital, Gujranwala. Before data collection verbal informed consent was obtained from the participants. The participants were informed that their privacy and confidentially will never be breached.
5. RESULTS

5.1 Sociodemographic characteristics of participants

There were 12 pregnant women who participated and were interviewed in the study and gave interviews willingly. All the women were resident of district Gujranwala from different urban and rural areas living in either nuclear or extended type family. Majority of the study participants were literate and had primary or secondary level education. Most of the study participants were housewives whereas some were employed. Almost all of the study participants have had pregnancies in the past except 1. The age range was 21 to 32 years of age. Table 4 presents the sociodemographic characteristics and pregnancy history of women.
Table 4. Sociodemographic characteristics and pregnancy history

<table>
<thead>
<tr>
<th>Sr. #</th>
<th>Age( in years)</th>
<th>Children (n)</th>
<th>Place of Residence (Urban/Rural area)</th>
<th>Family type (Extended/ Nuclear)</th>
<th>Education level</th>
<th>Working status (yes/no)</th>
<th>Previous pregnancies (n)</th>
<th>Previous births (n)</th>
<th>Current month of pregnancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>30</td>
<td>2</td>
<td>Rural</td>
<td>Nuclear</td>
<td>Tertiary</td>
<td>Yes</td>
<td>2</td>
<td>2</td>
<td>7th</td>
</tr>
<tr>
<td>2</td>
<td>21</td>
<td>2</td>
<td>Rural</td>
<td>Extended</td>
<td>Primary</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>8th</td>
</tr>
<tr>
<td>3</td>
<td>27</td>
<td>0</td>
<td>Urban</td>
<td>Extended</td>
<td>Secondary</td>
<td>No</td>
<td>0</td>
<td>0</td>
<td>9th</td>
</tr>
<tr>
<td>4</td>
<td>27</td>
<td>2</td>
<td>Urban</td>
<td>Extended</td>
<td>Secondary</td>
<td>No</td>
<td>6</td>
<td>4</td>
<td>8th</td>
</tr>
<tr>
<td>5</td>
<td>30</td>
<td>1</td>
<td>Urban</td>
<td>Extended</td>
<td>Secondary</td>
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<td>1</td>
<td>1</td>
<td>3rd</td>
</tr>
<tr>
<td>6</td>
<td>28</td>
<td>6</td>
<td>Urban</td>
<td>Nuclear</td>
<td>Primary</td>
<td>Yes</td>
<td>6</td>
<td>6</td>
<td>7th</td>
</tr>
<tr>
<td>7</td>
<td>28</td>
<td>1</td>
<td>Urban</td>
<td>Extended</td>
<td>Secondary</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>9th</td>
</tr>
<tr>
<td>8</td>
<td>22</td>
<td>1</td>
<td>Urban</td>
<td>Nuclear</td>
<td>Secondary</td>
<td>No</td>
<td>1</td>
<td>1</td>
<td>8th</td>
</tr>
<tr>
<td>9</td>
<td>24</td>
<td>2</td>
<td>Rural</td>
<td>Extended</td>
<td>Primary</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>6th</td>
</tr>
<tr>
<td>10</td>
<td>22</td>
<td>2</td>
<td>Urban</td>
<td>Nuclear</td>
<td>Secondary</td>
<td>No</td>
<td>2</td>
<td>2</td>
<td>8th</td>
</tr>
<tr>
<td>11</td>
<td>24</td>
<td>0</td>
<td>Rural</td>
<td>Nuclear</td>
<td>Secondary</td>
<td>Yes</td>
<td>1</td>
<td>0</td>
<td>8th</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>2</td>
<td>Urban</td>
<td>Nuclear</td>
<td>Secondary</td>
<td>Yes</td>
<td>2</td>
<td>2</td>
<td>7th</td>
</tr>
</tbody>
</table>
5.2 Knowledge

5.2.1 Knowledge regarding anemia
Most of the women did not know about the terminology. Participants were asked about what women should do to prevent anemia or low level of blood during pregnancy and what are the foods which can help prevent anemia. All of the subjects had some knowledge that anemia is common particularly in pregnancy. Moreover, they knew about the common foods which are good sources of iron and help prevent anemia. Furthermore, most of those pregnant women reported of being with the low levels of blood and iron at the time of interview or had experienced it in their previous pregnancies.

5.2.2 Familiarity with the term “Anemia” and perceptions about anemia
Majority of the pregnant women have not heard the term “Anemia” before. A possible reason for being unaware with this term could be low level of education in general by majority of the participants or it could be the infrequent use of technical terminologies by medical personnel with patients or clients. There were only two women who have had heard it from medical personnel but they still did not know what the term “Anemia” exactly means. All the participants knew low level of blood and iron in body even though they did not know the term anemia.

One woman said

“I don’t know what exactly it is. I have only heard the word anemia from my mother because she was a midwife”

One woman stated that

“Yes, I have heard the word anemia from my doctor but I am not sure what it is”

One woman stated that

“Yes, I have heard about the low level of blood in the body and I was also transfused blood as it was recommended by a doctor…. because she told me that I have a low level of blood in my body. Yes, it also occurs in pregnancy”

Similarly, another woman quoted the term Hb in her description of anemia, but she was not aware of what exactly did it mean.
“Yes, I have heard low level of blood in the body and it is very common in pregnancy. My doctor told me that I have a low level of blood in the body she told me that my Hb is 9”

5.2.3 Knowledge about causes of anemia in pregnancy
The main reasons for anemia in pregnancy as mentioned by the majority of the subjects were improper eating habits and increase in energy demands of women in pregnancy. Awareness about the connection between the dietary deficiencies and anemia among participants in pregnancy can also be due to social influences, as in Pakistani society, the “taking care of diet” is among the most common advices given to the expecting mother from her family and friends.

One woman stated

“It happens in pregnancy because usually, women do not take good care of their diet during pregnancy”

One woman stated

“It is common in pregnancy because one new life is developing inside women and therefore she needs more energy and power”

5.2.4 Knowledge regarding preventive measures for anemia
All the women were aware that the anemia can be prevented by taking optimal diet but none of them mentioned that the use of IFA supplements in preventing anemia and the useful impacts of IFA supplements. Even though most of these pregnant women had heard or used IFA supplements in their previous pregnancies but they did not mention about them as a preventive measure for anemia (Their perception of the IFA Supplements is given in section 5.3). Majority of the study participants stated that in order to prevent anemia women should take good care of their diet and they should eat foods like fruits, vegetables, and meat, milk and milk products as they are healthy foods.

One woman stated that

“To prevent the low level of blood in the body, women should have a good diet, for instance, she should take more fruits and vegetables, eat meat and drink milk and should take more milk products”
5.2.5 Knowledge about food sources of iron and folate

To assess the knowledge regarding iron and folate, women were asked if they had heard the words iron and folate and whether they knew the different food sources of iron and folate. Nearly all of the women had heard the words iron and folate. They had some awareness of the common food sources of iron in Pakistan but none of the participants knew the food sources of folate. The reason for being unaware of the food sources of folate could be that folate or folic acid is mostly considered as a medicine by laypeople.

One woman stated that

“Iron is present in fruits, green vegetables, eggs, meat, and fish etc.”

Similarly, another woman said

“Foods such as fruits and vegetables especially green vegetables contain iron”

One woman stated that

“Well, I do not know that folate or folic acid is present in foods it comes as medicine”

5.3 Knowledge regarding IFA supplements

5.3.1 Perceptions

Nearly all the participants had some knowledge regarding IFA supplements and they had heard about these supplements from either health care professionals or other societal health care operators, like traditional birth attendants. Almost all the participants said that IFA supplements have a positive influence on women’s health and in helping to prevent anemia in pregnancy.

One woman stated

“I know that they are good for women’s health and make women strong and healthy”

One woman stated that

“I know that these IFA supplements help to make blood and are very good for women’s health particularly in pregnancy”
5.3.2 Knowledge regarding initiation of IFA supplements

Majority of the study participants said that they do not know when women should start taking these supplements. Women from rural areas were more aware about IFA supplements where LHWs provide community health services. This reflects that health care providers working in the public hospital or other health care facilities are not providing detailed information to women regarding IFA supplementation. Lack of provision of detailed information by health care providers to women in public hospital could be due to the reason that they have to serve huge number of patients and clients. Only 3 women knew that these supplements should be started before pregnancy.

One woman said

“Actually, I don’t know when women should start taking IFA supplements”

Similarly, another woman said

“Well I don’t know exactly when women should start taking these supplements but I know that women should take when she becomes pregnant”

One woman from rural area said

“Women should start taking these supplements at the beginning of pregnancy even 3 to 4 months before pregnancy”

5.3.3 Knowledge regarding the reasons for starting before conception

Majority of the participant did not know why women should take IFA supplements before conception. Some women even did not know that women should take it before gestation. Only 3 women had some knowledge regarding the need for initiation of these supplements before conception.

One woman said

“Before conception….! Do women have to take these supplements before conception?”

One woman said

“Yes, I know why women should start it before conception because if women do not take these before conception child can be weak both mentally and physically”
5.3.4 Knowledge regarding the reason for continuation throughout pregnancy
All of the women explained that IFA supplements are very good if taken during pregnancy. They said that IFA supplements are helpful for making females strong and prevent weakness in women particularly during pregnancy and also good for the health of growing child. Knowledge about continuing IFA supplements throughout the pregnancy might be due to the reason that most of the women use to go to health care providers after the pregnancy for antenatal visits and they are advised to take these supplements regularly until birth.

One woman said

“Women should take IFA supplements in pregnancy to stay healthy and strong”

One participant stated

“Yes, I know that women should take these supplements during pregnancy because they help make women and the growing baby strong and healthy”

5.3.5 Awareness about adverse outcomes if not taken and about the recommended dose
Majority of these women did not know what health problems can result if they do not take IFA supplements before and during pregnancy. However, 2 of the participants were aware that if pregnant women do not take these supplements, the growing baby can suffer from a physical or mental health problem.

One woman from rural area said

“If women would not take during pregnancy she would be physically weak. It can have a negative impact on child’s health and baby can have any physical or mental abnormality”

None of the participants were aware of the recommended dose of IFA supplements. The reason for being unaware about the recommended dose of IFA supplements can potentially be their low levels of education. Also, the obvious connection to the possible inadequacy in the role of health care providers in providing this piece of health education in their practice, can be there.

5.4 Attitudes toward IFA supplementation
To investigate the attitudes of women regarding IFA supplements, subjects were inquired about various factors such as social, religious and their personal experiences.
5.4.1 Social and Religious influences

Discussion of health issues

More than half of participants stated that they discuss their health issues initially with their family members. Some women like discussing their health issues only with the doctor. Whereas few women discuss their health issues with untrained health care providers such as traditional birth attendants (TBAs).

One woman said

“I always first talk with my elder sister whenever I feel something unusual with my health”

One women stated

“I prefer consulting doctor so I don’t discuss with anyone regarding the health issues I always visit the doctor”

Another woman said

“Now in this pregnancy, I am consulting doctor about my health but in my previous pregnancies I used to consult with “Dai” (TBA)”

Role of family, relatives, and friends in shaping attitudes towards IFA supplements

Most of the participants, whether taking or not taking IFA supplements at the time of interview, reported a supportive role of husbands towards utilizing IFA supplements. But no one mentioned about the positive role of other members in family or friends. Living in an extended-type-family was also not influential on building any attitudes toward IFA supplements.

One woman said

“My husband says that I should use these supplements as they will help in developing our baby strong and healthy”

More than half of women specified that they do not know whether women in their social circle consume IFA supplements or not. Some of the participant said that the women in their social circle use these supplements. There is a lack of communication about the usage of IFA supplements among women.
One woman said

“I don’t know whether women in my family, friends, and relatives use these supplements before or during pregnancy”

One woman said

“Yes, some women in my family, friends, and relatives use these tablets when they get pregnant but I don’t know about the usage of these tablets by women in my neighborhood”

**Role of religion**

Almost all the study participants stated that they do not know any religious teaching or belief regarding the consumption of IFA supplements during pregnancy, except one woman who explained that before consuming the Supplements, she had discussed with a spiritual healer and taken his permission. This indicates that religious influence towards the usage of IFA supplements can be positive or negative regardless of health education by health care provider because the women who reported this might not have taken if her spiritual healer had refused its usage as he may not know anything about these supplements. This should have been explored more indepth.

She said

“I don’t know that what religion says regarding the use of these supplements but before starting I have asked from my Pir Sahib (spiritual healer) that can I use these tablets and he told me that yes I can take these tablets”

**5.4.2 Sources of Information and Personal Experiences**

Almost all the participants were advised about the intake of IFA supplements by trained medical personnel such as doctors, nurses or LHWs personnel, except one woman who was advised by her TBA. So only these 2 sources of information were pointed out by the subjects.

One woman said

“A lady doctor from this hospital advised me when I came in my third month of pregnancy for my first checkup”

Similarly, a woman from rural area stated
“LHW that comes to my village advised me to take these supplements……She told all the females in my area that women should start IFA supplements 3 to 4 months before conception and continue throughout the pregnancy”

One woman said

“In my previous pregnancy, I was advised by “Dai” (TBA) to take IFA supplements”

Nearly all women did not experience any associated adverse effect of IFA supplements, except 1 woman who had used IFA supplements in her previous pregnancy. Half of the women were using IFA supplements and those who were using almost all of them had a positive attitude towards continuing.

One woman said

“No, I did not experience anything bad when I used these supplements in my previous pregnancy”

Another woman stated

“In my last pregnancy I felt very restless and had stomach aches so that’s why I am not taking during this pregnancy”

One woman said

“Yes, I will continue throughout the pregnancy to stay healthy and strong”

5.5 Practices

To explore practices regarding IFA supplements, women were asked whether they were utilizing these supplements at the moment. When did they start taking it and if they were taking these supplements daily or not. Moreover, study participants were inquired about utilization of these supplements in their previous pregnancies. Almost all of the pregnant women had poor practices regarding IFA supplements regardless of the positive attitudes. The reason for poor practices could be the lack of motivation or lack of information provided by health care providers regarding the serious outcomes if IFA supplements are not taken before conception and during pregnancy. This also indicates that women often visit health care facilities after start of pregnancy rather than consulting health care providers before pregnancy. Furthermore, it also
suggests that pregnant women often visit health care facilities late for their antenatal visits and are attending fewer than the recommended number of antenatal visits. Previous pregnancy experiences were also not associated with compliance and good practices. Majority of women who were taking the supplements currently had started taking these supplements near the end of the first trimester or in the mid of second trimester. Some of them who initiated had taken only for few days and stopped spontaneously even without experiencing any side effects. Most of the women who were taking the supplements were not taking them regularly. These practice related reasonings should have been discussed more in-depth.

One woman said

“Yes, I am taking these supplements. I started in my 6th month of pregnancy. I took for 2 months but I stopped taking at the beginning of my 9th month. Yes, I used for few days in my last pregnancy”

Similarly, another woman said

“Nowadays I am not using these supplements but I used in the first month of my pregnancy and stopped after taking for 15 to 20 days”

One woman said

“Yes, I am taking these supplements but I started at the 5th month of my pregnancy and I also took in my last pregnancy but I did not take regularly in my last pregnancy”

Almost all the women bought the IFA supplements from pharmacy except one woman living in the rural area who got free from LHW.

One woman said

“I got these supplements free of cost from LHW that comes in my village.”
6. DISCUSSION

6.1 Discussion of the findings

This master’s thesis provided the understandings regarding knowledge about anemia and knowledge, attitude and practices regarding IFA supplementation among pregnant women residing in Gujranwala district of Pakistan. Majority of the women had not heard the term “Anemia” and most of the women knew IFA supplements as “tablet of strength” and were unaware about the terminologies. This finding is consistent with the qualitative study conducted to determine the knowledge regarding IFA supplements in urban and rural settings in Pakistan by Nisar et al. 2014b. A possible explanation for this similarity in the finding in the current study could be due to the reason that in DHQ hospital majority of patients come from low socioeconomic status and most of them do not have higher education, traits often connected to the rural communities in Pakistan.

Most of the study participants had some knowledge of anemia prevention through dietary measures. They mentioned some common foods in Pakistan which are sources of iron but none of them mentioned about the food sources of folate. The majority of the participants reported of being anemic at the time of interviews, which indicates that women had poor access to such foods which are rich in iron and folate. This indication of limited access to iron and folate rich foods is consistent with the Pakistan food fortification scoping study by Gaffey et al. 2014. They reported that currently there is no legislation for the fortification of staple foods with iron and folic acid both at provincial and national level. Gaffey and colleagues suggested that to overcome the limited access to iron and folate-rich foods among women and children under 5 in Pakistan, fortification of wheat flour with iron and folic acid must be done at universal or at a targeted population level in Pakistan. Wheat flour is a choice of food for fortification as the consumption of wheat flour is very high per capita in Pakistan. Moreover, fortification of wheat flour with iron and folic acid is cost effective and has been done in many industrialized countries (Gaffey et al. 2014).

Nearly all the study participants had limited knowledge regarding IFA supplements, particularly they had limited knowledge about the time to initiate IFA supplements. More than half of the participants did not know why women should take IFA supplements before conception but the majority of women were aware of the reason to take IFA supplements during pregnancy. Most of
the women did not know about the consequences of not initiating before pregnancy and continuing IFA supplements throughout the gestation. These findings are consistent with other KAP studies conducted on IFA supplements (Vitale et al. 2009, Hisam et al. 2014). One of the factors that negatively influences knowledge about IFA supplements is being resident of the rural area as reported in other studies (Hisam et al. 2014, Titaley et al. 2015, Gebreamlak et al. 2017, Nisar et al. 2014a). This study revealed that the some of the women residing in rural areas had better knowledge about when to start and about the benefits of initiating IFA supplements before pregnancy and continuing throughout the pregnancy. The potential reason for better knowledge about these supplements among women residing in rural area could be the health education given by LHWs working in different rural areas across the Pakistan.

This study showed that the women have a positive attitude towards IFA supplements. The attitude towards IFA supplements among Pakistani women is shaped mainly by health care providers such as doctors and LHWs which was also reported in another study on IFA supplements in Pakistan (Nisar et al. 2014b). This study showed that TBAs also play some role in shaping attitude towards IFA supplements which were not reported in other studies (Hisam et al. 2014, Nisar et al. 2014a, Nisar et al. 2014b). Results showed that family, particularly husbands, supported their wives to take IFA supplements, a finding consistent with other studies (Wiradnyani et al. 2016, Tinago et al. 2017). This study also found that women in the social circle do not exert considerable influence in shaping attitudes toward IFA supplements; and most of the pregnant women do not discuss their health issues with other women in neighborhood or relatives, a phenomenon not reported in other studies (Hisam et al. 2014, Nisar et al. 2014b). Experience of side effects was also found to be influential in shaping attitudes towards IFA supplements, consistent with other similar studies (Gebreamlak et al. 2017, Mithra et al. 2013, Kamau et al. 2018). This study also suggested that religious/spiritual healers influence attitudes towards IFA supplements. Role of religion could have been explored more in-depth.

This study reported that women had poor practices regarding IFA supplements. None of the pregnant women had started taking IFA supplements before conception. It also showed that women who started using IFA supplements during pregnancy, none of them took it regularly despite having positive attitudes. This study also reported that women stopped taking IFA supplements even without experiencing any side effects. This practice is in line with findings of

6.2 **Strengths and Limitations**

Few studies have been conducted on knowledge, attitude, and practices regarding IFA supplements in Pakistan among pregnant women. This study was conducted in Gujranwala district of Pakistan where no such study has been conducted before. The methodology used to collect data was qualitative interviews, which are the recommended tool for data collection in KAP studies, as a qualitative study provides an in-depth and comprehensive understanding. Furthermore, the Urdu language was used for data collection which is the local language. Another strength of this study was that the data were collected from Gynecological Department of DHQ Hospital, the largest government hospital in Gujranwala district. Gynecological Department of DHQ hospital has the largest influx of women, with various health problems from all over the Gujranwala district.

The major limitation of this study was that the data collector was male. Pakistani society is predominantly conservative in nature, and due to the segregation based social norms, women are not very expressive in front of males. For this reason, pregnant women were bit anxious, shy and less talkative. Women responded to questions in very short statements rather than explaining in details. Another limitation was that the place where women were recruited for interviews was very busy and crowded as this was the main public hospital in the district. Moreover, the majority of the pregnant women had travelled long distances and waited long for their medical examinations by doctors. Due to this reason, most of the women were reluctant to participate in this study and those who participated wanted to finish interview as early as possible. These barriers resulted in affecting an in-depth exploration of the phenomena. Despite the fact that in qualitative studies sample size is of no concern another possible limitation of this study was that sample size was very small.

6.3 **Implications for better practice and further research**

This study has implications to enhance knowledge particularly about the benefits of IFA supplements among pregnant as well as among non-pregnant women. This calls for an enhanced and more active role of the LHWs and all other levels of health care workers in providing the health education. Antenatal visits are key opportunities to convey this health education, but
similarly other venues should be explored and employed further. Awareness can be improved by media campaigns by governmental public health institutions as well as by non-governmental organizations. These interventions will not only raise knowledge but also help in developing positive attitudes toward IFA supplements. Additionally, further research needs to be conducted to find the inhibiting and promoting factors regarding IFA supplementation, with a potential input in designing and implementing effective interventions by governmental public health institutions.

6.4 Reliability and validity
For this KAP study, qualitative research methodology was used. Tool of choice was in-depth interview. An interview guide was pre-tested in a pilot study before the actual data collection and changes in the interview guide were made accordingly. Every participant and each interview was handled in the same manner, by the same interviewer, who was fluent in the local language and customs.
7. CONCLUSION
The current study provided a useful piece of public health information about the KAP situation of IFA supplements in Pakistan especially among pregnant women of Gujranwala district. This study reported that pregnant women have poor knowledge and poor practices regarding IFA supplements. But they have a positive attitude toward IFA supplements. This contrast of having a positive attitude even in a lacking knowledge scenario is a potential focal point for an intervention. Also, the distance between the attitudes and practices is quite evident and needs bridging up.
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9. APPENDICES

APPENDIX 1

Interview Guide

Sociodemographic Characteristics:

Age:

Children:

Place of residence:

Family type:

Education:

Occupation:

Religion:

Distance from hospital:

Previous pregnancies:

Previous births:

KAP Questions

1) How is your pregnancy going?
2) Is it your first visit to hospital?
3) How many month is your pregnancy?
4) Whom do you consult when you feel something unusual about your health?
5) Do you know what is anaemia?
6) Do you know what is low level of blood in the body? Does it occur in pregnancy?
7) Why low level of blood is common in pregnancy?
8) What women should do to prevent low levels of blood in pregnancy? /what do you think about foods? do they help?
9) Have you heard the word iron?
10) Have you heard the word folic acid?
11) What foods contain iron?
12) What foods contain folic acid?
13) Have you heard about the iron/folic acid supplements and where did you hear about it?
14) What do you know about IFA supplements?
15) When women should start taking IFA supplements?
16) Do you know why women should start taking IFA supplements before conception?
17) Do you know why women should take IFA supplements in pregnancy?
18) What health problems can result if women do not take IFA supplements before and during pregnancy?
19) Do you know what is the recommended dose of IFA supplements?
20) Are you taking IFA supplements? If yes, then when did you start taking these supplements? Have you had used these supplements in previous pregnancies?
21) Who suggested or advised you to start taking IFA supplements?
22) How you are using IFA supplements? Are you taking daily or weekly dosage?
23) Did you get it free from hospital or you bought it?
24) Have you ever experienced something unusual or wrong while using IFA supplements?
25) What does your husband say about the use of IFA supplements?
26) What does religion says regarding the usage of these supplements?
27) Do women in your family, friends, relative or neighborhood use these supplements?
28) If you are using will you continue using throughout your pregnancy?
Ethical Permission

UNIVERSITY OF EASTERN FINLAND
Institute of Public Health and Clinical Nutrition

To DHQ Hospital Gujranwala, Pakistan
Dated: 15th of December, 2017

“Tamoor Ilmas” is currently enrolled as a regular student in Masters of Public Health degree Programme at University of Eastern Finland. A requirement to complete the degree is to conduct a research process which should lead to thesis. In this regard, “Tamoor Ilmas” has started working on his project, titled: “Knowledge, attitudes and practices regarding Iron/Folic acid supplementation among pregnant women”. Kindly allow him to collect data at your Institute and assist him in the logistics.

University of Eastern Finland is grateful to you for your kind cooperation.

Please feel free to contact us for any further clarification or questions.

Thanking you,

Dr. Sohaib Khan, MBBS, MPH, PhD
Assistant Professor in International Health,
Institute of Public Health & Clinical Nutrition,
University of Eastern Finland,
Kuopio, Finland.
Email: sohaib.khan@uef.fi

Professor N. Sohail
Professor of Gynaecology
pl discussed

8/1/18
The MS,
DHQ Hospital Gujranwala,

Respected Sir,

It is stated that I Tamoor Ilmas is student at University of Eastern Finland and studying Masters in Public Health. I need to undertake a master research thesis. Kindly allow me to collect data from your hospital. I shall be grateful to you for this kindness.

Yours Sincerely,
Tamoor Ilmas
Dated: 08/01/2018

Allowed if administration has
no objection.

Nudrat Sohail
08.01.18

PROF. NUDRAT SOHAIL
MBBS, FCPS (Obgy), DCPs, MCPS (HPE)
HEAID OF OBST & GYNAE DEP'TT
MCMONTEACHING HOSPITAL GRW

allowed
I am
8/1/18