

**ANAEMIA IN THE KYRGYZ REPUBLIC:  
NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICE OF  
PREGNANT AND BREASTFEEDING WOMEN**

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## ANAEMIA IN THE KYRGYZ REPUBLIC: NUTRITION KNOWLEDGE, ATTITUDE AND PRACTICE OF PREGNANT AND BREASTFEEDING WOMEN

Anaemia refers to a state where the number of red blood cells has decreased, where there is low level (<117g/l for women) of haemoglobin or morphology of the red blood cells has changed. The prevalence of anaemia among women of reproductive age has been high in Central Asian countries especially, in pregnant women (64%) in the Kyrgyz Republic in 2011. This study examined anaemia among pregnant and breastfeeding women in four different regions and urban and rural settings in the Kyrgyz Republic in Central Asia. The study was part of a Knowledge, Attitude and Practices survey focused on anaemia of pregnant and breastfeeding women conducted by the United Nations World Food Programme (WFP) in August 2014. Simple random sampling was used to select pregnant and breastfeeding women in each city and village on the basis of lists provided by Family Medicine Centres. The sample size was 200 pregnant and 200 breastfeeding women in four different regions (Osh, Chui, Talas and Issyk-Kul). Data was collected through interviews conducted by three supervisors and ten qualified fieldworkers. The questionnaire consisted of 25 questions about for instance, basic nutrition awareness, causes, symptoms and prevention of anaemia.

Pregnant women who received information about anaemia had more knowledge of anemia, its causes and prevention than pregnant women who did not receive any information about anaemia from health personnel. There was no difference in the knowledge of anaemia between breastfeeding women who received information about anaemia and those who did not receive information about anaemia. There were differences in knowledge and practices on anaemia among women in the different regions, but not between women in urban and rural settings. There is need to improve knowledge of anaemia and good nutrition practices among pregnant and breastfeeding women in the Kyrgyz Republic, for example through novel awareness raising measures. Further studies may help to determine if nutrition education based approaches improve iron status in developing countries. There is need for more equally distributed information in Kyrgyz and Russian languages on causes, symptoms and prevention on anaemia for not only pregnant women, but also for breastfeeding women in all four regions and in urban and rural areas.

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## ANAEMIA KIRGISIASSA: RASKAANA OLEVIEN JA IMETTÄVIEN NAISTEN RAVITSEMUS TIETÄMYS, ASENNE JA KÄYTÄNTÖ

Anemia tarkoittaa punasolujen määrän vähenemistä, jolloin hemoglobiinitaso on alhainen (<117g/l naisilla) tai punasolujen morfologia on muuttunut. Anemian esiintyvyys hedelmällisessä iässä olevilla naisilla on ollut korkea Keski-Aasian maissa ja erityisesti, raskaana olevilla naisilla (64%) Kirgisiassa vuonna 2011. Tämä tutkimus tarkasteli raskaana olevien ja imettävien naisten anemiaa neljällä eri alueella ja kaupunki- sekä maaseutualueilla Kirgisiassa Keski-Aasiassa. Tutkimus oli osa Tietoisuus, Asenne ja Käytänteet –tutkimusta, joka keskittyi raskaana olevien ja imettävien naisten anemiaan. Tutkimuksen toteutti Yhdistyneiden Kansakuntien Maailman Ruokaohjelma elokuussa 2014. Yksinkertaisella satunnaisotannalla valittiin raskaana olevat ja imettävät naiset jokaisesta kaupungista ja kylästä perheterveyskeskuksesta saadun listan avulla. Tutkittavia oli 200 raskaana olevaa ja 200 imettävää naista neljältä eri alueelta (Osh, Chui, Talas ja Issyk-Kul). Tutkimusaineisto kerättiin kolmen ohjaajan ja kymmenen kenttätyöntekijän haastattelujen avulla. Kyselylomake sisälsi 25 kysymystä, esimerkiksi perusravitsemus tietoisuudesta ja anemian syistä, oireista sekä ennaltaehkäisystä.

Raskaana olevat naiset, jotka olivat saaneet tietoa anemiasta, tiesivät enemmän anemiasta, sen syistä ja ehkäisystä kuin ne raskaana olevat naiset, jotka eivät olleet saaneet tietoa anemiasta terveydenhuollon henkilökunnalta. Anemia tietoisuudessa ei ollut eroa imettävillä naisilla, jotka olivat saaneet tietoa anemiasta ja niillä imettävillä naisilla, jotka eivät olleet saaneet tietoa anemiasta. Eroja oli nähtävissä naisten anemia tietoisuuden ja käytänteiden osalta alueitten välillä, mutta ei verrattaessa kaupungissa ja maaseudulla asuvien naisten kohdalla. Anemia tietoisuutta ja hyviä ravitsemus käytänteitä on tarpeellista vahvistaa raskaana olevien ja imettävien naisten kohdalla Kirgisiassa, esimerkiksi uusien tietoisuuden lisäämisen avulla. Lisätutkimusten avulla voidaan määrittää, auttaako ravitsemuskoulutus parantamaan rautatilannetta kehitysmaissa. Anemian syistä, oireista ja ennaltaehkäisystä kertovaa materiaalia on tarvetta jakaa tasapuolisesti kirgiisin ja venäjän kielillä niin raskaana oleville kuin imettävillikin naisille kaikilla neljällä alueella ja kaupunki- ja maaseutualueilla.

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**АНЕМИЯ В КЫРГЫЗСКОЙ РЕСПУБЛИКЕ: ЗНАНИЯ БЕРЕМЕННЫХ И КОРМЯЩИХ ЖЕНЩИН О ПИТАНИИ, ОТНОШЕНИИ И ПРАКТИКЕ.** Анемия представляет собой состояние, при котором количество красных кровяных клеток уменьшается, уровень гемоглобина низкий (<117г/л для женщин) либо морфология красных кровяных клеток изменилась. Распространенность анемии среди женщин репродуктивного возраста была высока в Центральной Азии, в частности, среди беременных женщин в Кыргызстане в 2011 году. (64%). Данное исследование было направлено на изучение анемии среди беременных и кормящих женщин в четырех разных областях Кыргызской Республики, в городской и сельской среде. Данное исследование является частью исследования под названием «Знание, отношение, практика», сфокусированного на изучении анемии, проведенного Всемирной Продовольственной Программой ООН (ВПП) в августе 2014 года. Была использована простая выборка при отборе беременных и кормящих матерей в каждом городе и селе на основании списков, предоставленных Центрами семейной медицины. Величина выборки составила 200 беременных и 200 кормящих матерей в четырех разных областях страны (Ошской, Чуйской, Таласской и Иссык-Кульской областях). Данные собирались при помощи интервью, проводимых тремя супервайзерами и десятью квалифицированными полевыми сотрудниками. Вопросник состоял из 25 вопросов, связанных с вопросами осведомленности о базовом питании, причинах, симптомах и профилактике анемии.

У беременных женщин, которые знали об анемии, было больше знаний об анемии, ее причинах и профилактике, чем у беременных женщин, которые не получили информации об анемии от медицинского персонала. Не было никаких отличий между знаниями об анемии среди кормящих женщин, которые были проинформированы об анемии и теми, которые не получили информации о ней. Имеются различия в знаниях и практике по анемии среди женщин в разных регионах, но таковые отсутствуют между женщинами сельской и городской местности. Имеется необходимость улучшения знаний по анемии и практике полноценного питания среди беременных и кормящих женщин в Кыргызской Республике, например, при помощи новых мер по повышению информированности. Последующие исследования могут помочь определить смогут ли подходы, основанные на

просвещенности по вопросу питания, улучшить содержание железа в организме женщин в развивающихся странах. Имеется необходимость в более равномерном распределении информации на кыргызском и русском языках относительно причин, симптомов и профилактики анемии не только среди беременных женщин, но и среди кормящих женщин во всех четырех областях, как в городской, так и в сельской местности.

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## **ABBREVIATIONS AND DEFINITIONS**

FAPs: Midwifery posts

FGPs: Family group practices

FMCs: Family medicine centres

HIV: Human immunodeficiency virus

KAP Survey: Knowledge, Attitude and Practise Survey

KSMA: The Kyrgyz State Medical Academy

MOH: The Ministry of Health of the Kyrgyz Republic

NGO: Non-governmental Organization

NSC: The National Statistical Committee

RHPC: The Republican Health Promotion Centre

RMIC: The Republican Medical and Information Centre

UNFPA: The United Nations Population Fund

UNICEF: The United Nations Children's Fund

WFP: The United Nations World Food Programme

## 1 INTRODUCTION

Anaemia refers to a state where the number of red blood cells has decreased, where there is low level ( $<117$  g/l for women) of haemoglobin or morphology of the red blood cells has changed (Kassebaum et al. 2014). Women of reproductive age (15-49 years) can suffer from anaemia due to menstrual bleeding or the transfer of iron to the foetus during pregnancy (Nordic Nutrition Recommendations 2012). The symptoms of anaemia include weakness and low work productivity (Kassebaum et al. 2014). Anaemia can be prevented by ensuring adequate iron intake for instance, by eating red meat and taking daily iron supplementation (Gleason and Sharmanov 2002, Blanco-Rojo et al. 2014, Pasricha et al. 2014). This study examines anaemia among pregnant and breastfeeding women in the Kyrgyz Republic. The Kyrgyz Republic (Figure 1) is situated in Central Asia. The neighbouring countries are Kazakhstan in the north, Uzbekistan in the west, China in the east and Tajikistan in the south part of the country.



Figure 1. The map of Central Asia (United Nations 2011).

The population in the Kyrgyz Republic in 2011 was about 5.6 million (National Statistical Committee of the Kyrgyz Republic et al. 2012). Most of the people (66%) live in rural areas (Ministry of Health et al. 2013). The population is young, with more than a third of the population under 15 years old (Ibraimova et al. 2011, National Statistical Committee of the Kyrgyz Republic et al. 2013). Life expectancy for women was 73.7 years and for men 65.7 years in 2011 (National Statistical Committee of the Kyrgyz Republic et al. 2012). The total number of women of reproductive age 15-49 years was 1.5 million in 2012 (World Health Organization 2012). Maternal mortality rate in the Kyrgyz Republic was the highest among rural women in 2010 and it was nearly two times (61.3 deaths/ 100 000 live births) higher than among urban women (32.1 deaths/ 100 000 live births) (The Ministry of Health et al. 2013).

The prevalence of anaemia among women of reproductive age (15-49 years) has been high in Central Asia and especially in countries like Azerbaijan (69%), Kazakhstan (58%) and Uzbekistan (51%) (Tazhibayev et al. 2008). Prevalence of anaemia, among women of reproductive age (15-49 years), in the Kyrgyz Republic was 35 %, in Armenia 25% and in Moldova 28% in 2005 (National Statistical Committee of the Kyrgyz Republic Bishkek et al. 2012).

Studies on nutrition knowledge, attitude and practice of pregnant and breastfeeding women have not been done before in the Kyrgyz Republic. However, the National Statistical Committee (NSC), the Ministry of Health of the Kyrgyz Republic (MOH), the United Nations Children's Fund (UNICEF), and the Center for Disease Control and Prevention (CDC) conducted a health survey in 2009 on mothers' knowledge, attitudes and practices on nutrition of young children (MOH et al. 2015).

The United Nations World Food Programme (WFP), MOH and the United Nations Population Fund (UNFPA) implemented a Knowledge, Attitude and Practices survey focused on anaemia of pregnant and breastfeeding women in August 2014. The data from that survey are owned by the Ministry of Health (MOH) of the Kyrgyz Republic and are used in this thesis.

## 2 LITERATURE REVIEW

### 2.1 Anaemia

There are different causes of anaemia, such as low iron intake, blood loss and deficient function of bone marrow, which disturbs production of red blood cells (UNICEF et al. 2001). This thesis, however, focuses on iron deficiency anaemia due to poor nutrition. Iron deficiency anaemia needs a long time to develop and it causes unbalanced iron status in body (UNICEF et al. 2001). Other nutrition deficiencies, such as folate and vitamin B12 may also affect the aetiology of anaemia (Semba and Bloem 2008).

Anaemia can be diagnosed with tests to determine the concentration of haemoglobin in blood (Nordic Council of Ministers 2014, McDonagh et al. 2015). Anaemia is defined by a low level of haemoglobin (<120 g/L for women) (UNICEF et al. 2001). Iron status can be classified into non-anaemia, mild anaemia, moderate anaemia and severe anaemia based on haemoglobin levels (Table 1) (World Health Organization 2011).

Table 1. Haemoglobin levels to define anaemia in non-pregnant and pregnant women

Population ( $\geq 15$ years)	Non-anaemia (g/l)	Mild anaemia (g/l)	Moderate anaemia (g/l)	Severe anaemia (g/l)
Non-pregnant women	$\geq 120$	110-119	80-109	< 80
Pregnant women	$\geq 110$	100-109	70-99	< 70

Symptoms of anaemia include for instance, fatigue, lack of energy, breathlessness, dizziness, poor appetite and reduced cognitive function (Makboobeh et al. 2014, Kassebaum et al. 2014). Kassebaum et al. (2014) found that anaemia increases the risk of low birth-weight in infants (<2 500g) and maternal mortality (Kassebaum et al. 2014, World Health Organization and UNICEF 2004). Women with haemoglobin levels between 80 and 99 g/L have higher risk for instance, for low birth weight and preterm birth. There is, however, controversy as a meta-analysis, that was conducted on studies between the years 1985 and 1998, showed association between maternal anaemia and slightly increased risk of preterm delivery but not with low birth-

weight (Bencaiova and Breymann 2014). The causal association between iron deficiency and maternal mortality is questioned due to dearth of controlled trials. Few observational studies (Semba and Bloem 2008) showed that iron deficiency increased the morbidity and mortality of infectious diseases (Semba and Bloem 2008).

Iron in foods is either haem iron or non-haem iron (Nordic Council of Ministers 2014). Haem iron is the most functional iron (Semba and Bloem 2008). Haem iron is more efficiently absorbed than non-haem iron from the food (Nordic Council of Ministers 2014). Iron absorption is influenced by dietary iron content and bioavailability of dietary iron (Semba and Bloem 2008). Bioavailability of non-haem iron is dependent on other dietary compounds. Calcium inhibits both haem and non-haem iron absorption. Tea and coffee consumption with meal inhibits the absorption of non-haem iron (Nordic Council of Ministers 2014). In addition, phytates inhibit the absorption of non-haem iron (Semba and Bloem 2008). Vitamin C, fresh vegetables, fresh fruits and berries, meat, fish and poultry enhance non-haem iron absorption (Nordic Council of Ministers 2014, Semba and Bloem 2008). Fruits and vegetables contain non-haem iron and together with C vitamin the absorption of iron improves (Belton 1995, Nordic Council of Ministers 2014).

### **2.1.1 Anaemia among pregnant and breastfeeding women**

On a global level, women of reproductive age are at risk of iron-deficiency anaemia (Miller 2014). Globally, nearly half (40-50%) of reproductive age women suffer from anaemia (Kozuki et al. 2012). Every third person with anaemia is a pregnant woman in South-East Asia (Benoist et al. 2008). Smagulova et al. (2013) studied prevalence of anaemia in 1303 women (15-49 years old) and 6.8% of the respondents were pregnant women in Kazakhstan. Haemoglobin level in the blood was significantly lower among pregnant women than in non-pregnant women. Nearly half (43.8%) of pregnant women were suffering from iron deficiency. More than half of pregnant women (51.2%) and more than three fourths of non-pregnant women (77.2%) had severe anaemia. Prevalence of moderate anaemia among pregnant women was between 43.6% and 50.5% (Smagulova et al. 2013).



The prevalence of anaemia in pregnant women was 64% in the Kyrgyz Republic in 2011 (MOH 2013). The prevalence of women who took iron tablets and syrup during their most recent pregnancy was 44% in 2012 in the Kyrgyz Republic (NSC et al. 2012). Every third woman took folic acid tablets during their most recent pregnancy in 2012. Folic acid tablets were used less often than iron supplements in 2012. Folic acid supplementation was highest in the Issyk-Kul region and Bishkek city and lowest in the Batken region in 2012 (NSC et al. 2012).

Breastfeeding is associated with lower dietary iron needs than pregnancy because of relatively low iron levels in breast milk and lactational amenorrhea (Miller 2014). Lactational amenorrhea is natural infertility due to patterns of breastfeeding (Kouyaté et al. 2014). Low amount of iron and factors that increase absorption of iron in breast milk may affect growth and development among babies (Marin et al. 2012). Breastmilk has a small amount of iron and the need for iron in infants increases after the first 6 months after birth. Therefore, iron rich food, such as complementary feeding is necessary for increasing iron intake at 6 months (Margues et al. 2014).

### **2.1.2 Prevention of anaemia**

Nutrition has an effect on health, and maternal nutrition is important during pregnancy. Health and nutrition status among breastfeeding women also affects the health of their children (Udipi et al. 2000).

The need for iron increases after the first trimester of pregnancy and the total iron need is 1 040 mg during pregnancy (Nordic Council of Ministers 2014, McDonagh et al. 2015). The need for iron among pregnant women is individual, and supplementing with 40 mg iron per day from pregnancy week 18-20 can prevent anaemia (Nordic Council of Ministers 2014). The World Health Organization (2012) and UNICEF et al. (2001) recommend that dietary allowance of iron for pregnant and breastfeeding women is 30-60 mg per day and that of folate is 400 µg per day (World Health Organization 2012, UNICEF et al. 2001).

Iron status can be improved by eating diverse meals and promoting better feeding practices. Meals can be diversified by increasing access to iron rich foods for example, fish, poultry and whole grains (UNICEF et al. 2001).

Zijp et al. (2000) observed that presence of sufficient amounts of iron absorption enhancers overcome inhibition of iron absorption by high consumption of tea. The study suggests use of iron fortified foods, tea drinking between meals instead of during the meals and varying consumption of meat, fish and poultry in order to increase iron intake (Zijp et al. 2000).

Cross-sectional studies done among young women aged 19 to 34 years, have shown no association between total dietary iron intake and iron status (Beck et al. 2014). They also showed no association between fruit and vegetable intake and iron status. However, association between iron status and meat intake has been found among young women (Beck et al. 2014).

An intervention done by Marin and colleagues (2012) investigated personalized iron supply as a prevention and treatment for pregnant women ensuring normal iron content in their breast milk. A total number of 360 women were included in the survey and they were randomized in two groups: a control group got free iron tablets from health centre and an intervention group received iron tablets from health personnel in their homes. The intervention group had higher iron levels in breast milk. The study showed that personalized iron prevention and treatment affected iron levels in breast milk (Marin et al. 2012).

Control for iron deficiency anaemia among women, include food fortification and supplementation with iron and, further, folic acid has been suggested for pregnant women (Smagulova et al. 2013, Mei et al. 2014). Iron and folic acid supplements were given to 75% of pregnant women in the Kyrgyz Republic in 2012 by the antenatal care services (MOH et al. 2013). Prenatal iron-folic acid and multiple micronutrient supplements have been considered to have limitations in women who are suffering from mild anaemia or do not have anaemia (Mei et al. 2014). However, Mei et al. (2014) found that iron status improved in women who received iron-folic acid supplements and multiple micronutrient supplements, and had mild anaemia or non-anaemia during pregnancy. Similar effects were not found with women who suffered from perinatal anaemia which, in other words, occurs before, during or straight after birth (Nogueira Reis et al. 2013, Mei et al. 2014).

## **2.2 Prevention programmes for iron deficiency anaemia among pregnant and breastfeeding women**

Geographical, social and economic factors need to be understood well in order to design effective interventions (Benoist et al. 2008). Better feeding practices can be adopted by educating pregnant and breastfeeding women about good nutrition practices (Yuan et al. 2014).

The World Health Organization has created an anaemia prevention program which aims to reduce anaemia among pregnant women (World Health Organization 2014a). Strategies on reducing anaemia aim that targeted interventions should provide iron supplements, especially to pregnant women. Strategies should be targeted to primary health care and existing programmes on maternal health (World Health Organization and UNICEF 2004). Public health authorities should re-evaluate current strategies to control anaemia (Benoist et al. 2008). In addition, strategies need to be evidence based, applied to local conditions and for the prevalence of anaemia. Health care providers and people at health risk should improve their awareness and knowledge on anaemia (World Health Organization and UNICEF 2004).

The Central Asian countries; Kazakhstan, Uzbekistan, the Kyrgyz Republic, Tajikistan and Turkmenistan have developed anaemia prevention and control policies. These are based on education, promotion and also fortification of wheat flour with iron and other micronutrients. The countries aim to reduce prevalence of anaemia and iron deficiency among women of child-bearing age (15-49 years) (Gleason and Sharmanov 2002).

In Uzbekistan, a national survey using random samples evaluated iron and folate status among women of reproductive age after three years of consuming flour fortified with micronutrients. It was estimated that the prevalence of anaemia was 34.4% (95% CI: 32.0, 36.7) and folate deficiency 28.8% (95% CI: 26.8, 30.8) (Hund et al. 2013). Folate deficiency had stronger association with severe anaemia than an unbalanced iron status. The national survey concluded that women were not eating enough iron rich foods and had problems in their iron absorption. Fortified products were common in Uzbekistan but knowledge of fortification and anaemia was low. The study suggested distributing nutritional information to women (Hund et al. 2013). Supplementation with iron-folic acid or iron with other multiple micronutrients is suggested (Mason et al. 2014). More research is needed to determine the effects of breastfeeding on

maternal nutritional status and to prepare strategies for increasing nutrient intake among mothers (Dewey 2004).

There is an increasing need for timely health care visits, awareness on prevention of anaemia and maternal nutrition among women and their families (MOH 2012). The Kyrgyz Republic has also implemented prevention programmes under the Manas Taalimi, National Health Reform Programme (2006-2011) and Den Sooluk, National Health Reform Programme (2012-2016). Manas Taalimi aimed to improve health by integrating service delivery system and including individual and public health services. Den Sooluk aims to improve the quality of health care and achieve reduction of anaemia by 4% in 2014 and by 12% in 2016 among pregnant women, for instance improving women's awareness on anaemia prevention and maternal nutrition (MOH 2011, MOH 2012).

The Ministry of Health of the Kyrgyz Republic together with the United Nations Population Fund Kyrgyzstan and Kyrgyz-Swiss-Swedish Health Project developed a national health education campaign aiming to improve diet during pregnancy and breastfeeding in 2008 (MOH et al. 2008).

### **2.2.1 Anaemia prevention tools for iron deficiency anaemia among pregnant and breastfeeding women**

Education campaigns are not the only possible way to prevent anaemia. Mobile applications, videos, e-Health and social media can be utilised in anaemia mitigation. Mobile applications can also use pictures and videos which are both comfortable and visual ways for showing data to users (Martinez-Perez et al. 2013). Mobile communications have possibilities to provide quick and cheap health care services by preventive approaches (World Bank 2012). The mobile application needs to be simple to use with only minimal training (Wuorisalo, Viljakainen, personal communication 5.2.2016, World Bank 2012). Community workers and volunteer women can be helpful in designing of mobile applications (Wuorisalo, Viljakainen, personal communication 5.2.2016).

Martinez-Perez et al. (2013) found that there were more than 1000 mobile applications in Google apps available for diabetes or depression but not for anaemia. Mostly mobile applications had functions in monitoring, assistance or informing of the condition in question. The majority of mobile applications available did not need an Internet connection. Social media can be utilised to improve knowledge and dietary habits through interactive communication between health consumers and health professionals (Bissonette-Maheux et al. 2015). Blogs on healthy eating written by dieticians for 33 Caucasian women aged between 22 to 73 years showed that increased interaction, shared information and peer supports were the main advantages in using social media for health communication (Bissonette-Maheux et al. 2015).

Mobile applications for maternal and child health have also been used in South Africa, Zambia and Mozambique. These include health campaigns through text messages in South Africa, video workshops in community health in Zambia and utilization of applications in clinics in Mozambique (Wuorisalo, Viljakainen, personal communication 5.2.2016).

GloCal is an example of a nutrition and health education program developed by Helsinki University, collaborated by Kenyatta University, Ministry of Health Kenya and UNICEF Kenya in Kenya to give accurate information on maternal nutrition, anaemia and health to mothers and other caregivers. It includes about 40 educational videos and a mobile application. It allows healthcare workers to give the right treatment for mother's needs through videos that explain different aspects of maternal health, diet and breastfeeding. About 20 videos were produced together with local communities, through a co-creation model, using local women and local foods in the demonstrations (Mutanen, Schneider, Avento, Viljakainen, personal communication 22.1.2016).

Kyrgyz National Strategy (2012) aims to provide equal access to information for all citizens. The health care information systems and the telemedicine consist of tele-education in distance training and health promotion and also telemedicine in information exchange on diagnostics and treatment in the Kyrgyz Republic (United Nations Economic Commission for Europe 2002). In the Kyrgyz Republic, there is not much evidence on the use of mobile technologies in the health sector. However, interactive mobile apps have been used to improve reading skills and motivate children to read (Aga Khan Foundation 2016) using an applications called Read Together, which

was developed by Aga Khan Foundation together with USAID, Balastan and Avisa Technologies (Aga Khan Foundation 2016).

A project called E-Health service was introduced to improve quality in health care in the Kyrgyz Republic (Suyunbaeva 2012). The aim of E-Health was to provide women better access in maternity health care in remote and rural areas. The project started in Batken region where there is lack of medical personnel, health services and special medical equipment. E-health service allows using information technologies and do co-operation between private and public sectors. E-Health has many applications in maternal monitoring (Suyunbaeva 2012).

### **2.3 Maternal health care systems in the Kyrgyz Republic**

Health systems in the Kyrgyz Republic include maternal care services. Health services are provided in provincial, state and specialised hospitals and research institutes. Primary health care in the Kyrgyz Republic mostly offers maternal health services (UNICEF 2009).

Primary health care offers services of midwifery posts (FAPs), family group practices (FGPs) and family medicine centres (FMCs) (Figure 2). FAP is the health care system in rural areas for a population between 500 and 2000 people. There is a midwife who works in communities in co-operation with local NGOs to improve hygiene. FGP is based on health facilities such as polyclinic and rural district hospitals. One physician, two nurses and midwives are organized to cater to communities of 2000 and above people. FGP provides primary care and family medicine. The doctors are specialized in for example, obstetrics or gynaecology. FMC is the largest health facility in the Kyrgyz Republic. It consists of combined primary and outpatient care services. It provides for example, family planning, obstetric care and home visits (Ibraimova et al. 2011).

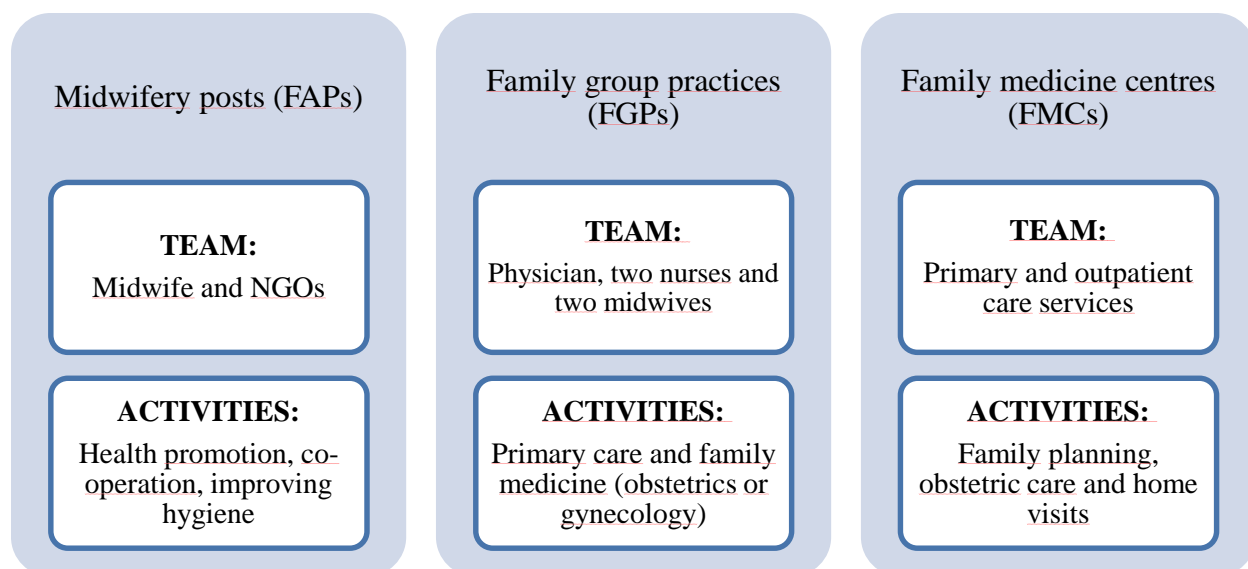


Figure 2. Maternal Health Care Systems in the Kyrgyz Republic

Prenatal care in the Kyrgyz Republic is given in early pregnancy (during the first trimester) and is given every month throughout the pregnancy. Antenatal care covers early screening and treatment of diseases for mothers. The antenatal care aims to improve nutritional status among women. Nearly every woman (97%) receives antenatal care at least once during their pregnancy in the Kyrgyz Republic. During the last five years there have been socioeconomic changes in the Kyrgyz Republic, which have had an impact on the health sector by reducing financial resources (UNICEF 2009). Primary care is more focus on clinical care instead of disease prevention and health promotion (McKee et al. 2002). Mostly women in rural areas receive low quality antenatal care because of a lack of an antenatal services package for pregnant women. There are no appropriate equipment nor qualified personnel (UNICEF 2009).

### **2.3.1 Nutrition Awareness through schools and health centres**

In secondary schools anatomy and biology teachers are responsible for giving information about nutrition to students at the age of 15 and 16. The students receive information about nutrition only once during their secondary school period (Pavlovna, Orozobekova and Viljakainen, personal communication 2.6.2015).

The Kyrgyz Medical Academy offers modules, for instance the development of primary health care and the introduction of family medicine for 4<sup>th</sup> and 5<sup>th</sup> year Dentistry and Health Science (Nutrition, Nursing) students and a nutrition training programme in Faculty of Prevention Medicine (Ibraimova et al. 2011, Orozobekova and Kadyrovna, personal communication 2.6.2015). Modules and nutrition training programmes have information about nutrition deficiencies among pregnant women (Orozobekova and Kadyrovna, personal communication 2.6.2015).

Each regional public health centre invites women in their region two times per year, to have a group discussion about anaemia and nutritious food. The teams (gynaecologists and a group of family doctors) have not been trained or have not got any special education about nutrition and anaemia (Viljakainen, Orozobekova and Ryskulova, personal communication 2.6.2015). There are more than 100 polyclinics in the Kyrgyz Republic but not all of those receive patients with anaemia in the Kyrgyz Republic (World Health Organization 2014b, Viljakainen, Alyshbaev, Orozobekova and Meerim, personal communication 2.6.2015). The polyclinics are specialized for giving treatment for the people with anaemia (Viljakainen, Alyshbaev, Orozobekova and Meerim, personal communication 2.6.2015).



## 2.4 Knowledge, Attitude and Practice Surveys

A Knowledge, Attitude and Practice survey (KAP survey) deepens knowledge and understanding of a situation, a problem or brings up aspects that are not yet known (Gumucio et al. 2011). Knowledge refers to a set of understandings and capacity for a person to perceive (Gumucio et al. 2011). The survey gives a possibility to evaluate the degree of knowledge (Gumucio et al. 2011). Attitude is a position which helps to explain the possible practices for example, in case of anaemia. It is not observable as practices but it helps to assess them (Gumucio et al. 2011). Practice refers to concrete actions for instance, high consumption of red meat (Gumucio et al. 2011).

The KAP Survey is a quantitative method and is used for individual and/ or group interviews (focus groups). A combination of observations and open interviews helps to deepen certain topics that are addressed during the KAP survey (World Food Programme 2014). KAP surveys on tobacco smoking, diabetes, hypertension and alcohol have been done in Mongolia (Demaio et al. 2014, Demaio et al. 2013a, 2013b, 2013c). Demaio et al. (2014) conducted a KAP-survey on smoking among men and women aged 15 to 64 in Mongolia. A total number of 3450 people were included in the survey and were randomized by cluster sampling from permanent residents aged 15 and 64 years. Nearly half (46.3 %) of the men and less than every tenth (6.8 %) of women were smokers. Knowledge of tobacco smoking effect on health was dependent on the level of education of the respondents. The study claimed that knowledge does not have an impact on behaviour change (Demaio et al. 2014).

Comprehensive studies on nutrition knowledge, attitude and practice of both pregnant and breastfeeding women have not been conducted before in former Soviet Union countries. A nutritional attitude survey on healthy eating has been conducted in Ukraine. The main factors affecting food choices were: quality or freshness (80 %), price (58 %) and taste (47 %). Women thought more about nutrition and less about their health than men (Biloukha and Utermohlen 2001).

Chukmaitoiv et al. (2008) conducted a study on breast cancer knowledge and attitudes toward mammography as predictors of breast cancer preventive behaviour in Kazakhstan, aimed at demonstrating differences in breast cancer knowledge and attitudes toward mammography among Kazakh, Korean and Russian women. The study was a cross-sectional, descriptive study and a total number of 500 women were interviewed face-to-face in the city of Alma. The study found that the women were more engaged in breast cancer preventive practices if their doctor had advised obtaining a mammography (Chukmaitoiv et al. 2008).

A study on HIV/AIDS awareness and risk behaviour among pregnant women was done in Semey, Kazakhstan in 2007, aimed at evaluating knowledge, risk behaviour and attitudes on voluntary counselling and testing HIV/AIDS among participants. The study population was 520 pregnant women and a total of 226 women responded to the questionnaire. Most of the participants (96%) had heard about HIV and the main sources of information were media (52%) and school (40%). Most of the women (83%) mentioned that they would not breastfeed their baby if they had HIV. The study established that the pregnant women in Semey had poor knowledge about specific mother-to-child HIV transmission and did not know the purpose of reducing mother-to-child HIV infection. The study suggested that the information in the public health program needs to be improved (Sandgren et al. 2008).

Maternity care and birth preparedness was studied between the years 2006 and 2011 in rural Kyrgyzstan and Tajikistan to assess the baseline level of maternity care knowledge of the population and care providers. The study participants were pregnant women and men interviewed for instance, about their knowledge of pregnancy related risks and serious health problems during pregnancy, labour and childbirth. The study observed that Kyrgyz and Tajik women and men had limited knowledge about possible complications during pregnancy. Service providers also had poor professional level of knowledge of perinatal health issues (Wiegers et al. 2010).

MOH, NSC, United Nations Children's Fund, Kyrgyz-Swiss-Swedish Health Project and the U.S Centers for Disease Control and Prevention conducted nutrition survey in the rural areas of Talas Oblast in the Kyrgyz Republic in June and July 2008. The study participants were children aged 6-24 months and the mothers of these children were interviewed on, for instance infant feeding practices, knowledge of Village Health Committees and source of health information. The study

found that the mothers received information on diet mostly from medical professionals, family members, friends and neighbours. More than half (63.3%) of the mothers who were diagnosed with anaemia by a doctor, took iron supplements (MOH et al. 2008).

NSC et al. conducted a health survey from August to December in 2012, on knowledge and attitudes on tuberculosis in the Kyrgyz Republic (NSC et al. 2012).

### **3 AIMS**

The main purpose of this master's thesis was to assess the nutrition knowledge, attitude and practice in regard to anaemia of pregnant and breastfeeding women, in the Kyrgyz Republic. It compares the nutrition knowledge, attitude and practice of informed and non-informed pregnant and breastfeeding women. Nutrition knowledge, attitude and practice in four regions and in urban and rural settings are also compared. The aim is also to formulate recommendations for raising awareness of anaemia and its mitigation.

## 4 MATERIALS AND METHODS

### 4.1 Study design and location

The study focused on nutrition knowledge, attitude and practice in the Kyrgyz Republic using a KAP-survey among pregnant and breastfeeding women. The study was designed to determine factors influencing behaviours and gaps in knowledge among pregnant and breastfeeding women.

The research was implemented in the Kyrgyz Republic in Chui region in the north, in Osh region in the south, and finally in Talas and Issyk-Kul regions in the north (Figure 3).

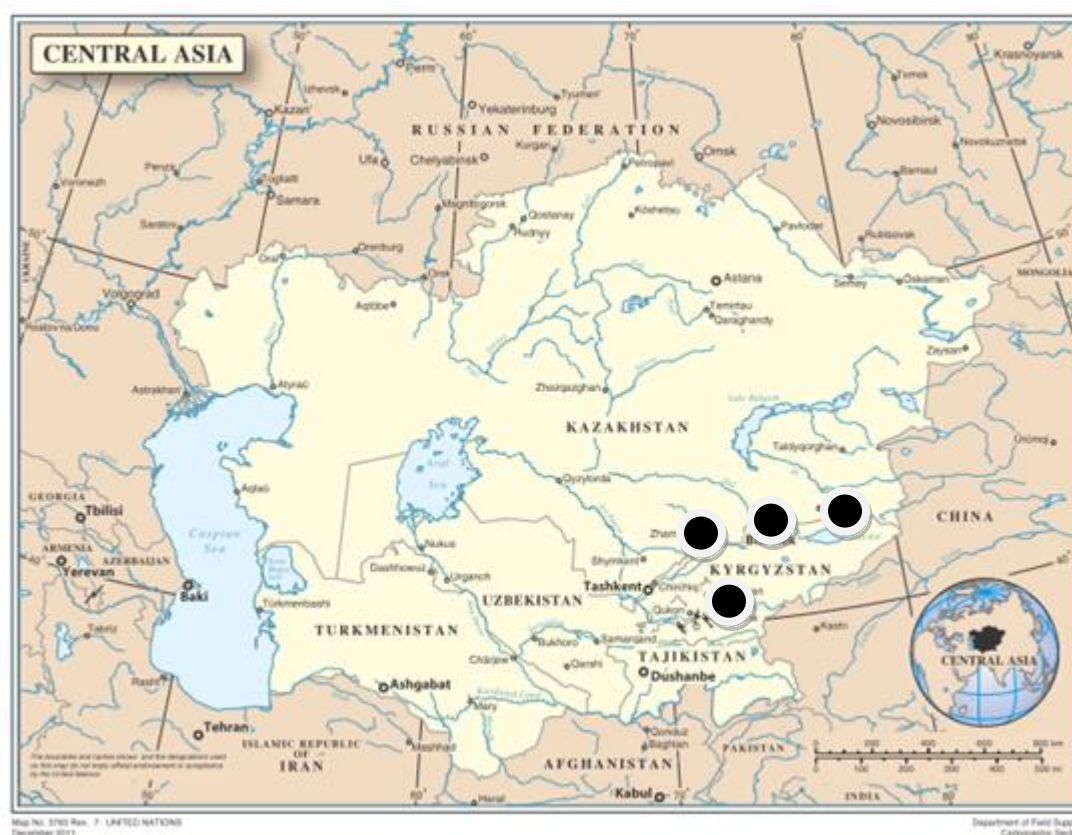


Figure 3. Research areas for the KAP-survey on anaemia in pregnant and breastfeeding women (United Nations 2011, modified)

## 4.2 Participants

The target group was pregnant and breastfeeding women between the ages of 18 and 49 years old. The sample size was calculated on the basis of the 2009 Demographic Health Survey which was conducted by NSC.

Simple random sampling was used to select pregnant and breastfeeding women in each city and village on the basis of lists provided by the Family Medicine Centres (FMCs). Each urban and rural area had different sample size, based on the representative sample of a population, for instance, if there were ten pregnant women on the list of the health centre and five pregnant women were needed for interviews, every second pregnant woman from the list was selected (Table 2).

Table 2. Number of households selected for the survey

Number of households N=400	Regions			
	Osh	Chui	Talas	Issyk-Kul
Rural	50	50	50	50
Urban	50	50	50	50

## 4.3 Data collection and analysis

Data were collected through interviews conducted by three supervisors and ten qualified fieldworkers from the Republican Medical and Information Centre (RMIC), the Republican Health Promotion Centre (RHPC), the Kyrgyz State Medical Academy (KSMA), the NGO Kyrgyz Alliance of Reproductive Health, health care organizations including the National Centre for Protection of Motherhood and Childhood and the Family Medicine Centre using a questionnaire (Appendix 1). The questionnaire consisted of 25 open questions about basic nutrition awareness, causes, symptoms and prevention of anaemia, use of iron, vitamins and folic acid supplements, number of the meals and tea drinking. Some of the questions consisted of yes and no –answers while other questions included multiple answer options. The questionnaire was initially designed in English then translated into Russian and following translated into Kyrgyz.

A one-day training – including information on how to complete questionnaires for the fieldworkers was held by United Nations Population Fund and WFP staff. The fieldworkers were divided into two teams of five fieldworkers and three supervisors that were responsible for monitoring. Each team had five fieldworkers. Team one collected the data in Chui region and Issyk-Kul region and team two collected the data in Talas region and Osh region. The data collection covered one or two urban and one or two rural areas per day. Two or three fieldworkers interviewed pregnant women and two or three fieldworkers interviewed breastfeeding women, in separate rooms, in the health centre. Interviews were conducted in the Russian and Kyrgyz languages. The pregnant and breastfeeding women were selected from a list given by FMC. Fieldworkers and the quality of data in the field visits were monitored by the KAP Survey team, which included the team-leaders and UNFPA and WFP staff. Health organizations were aware of the survey.

Data was entered in Excel (Version 2003) and was analysed with the statistical analysis programme (SPSS version 19, IBM Corp and R Studio, R Core Team). Data were presented using frequencies and percentages (%). Data were presented by geographical areas (oblasts/regions), residential environment (urban or rural) and differences among categories were tested using chi square test. In addition, data was presented by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP), and the two groups were compared. Breastfeeding women were also classified into two groups, breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB).

#### **4.4 Ethical considerations**

Ethical permission for the Knowledge, Attitude and Practice Survey was given by Bioethics Committee at the Ministry of Health of the Kyrgyz Republic in August 2014 (Appendix 2). Respondents gave an informed oral consent to participate in the KAP survey before the interview. Participation in the study was voluntary which means that a respondent had the right to stop the interview at any time. The results were reported so that the identity of the respondents is not revealed.

## 5 RESULTS

### 5.1 Description of the respondents

A total of 397 respondents participated in this study. Among them 197 (49.6%) were pregnant women and 200 (50.4%) were breastfeeding women (Table 3). More than half of the pregnant and breastfeeding women were between 18 and 30 years old. One third of the pregnant and breastfeeding women were between 31 and 49 years old. Most of the pregnant and breastfeeding women were married.

Respondents were from 11 urban and 19 rural areas (Appendix 3) in the four regions: Chui, Issyk-Kul, Osh and Talas of the Kyrgyz Republic. In Osh there were 3 urban and 6 rural areas, in Talas there were 1 urban 5 rural areas, in Chui there were 4 urban and 3 rural areas and in Issyk-Kul there were 3 urban and 5 rural areas. All regions contributed 25% of the total sample size. Less than half of the pregnant and breastfeeding women lived in urban areas and more than half in rural areas. The planned sample size was reached well.

Table 3. Demographics of pregnant and breastfeeding women interviewed

<b>Demographics</b>	<b>Frequency (n)</b>	<b>Percent (%)</b>
<b>Respondent n=397</b>		
Pregnant women	197	49.6
Breastfeeding women	200	50.4
<b>Age (years) n=397</b>		
18-30	282	71.0
31-49	115	29.0
<b>Marital status n=397</b>		
Married	380	95.7
Single with child	15	3.8
Single without child	2	0.5
<b>Respondent's home region n=397</b>		
Chui	100	25.2
Issyk-Kul	100	25.2
Osh	100	25.2
Talas	97	24.6
<b>Respondent's residential environment n=397</b>		
Urban	160	40.3
Rural	237	59.7



## 5.2 Knowledge, attitudes and practices on anaemia in pregnant women

In this section pregnant women shall be classified into two groups, pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP), and the two groups shall be compared.

Hospital and health care staff were the most common source of information on anaemia for 66.3% of the IP group and 50.0% of the UP group (Table 4). More women in the UP group (25.9%) than in the IP group (16.8%) mentioned radio and television programmes as a source of information on anaemia.

Table 4. Provider of information on anaemia to pregnant women

Provider of information on anaemia	IP (n=137)%	UP (n=45)%
Health personnel/volunteers	66.3	50.0
Radio/TV programs	16.8	25.9
Members of the family	11.6	10.3
School	2.6	3.4
Other	2.1	3.4
I do not know	0.5	6.9

Pregnant women had been given information about anaemia over a 3 month period preceding the interview (45.6%). Every fifth pregnant women received information about anaemia over a 6 month period preceding the interview. In addition, 12.1% of pregnant women received information about anaemia 12 months before the interview.

More women in the IP group (96.5%) than women in the UP group (81.8%) had heard about anaemia (Table 5). From the IP group 93.7% had heard about the importance of iron in the diet, while the corresponding figure was 72.7% in the UP group. There were significant differences between the IP group and UP group: only 4.2% of the IP group had not heard about the importance of iron in the diet, while in the UP group the corresponding figure was 27.3% (p-value <0.001). The majority of the IP group had heard about folate, while this was not the case in the UP group. More women in the IP group (76.8%) had taken folic acid supplements, during their current pregnancy, than in the UP group (23.2%). There was a similar trend in the use of

iron tablets. Almost half of the IP group had used iron tablets in comparison to 29.1% in the UP group. More women in the IP group (78.2%) than in the UP group (58.2%) knew that tea consumption affects iron absorption.

Table 5. Knowledge, attitudes and practices on anaemia in pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

	IP (n=142)			UP (n=55)			P-value <sup>a</sup>
	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	
Has heard about anaemia	137 (96.5) <sup>b</sup>	5 (3.5)	0	45 (81.8)	10 (18.2)	0	0.001*
Diagnosed with anaemia by health personnel (n=182)	67 (48.9)	70 (51.1)	0	16 (35.6)	29 (64.4)	0	0.119
Health personnel explained the causes, prevention and treatment of anaemia besides medication (n=192)	66 (98.5)	1 (1.5)	0	13 (81.3)	3 (18.8)	0	0.004*
Has heard about the importance of iron in the diet	133 (93.7)	6 (4.2)	3 (2.1)	40 (72.7)	15 (27.3)	0	<0.001*
Has heard about folate	118 (83.1)	21 (14.8)	3 (2.1)	31 (56.4)	23 (41.8)	1 (1.8)	<0.001*
Folic acid supplements taken in current pregnancy (n=197)	109 (76.8)	33 (23.2)	0	30 (54.5)	25 (45.6)	0	0.002*
Iron tablets taken in current pregnancy (n=197)	68 (47.9)	74 (52.1)	0	16 (29.1)	39 (70.9)	0	0.017*
Vitamin supplements taken in current pregnancy (n=197)	69 (48.6)	73 (51.4)	0	19 (34.5)	36 (65.5)	0	0.075
Know that tea consumption affects iron absorption	111 (78.2)	29 (20.4)	2 (1.4)	32 (58.2)	23 (41.8)	0	0.007*

<sup>a</sup>Pearson chi-square test, Probability 95 % significance level

### 5.2.1 Knowledge on causes of anaemia in pregnant women

Insufficient dietary intake was the most common cause of anaemia mentioned by the IP group (64.7%) and the UP group (54.2%) (Table 6). More women in the UP group (20.8%) did not know the causes of anaemia as compared to the IP group (8.5%).

Table 6. Knowledge on causes of anaemia mentioned by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Knowledge on causes of anaemia	IP (n=137)%	UP (n=45)%
Insufficient dietary intake	64.7	54.2
Excessive blood loss	6.5	10.4
Blood loss during menstruation	4.6	0
Heavy bleeding during surgery	3.3	2.1
Lack of vitamins	3.3	0
Other	9.2	12.5
I do not know	8.5	20.8

### 5.2.2 Knowledge on symptoms of anaemia in pregnant women

Paleness and weakness were the most common symptoms mentioned by women in the IP and UP groups. The women in both the IP and UP groups mentioned the same symptoms. Of the UP group, 7.7% and the IP group, 1.7% did not know the symptoms of anaemia (Table 7).

Table 7. Knowledge on symptoms of anaemia mentioned by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Knowledge on symptoms of anaemia	IP (n=137) %	UP(n=45) %
Weakness	31.2	26.9
Paleness	27.1	23.1
Tiredness	17.6	14.1
Dizziness	10.5	16.7
Nausea	5.1	3.8
Craving for non-food items	2.7	1.3
Shortness of breath	1.0	0
Poor growth and development	1.0	1.3
Headache	0.7	0
Other	1.3	5.1
I do not know	1.7	7.7

### 5.2.3 Knowledge on prevention of anaemia in pregnant women

From the IP group 59.4% and the UP group 44.4% mentioned improving their eating habits in case they were diagnosed with anaemia by health personnel (Table 8). Slightly more women in the UP group (46.7%) mentioned taking medications (supplements) than in the IP group (39.2%).

More than half of the women both in the IP and UP groups mentioned taking a good diet in preventing anaemia. Almost every third woman in the IP group and every fourth woman in the UP group mentioned taking iron or folic acid. The women in both the IP and UP groups mentioned means to prevent anaemia.

Table 8. Anaemia treatment and prevention by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Anaemia treatment and prevention	IP (n=137)%	UP (n=45)%
<b>Anaemia treatment after diagnosed anaemia</b>		
Improved my eating habits	59.4	44.4
Took medications (supplements)	39.2	46.7
I do not know	1.3	8.9
<b>Anaemia prevention</b>		
Taking a good diet	58.8	54.2
Taking iron/folic acid	27.8	25.4
Other medical care	0.6	6.7
Access to more information	1.5	0
Other	0.5	1.7
I do not know	5.2	13.5

It was tested whether the pregnant women could mention iron-rich foods (Table 9). Almost every third woman in the IP group and every fourth woman in the UP group mentioned meat as a good source of iron. The UP group (28.1%) mentioned fruits almost two times more often than the IP group (15.8%). None of the women in the UP group mentioned vegetables as a good source of iron, while only 2% of the women in the IP group did.

Table 9. Foods mentioned as good sources of iron by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Foods mentioned as good sources of iron	IP (n=142) %	UP (n=55) %
Meat	28.6	25.0
Offal (liver)	16.8	15.6
Fruits	15.8	28.1
Fish	12.5	8.3
Green leafy vegetables	7.4	3.1
Eggs	7.1	4.2
Legumes	2.7	4.2
Vegetables	2.0	0
Other	2.0	4.1
I do not know	4.4	7.3

#### 5.2.4 Food consumption among pregnant women

More than half of the women both in the IP and UP groups eat more than three times meals in a regular day (Table 10). The survey investigated which foods were consumed at least three times a week among pregnant women. Meat was the most common food, consumed by more than every third woman in both the IP and UP groups. Slightly more women in the IP group (21.7%) consumed green leafy vegetables than women in the UP group (16.7%). Eggs, on the other hand, were mentioned by about 16-18% of women in both groups.

There were differences in tea drinking during or right after eating main meals between the women in the IP and UP groups. More women in the UP group (74.5%) than the women in the IP group (43.7%) mentioned drinking tea always during or right after eating main meals. Every fifth woman in the IP group and none of the women in the UP group said they rarely drank tea during or right after eating main meals.

Table 10. Food consumption by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Food consumption	IP (n=142)%	UP (n=55)%
<b>Number of meals in a regular day</b>		
More than three times a day	56.3	50.9
Three times a day	26.8	29.1
Two times a day	14.8	18.2
Once	2.1	1.8
<b>Foods consumed at least three times a week</b>		
Meat	36.7	36.2
Green leafy vegetables	21.7	16.7
Eggs	16.5	17.7
Fish	9.0	7.6
Fruits	6.8	6.9
Offal (Liver)	3.7	6.2
Legumes	3.7	4.6
Dairy products	1.2	0.8
Other	0	3.1
I do not know	0	0.8
<b>Drinking tea during or right after eating main meals</b>		
Yes always	43.7	74.5
Yes sometimes	19.7	16.4
Yes rarely	20.4	0
Not at all	16.2	9.1

### 5.2.5 Eating practices among pregnant women

Most of the women in the IP and UP groups mentioned that their families usually eat together (Table 11). More women in the UP group (12.7%) mentioned that adults eat first in their family. Contrastingly, only 3.5% of the women in the IP group mentioned that adults eat first in their family.

Table 11. Eating practices among pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Eating practices	IP (n=142)%	UP(n=55)%
We eat together as a family	91.5	81.8
Children eat first	4.2	5.5
Adults eat first	3.7	12.7
Father and young children eat first	0.7	0
The mother eat first	0	0

### 5.2.6 Decision makers on meal content mentioned by pregnant women

Women in both the IP and UP groups identified themselves, their mothers or their mother-in-laws as a decision makers on meal content (Table 12). The women in both the IP and UP group mentioned the same decision makers on meal content.

Table 12. Meal decision makers mentioned by pregnant women that received information about anaemia (IP) and pregnant women that did not receive information about anaemia (UP)

Meal decision	IP (n=142) %	UP (n=55) %
Mother	62.7	61.8
Mother-in-law	19.7	16.4
Father	9.9	3.6
Both mother and father	6.3	10.9
Father-in-law	0.7	3.6
Other	0.7	3.6



### 5.3 Knowledge, attitudes and practices on anaemia in breastfeeding women

In this section breastfeeding women shall be classified into two groups, breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB), and the two groups shall be compared.

Hospital and health care staff were the most common source of information on anaemia in 84.4% of the IB group and 65.9% of the UB group (Table 13). Members of the family were the source of information on anaemia for 20.9% of the UB group and 12.5% of the IB group.

Table 13. Provider of information on anaemia to breastfeeding women

Provider of information on anaemia	IB (n=90)%	UB (n=99)%
Health personnel/volunteers	84.4	65.9
Members of the family	12.5	20.9
Radio/TV programs	3.1	8.5
School	0	1.6
Other	0	2.3
I do not know	0	1.0

Breastfeeding women had been given information about anaemia mostly over a 6 month period preceding the interview (57.7%). Every third breastfeeding woman had been given information about anaemia 3 and 12 months before the interview.

Slightly more IB women (97.8%) had heard about anaemia than UB women (91.7%). From the IB group 91.2% had heard about the importance of iron in the diet, while corresponding figure was 93.5% in the UB group (Table 14). Slightly more women in the IB group (92.4%) than the women in the UB group (87.0%) knew that tea consumption affects iron absorption. However, there were no significant differences between the women in the IB and UB groups.

Table 14. Knowledge, attitudes and practices on anaemia in breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

	IB (n=92)			UB (n=108)			P-value <sup>a</sup>
	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	
Has heard about anaemia	90 (97.8) <sup>b</sup>	2 (2.2)	0	99 (91.7)	9 (8.3)	0	0.057
Diagnosed with anaemia by health personnel (n=189)	49 (54.4)	41 (45.6)	0	60 (60.6)	39 (39.4)	0	0.392
Health personnel explained the causes, prevention and treatment of anaemia besides medication (n=192)	46 (93.9)	3 (6.1)	0	58 (96.7)	3 (3.3)	0	0.489
Has heard about the importance of iron in the diet	84 (91.2)	8 (8.7)	0	101 (93.5)	6 (5.6)	1 (0.1)	0.454
Has heard about folate	66 (71.7)	25 (27.2)	1 (1.1)	77 (71.3)	29 (26.9)	2 (1.9)	0.906
Know that tea consumption affects iron absorption	85 (92.4)	7 (7.6)	0	94 (87.0)	14 (13.0)	0	0.218

<sup>a</sup>Pearson chi-square test, Probability 95 % significance level

### 5.3.1 Knowledge on causes of anaemia in breastfeeding women

Insufficient dietary intake was the most common cause of anaemia mentioned by the IB group (70.2%) and the UB group (70.9%) (Table 15). Of the IB group, 11.7% and the UB group, 16.6% did not know the causes of anaemia. The women in both the IB and UB groups mentioned the same causes of the anaemia.

Table 15. Knowledge on causes of anaemia mentioned by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Knowledge on causes of anaemia	IB (n=90)%	UB (n=99)%
Insufficient dietary intake	70.2	70.9
Excessive blood loss	7.4	4.9
Lack of vitamins	4.3	2.9
Blood loss during menstruation	1.1	1.9
Heavy bleeding during surgery	1.1	1.0
I do not know	11.7	16.6
Other	4.3	1.0

### 5.3.2 Knowledge on symptoms of anaemia in breastfeeding women

Weakness was the most common symptom mentioned by the IB and UB groups (Table 16). More women in the IB group (23.1%) mentioned dizziness as a symptom of anaemia as compared to the UB group (8.2%). Of the UB group, 25.9% and the IB group, 15.0% mentioned paleness as a symptom of anaemia. Of the UB group, 20.0% and the IB group, 11.6% mentioned tiredness as a symptom of anaemia.

Table 16. Knowledge on symptoms of anaemia mentioned by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Symptoms of anaemia	IB (n=90)%	UB (n=99)%
Weakness	29.9	30.9
Dizziness	23.1	8.2
Paleness	15.0	25.9
Tiredness	11.6	20.0
Nausea	3.4	1.0
Craving for non-food items	2.7	5.0
Poor growth and development	2.0	1.4
Shortness of breath	1.0	1.4
Headache	0	1.0
Other	7.5	4.0
I do not know	4.0	1.8

### 5.2.3 Knowledge on prevention of anaemia in breastfeeding women

From the IB group 62.6% and the UB group 54.7% mentioned improving their eating habits in case anaemia diagnosed by health personnel (Table 17). More women in the UB group (43.4%) than in the IB group (33.0%) mentioned taking medications (supplements).

Taking a good diet was the most popular mentioned practice of preventing anaemia in both in the IB and UB groups. The women in both the IB and UB groups mentioned the same practices of preventing anaemia.

Table 17. Anaemia treatment and prevention by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Anaemia treatment and prevention	IB (n=90)%	UB (n=99)%
<b>Anaemia treatment after diagnosed anemia</b>		
Improved my eating habits	62.6	54.7
Took medications (supplements)	33.0	43.4
I do not know	4.4	2.0
<b>Anaemia prevention</b>		
Taking a good diet	62.8	63.0
Taking iron/folic acid	22.1	25.0
Other medical care	4.4	3.0
Access to more information	2.6	1.0
Other	0	1.0
I do not know	8.0	6.0

About every fourth in the IB group and more than every third in the UB group mentioned meat as a good source of iron (Table 18). The IB group (28.2%) mentioned fruits as good sources of iron than the UB group (19.0%).

Table 18. Foods mentioned as good sources of iron by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Foods mentioned as good sources of iron	IB (n=92)%	UB (n=108)%
Meat	26.9	35.4
Fruits	28.2	19.0
Green leafy vegetables	9.6	8.7
Fish	8.3	6.2
Offal (liver)	7.1	10.8
Eggs	4.5	3.6
Legumes	3.2	3.6
Vegetables	1.3	2.1
Other	5.1	3.1
I do not know	5.7	7.7

#### 5.2.4 Food consumption among breastfeeding women

More women in the UB group (70.4%) than in the IB group (52.2%) eat three or more meals in a regular day (Table 19). About every fourth woman in both the IB group and UB group mentioned eating three times a day. More women in the IB group (20.7%) than in the UB group (5.6%) mentioned eating two times a day.

Meat was consumed at least three times per week by every third woman both in the IB and UB groups. More women in the UB group (26.9%) than women in the IB group (17.0%) consumed green leafy vegetables. More women in the IB group (9.0%) than women in the UB group (1.6%) consumed legumes. Dairy products and vegetables were consumed less than three times a week in the UB group.

More than half of the women both in the IB group and UB group drank tea always during or right after eating main meals. More women in the IB group (20.7%) than in the UB group (10.2%) did mention that they did not drink tea during or right after eating main meals.

Table 19. Food consumption by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Food consumption	IB (n=92)%	UB (n=108)%
<b>Number of meals in a regular day</b>		
More than three times a day	52.0	70.4
Three times a day	24.0	22.2
Two times a day	21.0	5.6
Once	3.0	1.9
<b>Foods consumed at least three times a week</b>		
Meat	35.0	38.6
Eggs	20.0	21.3
Green leafy vegetables	17.0	26.9
Fish	9.0	5.6
Legumes	9.0	1.6
Offal (Liver)	4.0	3.2
Fruits	3.0	1.2
Dairy products	2.0	0
Vegetables	1.0	0
Other	1.0	1.2
I do not know	0	0.4
<b>Drinking tea during or right after eating main meals</b>		
Yes always	50.0	56.5
Yes sometimes	18.5	21.3
Yes rarely	10.9	12.0
Not at all	20.7	10.2

### 5.3.5 Eating practices among breastfeeding women

Most of the women in the IB and UB groups mentioned that their families usually eat together (Table 20). More women in the UB group (21.3%) than the women in the IB group (12.0%) mentioned that adults eat first.

Table 20. Eating practices among breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Eating practices	IB (n=92)%	UB (n=108)%
We eat together as a family	58.7	50.0
Children eat first	22.8	17.6
Adults eat first	12.0	21.3
Father and young children eat first	4.3	9.3
The mother eat first	2.2	1.9

### 5.3.6 Decision makers on meal content mentioned by breastfeeding women

Women in both the IB and UB groups identified themselves, their mothers or their mother-in-laws as a decision makers on meal content (Table 21). More women in the IB group (12.0%) than in the UB group (6.5%) identified father as a decision makers on meal content. More women in the UB group (22.2%) compare to the IB group (7.6%) identified both mother and father as a decision makers on meal content.

Table 21. Meal decision makers mentioned by breastfeeding women that received information about anaemia (IB) and breastfeeding women that did not receive information about anaemia (UB)

Meal decision	IB (n=92)%	UB (n=108)%
Mother	55.4	58.3
Mother-in-law	20.7	13.0
Father	12.0	6.5
Both mother and father	7.6	22.2
Father-in-law	4.3	0
Other	0	0



#### 5.4 Knowledge, attitudes and practices on anaemia by pregnant and breastfeeding women in 4 regions

In this section knowledge, attitudes and practices of pregnant and breastfeeding women shall be compared in the four regions. Hospital, health care staff and volunteers were the main source of information on anaemia in all four regions (Table 22). However, there were differences among regions. In Osh 84.0% of the women mentioned hospital, health care staff and volunteers as their source of information on anaemia, while the corresponding figures were 83.0% in Talas, 54.5% in Chui and 61.2% in Issyk-Kul. Every fifth woman in Issyk-Kul mentioned members of the family as a source of information on anaemia, while the corresponding rates were 10.4% in Osh, 8.1% in Talas and 14.9% in Chui. Radio and television programmes were a source of information on anaemia in Chui (20.1%) and Issyk-Kul (15.7%), whereas the corresponding rates were 3.8% in Osh and 9.1% in Talas.

Table 22. Provider of information on anaemia to pregnant and breastfeeding women in the four regions

Provider of information on anaemia	Osh (n=106)%	Talas (n=92)%	Chui (n=91)%	Issyk-Kul (n=134)%
Health personnel/volunteers	84.0	83.7	54.5	61.2
Members of the family	10.4	8.1	14.9	20.9
Radio/tv	3.8	9.1	20.1	15.7
School	1.0	0	5.2	0.7
Other	1.0	1.0	4.5	0
I do not know	0	4.0	0	1.5

About half of the women in Osh, Chui and Issyk-Kul but only 34.9% of the women in Talas had been given information about anaemia mostly over a 3 month period preceding the interview. Of the women in Talas, 39.7% had been given information about anaemia over a 6 month period preceding the interview, where as the corresponding figures were 18.5% in Osh, 22.5% in Chui and 24.0% in Issyk-Kul. About every fifth woman had been given information about anaemia over a 12 month period preceding the interview.

In Osh and Talas the majority of the women had received information about anaemia, 81% and 64.9% respectively (Table 23). In Chui and Issyk-Kul the corresponding rates were 40% and 50%. In Osh 62.7% of the women had used iron tablets. In Talas, Chui and Issyk-Kul the corresponding rates were 26.1%, 44.0% and 36.0%. In Osh and Issyk-Kul the majority of the women knew that tea consumption affects iron absorption, 92.0% and 80.0% respectively. In Talas and Chui the corresponding figures were 78.4% and 74.0%.

Table 23. Anaemia KAPs in pregnant and breastfeeding women in 4 regions of the Kyrgyz Republic

	Regions												P-value <sup>a</sup>
	Osh (n=100)			Talas (n=97)			Chui (n=100)			Issyk-Kul (n=100)			
	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	
Has received information about anaemia	81 (81.0) <sup>b</sup>	19 (19.0)	0	63 (64.9)	34 (35.1)	0	40 (40.0)	60 (60.0)	0	50 (50.0)	50 (50.0)	0	<0.001 <sup>a*</sup>
Has heard about anaemia	93 (93.0)	7 (0.7)	0	92 (94.8)	5 (5.2)	0	91 (91.0)	9 (9.0)	0	95 (95.0)	5 (5.0)	0	0.634 <sup>a</sup>
Diagnosed with anaemia by health personnel (n=371)	50 (53.8)	43 (46.2)	0	46 (50.0)	46 (50.0)	0	50 (54.9)	41 (45.1)	0	46 (48.4)	49 (51.6)	0	0.787 <sup>a</sup>
Health personnel explained the causes, prevention and treatment of anaemia besides medication (n=192)	49 (98.0)	1 (2.0)	0	42 (91.3)	4 (8.7)	0	48 (96.0)	2 (4.0)	0	44 (95.7)	2 (4.3)	0	0.470 <sup>a</sup>
Has heard about the importance of iron in the diet	89 (89.0)	9 (9.0)	2 (2.0)	85 (87.6)	10 (10.3)	2 (2.1)	92 (92.0)	8 (8.0)	0	92 (92.0)	8 (8.0)	0	0.593 <sup>a</sup>
Has heard about folate	73 (73.0)	26 (26.0)	1 (1.0)	70 (72.0)	23 (23.7)	4 (4.1)	72 (72.0)	26 (26.0)	2 (2.0)	77 (77.0)	23 (23.0)	0	0.457 <sup>a</sup>
Folic acid supplements taken in current pregnancy (n=197)	38 (74.5)	13 (25.5)	0	31 (67.4)	15 (32.6)	0	33 (66.0)	17 (34.0)	0	37 (74.0)	13 (26.0)	0	0.708 <sup>a</sup>
Iron tablets taken in current pregnancy (n=197)	32 (62.7)	19 (37.3)	0	12 (26.1)	34 (73.9)	0	22 (44.0)	28 (56.0)	0	18 (36.0)	32 (64.0)	0	0.002 <sup>a*</sup>
Vitamin supplements taken in current pregnancy (n=197)	20 (39.2)	31 (60.8)	0	23 (50.0)	23 (50.0)	0	25 (50.0)	25 (50.0)	0	20 (40.0)	30 (60.0)	0	0.540 <sup>a</sup>
Know that tea consumption affects iron absorption	92 (92.0)	8 (8.0)	0	76 (78.4)	21 (21.6)	0	74 (74.0)	24 (24.0)	0	80 (80.0)	20 (20.0)	0	0.012 <sup>a*</sup>

<sup>a</sup>Pearson chi-square test, Probability 95 % significance level

### 5.4.1 Knowledge on causes of anaemia by pregnant and breastfeeding women in 4 regions

There were differences among the regions in regard to knowledge on causes of anaemia (Table 24). Insufficient dietary intake was mentioned by 69.6% of the women in Osh, by 49.5% of the women in Talas, by 64.1% of the women in Chui and by 81.6% of the women in Issyk-Kul. Excessive blood loss was mentioned as a cause of anaemia by 16.8% of the women in Talas, by 8.8% of the women in Osh but only by 1% of the women in Chui and Issyk-Kul. Of the women in Talas 18.9%, Chui 13.6%, Osh 1.8% and Issyk-Kul 7.1% did not know causes of anaemia.

Table 24. Knowledge on causes of anaemia by pregnant and breastfeeding women in the four regions

Knowledge on causes of anaemia	Osh (n=93)%	Talas (n=92)%	Chui (n=91)%	Issyk-Kul (n=95)%
Insufficient dietary intake	69.6	49.5	64.1	81.6
Excessive blood loss	8.8	16.8	1.0	1.0
Lack of vitamins	4.9	4.2	1.0	2.0
Blood loss during menstruation	2.9	0	5.8	1.0
Heavy bleeding during surgery	0	3.2	3.9	1.0
Gastric ulcer	0	0	1.0	0
Other	2.0	7.4	9.7	6.1
I do not know	11.8	18.9	13.6	7.1

#### 5.4.2 Knowledge on symptoms of anaemia by pregnant and breastfeeding women in 4 regions

Weakness was the most common symptom mentioned by women in Chui and Issyk-Kul, 32.5% and 35.3% respectively (Table 25). In Osh and Talas the corresponding figures were 25.5% and 26.5%. In addition, paleness was the second most common symptom mentioned by women in Chui and Issyk-Kul, 28.1% and 30.9% respectively. In Osh and Talas the corresponding proportions were 15.2% and 18.5%. Dizziness was mentioned by women in Osh and Talas, 21.2% and 18.5% respectively. In Chui and Issyk-Kul the corresponding rates were 7.3% and 7.7%.

Table 25. Knowledge on symptoms of anaemia by pregnant and breastfeeding women in the four regions

Knowledge on symptoms of anaemia	Osh (n=93)%	Talas (n=92)%	Chui (n=91)%	Issyk-Kul (n=95)%
Weakness	25.5	26.5	32.5	35.3
Paleness	15.2	18.5	28.1	30.9
Dizziness	21.2	18.5	7.3	7.7
Tiredness	14.5	14.2	20.4	16.9
Nausea	6.7	4.9	1.0	1.4
Craving for non-food items	3.6	2.5	4.9	1.9
Poor growth and development	1.2	3.1	1.0	0.5
Shortness of breath	0.6	1.9	1.0	1.0
Headache	1.8	0	0	0.5
Other	6.7	4.3	3.4	1.4
I do not know	3.0	5.6	1.0	2.4

### 5.4.3 Knowledge on prevention of anaemia by pregnant and breastfeeding women in 4 regions

Of pregnant and breastfeeding women, 67.7% in Osh and 68.4% in Issyk-Kul mentioned improving eating habits in case anaemia was diagnosed by health personnel, whereas the corresponding rates were 45.7% in Talas and 47.6% in Chui (Table 26). About every second woman in Talas and Chui and every third woman in Osh and Issyk-Kul mentioned taking medications (supplements).

More than half of the women in all four regions mentioned taking a good diet in preventing anaemia. Every third woman in Chui region, about every fourth woman in Talas and Issyk-Kul and about every fifth woman in Osh region mentioned taking iron or folic acid.

Table 26. Anaemia treatment and prevention by pregnant and breastfeeding women in the four regions

Treatment and prevention of anaemia	Osh (n=93)%	Talas (n=92)%	Chui (n=91)%	Issyk-Kul (n=95)%
<b>Anaemia prevention after diagnosed anemia</b>				
Improved my eating habits	67.7	45.7	47.6	68.4
Took medications (supplements)	30.1	47.8	51.4	28.4
I do not know	2.2	6.5	1.0	3.2
<b>Anaemia prevention</b>				
Taking a good diet	64.5	54.5	58.5	64.3
Taking iron/folic acid	21.4	24.1	30.8	25.6
Other medical care	5.8	5.4	6.2	2.3
Access to more information	2.5	1.0	1.5	1.0
Other	0	1.0	0	1.0
I do not know	5.8	14.3	3.1	6.2

About every third woman in Talas, Chui and Issyk-Kul mentioned meat as a good source of iron, while in Osh about every fifth woman (Table 27). Fruits were mentioned as a good source of iron mostly in Osh (29.1%), Talas (27.1%) and Issyk-Kul (20.0%) and less in Chui (8.7%). Offal (liver) was mentioned mostly in Chui (19.5%) and in Issyk-Kul (17.5%) and less in Osh (7.3%) and in Talas (6.5%).

Table 27. Foods mentioned as good sources of iron by pregnant and breastfeeding women in the four regions

Foods mentioned as good sources of iron	Osh (n=100)%	Talas (n=97)%	Chui (n=100)%	Issyk-Kul (n=100)%
Meat	21.2	29.4	34.4	32.5
Fruits	29.1	27.1	8.7	20.0
Offal (liver)	7.3	6.5	19.5	17.5
Green leafy vegetables	11.2	6.5	9.7	3.5
Fish	10.1	6.5	8.2	12.5
Eggs	2.2	7.6	5.1	6.5
Legumes	4.5	4.1	3.1	1.5
Vegetables	1.7	2.4	1.0	2.0
Other	3.4	2.9	6.2	0.5
I do not know	9.5	7.1	4.1	3.5

#### 5.4.4 Food consumption by pregnant and breastfeeding women in 4 regions

The majority of the women in Chui and Issyk-Kul eat more than three times meals in a regular day at home, 74.0% and 68.0% respectively (Table 28). However, only 40.0% of the women in Osh and 51.5% in Talas eat more than three meals. About every third woman in Talas, every fourth woman in Osh and Issyk-Kul and every fifth woman in Chui eat three meals a day. Every third woman in Osh eats two times a day. In Talas, Chui and Issyk-Kul the corresponding figures were 12.4%, 6% and 6%.

About every fifth woman in Osh, Talas and Issyk-Kul sometimes drank tea during or right after eating main meals while, 15.0% of the women in Chui had a similar practice. In Osh every fourth did not drink tea during or right after eating. The corresponding rates were in Talas, Chui and Issyk-Kul 16.5%, 10.0% and 7.0%. In addition, in Osh 7.0% of the women, in Talas 8.2%, in Chui 16.0% and 21.0% in Issyk-Kul rarely drank tea during or right after eating.

Table 28. Food consumption by pregnant and breastfeeding women in the four regions

Food consumption and eating practices	Osh (n=100)%	Talas (n=97)%	Chui (n=100)%	Issyk-Kul (n=100)%
<b>Number of meals in a regular day</b>				
More than three times a day	40.0	51.5	74.0	68.0
Three times a day	25.0	29.9	20.0	26.0
Two times a day	32.0	12.4	6.0	6.0
Once	3.0	6.2	0	0
<b>Foods consumed at least three times a week</b>				
Meat	33.8	35.3	41.2	36.4
Eggs	19.0	20.5	16.7	20.5
Green leafy vegetables	18.2	17.9	25.3	24.3
Fish	9.5	8.9	6.0	7.1
Legumes	7.4	4.9	3.9	2.1
Fruits	3.0	3.6	2.1	7.5
Offal (Liver)	3.5	6.7	3.9	2.1
Dairy products	2.2	1.0	1.0	0
Vegetables	1.3	0	0	0
Other	1.7	1.0	0	0
I do not know	0.4	1.0	0	0
<b>Drinking tea during or right after eating main meals</b>				
Yes always	48.0	53.6	59.0	51.0
Yes sometimes	20.0	21.6	15.0	21.0
Yes rarely	7.0	8.2	16.0	21.0
Not at all	25.0	16.5	10.0	7.0



#### 5.4.5 Eating practices by pregnant and breastfeeding women in 4 regions

The majority of the women in all regions mentioned that their families eat usually together. In Osh and in Talas the corresponding figures were 79.0% and 76.3%, while slightly lower rates were seen in Chui (67.0%) and in Issyk-Kul (63.0%) (Table 29). More women in Chui (16.0%) mentioned that adults eat first in their families. In Osh, Talas and Issyk-Kul the corresponding figures were 9.0%, 10.3% and 11.0%. More women in Issyk-Kul (19.0%) mentioned that children eat first in their families. In Osh, Talas and Chui the corresponding rates were 9.0%, 13.4% and 8.0%.

Table 29. Eating practices of pregnant and breastfeeding women in the four regions

Eating practices	Osh (n=100)%	Talas (n=97)%	Chui (n=100)%	Issyk-Kul (n=100)%
We eat together as a family	79.0	76.3	67.0	63.0
Adults eat first	9.0	10.3	16.0	11.0
Children eat first	9.0	13.4	8.0	19.0
Father and young children eat first	1.0	0	6.0	7.0
The mother eat first	2.0	0	3.0	0

#### 5.4.6 Decision makers on meal content mentioned by pregnant and breastfeeding women in 4 regions

The majority of the women in Talas (67.0%), Chui (66.0%) and Issyk-Kul (65.0%) identified themselves and, their mothers as a decision makers on meal content, while this was not the case among women in Osh (41.0%) (Table 30). In Osh, the mother-in-law was mentioned as a decision maker by 34.0% of the women, while corresponding figures were 17.5% in Talas, 8.0% in Chui and 11.0% in Issyk-Kul. Mother and father were mentioned as a decision makers: where rates accounted for 6.0% in Osh, 4.1% in Talas, 19.0% in Chui and 17.0% in Issyk-Kul.

Table 30. Meal decision makers mentioned by pregnant and breastfeeding women in the four regions

Meal decision	Osh (n=100)%	Talas (n=97)%	Chui (n=100)%	Issyk-Kul (n=100)%
Mother	41.0	67.0	66.0	65.0
Mother-in-law	34.0	17.5	8.0	11.0
Both mother and father	6.0	4.1	19.0	17.0
Father	14.0	8.2	6.0	6.0
Father-in-law	5.0	2.1	0	0
Other	0	1.0	1.0	1.0

#### 5.5 Knowledge, attitudes and practices on anaemia by pregnant and breastfeeding women in urban and rural areas

In this section knowledge, attitudes and practices of pregnant and breastfeeding women shall be compared in urban and rural areas.

Hospital and health care staff were the main source of information on anaemia (Table 31). The women in both urban and rural areas mentioned the same sources of information on anaemia.

Table 31. Provider of information on anaemia to pregnant and breastfeeding women in urban and rural areas

Provider of information on anaemia	Urban (n=147)%	Rural (n=225)%
Health personnel/volunteers	65.9	68.9
Radio/tv	10.8	14.2
Members of the family	16.8	12.5
School	1.6	2.1
Other	3.2	1.0
I do not know	1.6	1.0

Slightly more women in rural areas (51.3%) than the women in urban areas (42.7%) had been given information about anaemia mostly over a 3 month period preceding the interview. About every third woman in urban and every fifth woman in rural areas had been given information about anaemia over the preceding 6 months before the interview. About every fourth woman in urban and every fifth woman in rural areas had been given information about anaemia over the preceding 12 months before the interview.

More women in rural areas (64.1%) than in urban areas (51.3%) had heard about anaemia (Table 32). Of the women in urban areas, 82.5% had heard about folate, while the corresponding rate was 67.5% for women in rural areas.

Table 32. Knowledge, attitudes and practices on anaemia by pregnant and breastfeeding women in urban and rural areas

	Residential Environment						P-value <sup>a</sup>
	Urban (n=160)			Rural (n=237)			
	Yes n(%)	No n(%)	I do not know n(%)	Yes n(%)	No n(%)	I do not know n(%)	
Has received information about anaemia	82 (51.3) <sup>b</sup>	78 (48.8)	0	152 (64.1)	85 (35.9)	0	0.014*
Has heard about anaemia	147 (91.9)	13 (8.1)	0	224 (94.5)	13 (5.5)	0	0.403
Diagnosed with anaemia by health personnel (n=371)	74 (50.3)	73 (49.7)	0	118 (52.7)	106 (47.3)	0	0.738
Has heard about the importance of iron in the diet	145 (90.6)	13 (8.1)	2 (1.3)	213 (89.9)	22 (9.3)	2 (0.8)	0.858
Has heard about folate	132 (82.5)	27 (16.9)	1 (0.6)	160 (67.5)	71 (30.0)	6 (2.5)	0.003*
Folic acid supplements taken in current pregnancy (n=197)	59 (73.8)	21 (26.3)	0	80 (68.4)	37 (31.6)	0	0.513
Iron tablets taken in current pregnancy (n=197)	35 (43.8)	45 (56.3)	0	49 (41.9)	68 (58.1)	0	0.909
Vitamin supplements taken in current pregnancy (n=197)	40 (50.0)	40 (50.0)	0	48 (41.0)	69 (59.0)	0	0.272
Know that tea consumption affects iron absorption	129 (80.6)	29 (18.2)	2 (1.3)	193 (81.4)	44 (18.6)	0	0.225

<sup>a</sup>Pearson chi-square test, Probability 95 % significance level

### 5.5.1 Knowledge on causes of anaemia by pregnant and breastfeeding women in urban and rural areas

Women in urban and rural areas mentioned the same causes of anaemia (Table 33).

Table 33. Knowledge on causes of anaemia by pregnant and breastfeeding women in urban and rural areas

Knowledge on causes of anaemia	Urban (n=147)%	Rural (n=224)%
Insufficient dietary intake	68.2	65.6
Excessive blood loss	5.8	7.0
Heavy bleeding during surgery	3.2	1.2
Lack of vitamins	2.6	3.3
Blood loss during menstruation	0.6	3.7
I do not know	13.6	12.3
Other	5.2	7.0

### 5.5.2 Knowledge on symptoms of anaemia by pregnant and breastfeeding women in urban and rural areas

Women in urban and rural areas mentioned the same symptoms of anaemia (Table 34).

Table 34. Knowledge on symptoms of anaemia by pregnant and breastfeeding women in urban and rural areas

Knowledge on symptoms of anaemia	Urban (n=147)%	Rural (n=224)%
Weakness	28.0	32.0
Paleness	26.3	22.3
Tiredness	15.0	18.0
Dizziness	16.7	10.5
Craving for non-food items	4.0	2.7
Nausea	3.3	3.2
Poor growth and development	0	2.3
Shortness of breath	0.7	1.1
Headache	0.7	0.5
Other	3.7	3.9
I do not know	1.7	3.6

### 5.5.3 Knowledge on prevention of anaemia by pregnant and breastfeeding women in urban and rural areas

More than half of the women in both urban and rural areas mentioned improving their eating habits to prevent anaemia after diagnose (Table 35). More women in urban areas (45.1%) than women in rural areas (36.2%) mentioned taking medications (supplements).

More than half of the women in both urban and rural areas mentioned taking a good diet to prevent anaemia. Women in urban and rural areas mentioned the same practices on preventing anaemia.

Table 35. Treatment and prevention of anemia among pregnant and breastfeeding women in urban and rural areas

Treatment and prevention of anaemia	Urban (n=147)%	Rural (n=224)%
<b>Anaemia prevention after diagnosed anemia</b>		
Improved my eating habits	52.9	59.9
Took medications (supplements)	45.1	36.2
I do not know	2.0	3.9
<b>Anaemia prevention</b>		
Taking a good diet	62.1	59.6
Taking iron/folic acid	25.1	25.9
Other medical care	3.6	5.7
Access to more information	2.6	0.7
Other	0.5	0.3
I do not know	6.2	7.7

Women in urban and rural areas mentioned the same iron rich foods, expect that more women in urban areas (25.0%) than women in rural areas (18.1%) mentioned fruits (Table 36).

Table 36. Foods mentioned as good sources of iron by pregnant and breastfeeding women in urban and rural areas

Foods mentioned as good sources of iron	Urban (n=160)%	Rural (n=237)%
Meat	29.5	29.5
Fruits	25.0	18.1
Offal (liver)	12.8	13.1
Fish	9.0	9.6
Green leafy vegetables	6.6	8.3
Eggs	4.2	6.1
Legumes	4.2	3.3
Vegetables	1.7	1.5
Other	1.7	4.1
I do not know	5.9	5.9

#### **5.5.4 Food consumption by pregnant and breastfeeding women in urban and rural areas**

About every fourth women in urban and more than every fourth woman in rural areas mentioned eating three times a day (Table 37). There were no differences in the consumption frequency of foods between women in urban and rural areas.

About every second woman both in urban and rural areas always drink tea during or right after main meals. More women in rural areas (25.3%) than women in urban areas (10.6%) sometimes drank tea during or right after eating.

Table 37. Food consumption by pregnant and breastfeeding women in urban and rural areas

Food consumption	Urban (n=160)%	Rural (n=237)%
<b>Number of meals in a regular day</b>		
More than three times a day	58.1	58.6
Three times a day	21.3	27.8
Two times a day	18.1	11.4
Once	2.5	2.1
<b>Foods consumed at least three times a week</b>		
Meat	35.2	37.9
Green leafy vegetables	22.4	20.9
Eggs	18.8	19.6
Fish	9.0	7.1
Legumes	4.4	4.7
Offal (Liver)	4.6	3.5
Fruits	3.9	4.3
Dairy products	0.8	0.9
Other	0.8	0.4
I do not know	0.3	0.2
<b>Drinking tea during or right after eating main meals</b>		
Yes always	58.1	49.4
Yes sometimes	10.6	25.3
Yes rarely	12.5	13.5
Not at all	18.8	11.8



### 5.5.5 Eating practices by pregnant and breastfeeding women in urban and rural areas

Most of the women in urban (66.9%) and rural areas (74.3%) mentioned that their families eat together (Table 38). More women in urban areas (16.9%) than the women in rural areas (8.0%) mentioned their family adults eat first.

Table 38. Eating practices by pregnant and breastfeeding women in urban and rural areas

Eating practices	Urban (n=160)%	Rural (n=237)%
We eat together as a family	66.9	74.3
Adults eat first	16.9	8.0
Children eat first	11.3	13.1
Father and young children eat first	3.1	3.8
The mother eat first	1.9	0.8

### 5.5.6 Decision makers on meal content mentioned by pregnant and breastfeeding women in urban and rural areas

Women in both urban and rural areas identified themselves, their mothers or their mother-in-laws as decision makers on meal content (Table 39). The women in both urban and rural areas mentioned the same meal decision makers.

Table 39. Meal decision makers by pregnant and breastfeeding women in urban and rural areas

Meal decision maker	Urban (n=160)%	Rural (n=237)%
Mother	58.8	60.3
Mother-in-law	19.4	16.5
Both mother and father	9.4	13.1
Father	9.4	8.0
Father-in-law	1.3	2.1
Other	1.9	0

## **6. DISCUSSION AND RECOMMENDATIONS**

The master's thesis assessed knowledge, attitudes and practices regarding iron deficiency anaemia of pregnant and breastfeeding women who had received information about anaemia during visits to health clinics (IP and IB groups) and those who did not receive any information (UP and UB groups) in urban and rural settings in 4 regions (Osh, Talas, Chui and Issyk-Kul) of the Kyrgyz Republic. The aim was to formulate recommendations for raising awareness of anaemia and its mitigation.

### **6.1 Knowledge on iron deficiency anaemia of pregnant and breastfeeding women in the Kyrgyz Republic**

The total sample size was 397 pregnant and breastfeeding women, where 45.6% of pregnant women had received information about anaemia in a 3 month period preceding the interview, which took place in mid-September 2014, while 57.7% of breastfeeding women had received information about anaemia in a 6 month period preceding the interview. More UP women (25.9%) than IP women (16.0%) mentioned radio and television programmes as a source of information on anaemia. More IB women (84.4%) than UB women (65.9%) mentioned health personnel or volunteers as a source of information on anaemia. The MOH et al. (2015) survey also showed that the media (radio and television) for pregnant women and medical person for breastfeeding women were significant sources of information on anaemia (MOH et al 2015). This can be due to that pregnant women have more time to listen to radio and watch television programmes, whereas breastfeeding women need to take care of their baby and breastfeed them. Mobile applications and videos can be helpful in health care and used to give accurate information on iron-deficiency anaemia (Mutanen et al. 2016, Martinez-Pérez et al. 2013). In addition, e-Health services allow people to have access to public medical services (Suyunbaeva 2012).

Improving eating habits was mentioned more in the IP group than the UP group and taking medications (supplements) was mentioned more in the UB group than in the IB group after diagnosed anaemia by health personnel. The MOH et al. (2015) survey also showed that the most common treatment for anaemia was improving diet and taking iron tablets after diagnosed anaemia (MOH et al. 2015). In our study, slightly more UB women were diagnosed with anaemia than IB women by health personnel. UB women may be recommended to take medications (supplements) for treating anaemia by health personnel. In our study, fruits were mentioned more in the UP and UB groups than in the IP and IB groups as a good source of iron. However, fruits are not good sources of iron. Iron status can be improved by eating iron rich foods such as fish, meat, poultry and whole grains (UNICEF et al. 2001). Our study results support earlier study (MOH et al. 2015), where especially IP and IB women understood better treatment and prevention of anaemia than UP and UB women but their knowledge of iron rich food was limited (MOH et al. 2015).

In this study, more IP women (48.9%) suffered from anaemia than UP women (35.6%). Polyclinics provide counselling, especially for those patients already diagnosed with anaemia. However, there is usually no proper counselling or information given to women before diagnosis or as preventive measures (Viljakainen, Alyshbaev, Orozobekova and Meerim 2.6.2015, McKee et al. 2002). The study findings are similar to earlier studies, which show that IP women knew more about causes, symptoms and prevention of anaemia than UP women.

It is questioned what has occurred to the IB group in regard to their knowledge of the causes, symptoms and prevention of anaemia. Slightly more women in the UB group knew about causes, symptoms and prevention of anaemia than the women in the IB group. Clear differences were seen between knowledge of anaemia in the IP and UP groups, but this was not the case between IB and UB groups. Breastfeeding women were once pregnant women and some of them were informed about anaemia during pregnancy. This poses an interesting discussion on received anaemia information among breastfeeding women. There may have been inconsistencies during data collection, for instance during the interview process. Translation errors may also have influenced how different women responded.

The timeframe between receiving anaemia information and postnatal care may have an impact on the IB group's knowledge of anaemia. Postnatal care refers to mothers and their babies during six-week period after birth which is given by health personnel, such as a doctor or midwife. The purpose of postnatal care is to inform mothers for instance, on nutrition and use of iron and folic acid supplements also in a low-risk group, non-anaemic women (World Health Organization 2013). Most of the Kyrgyz women received postnatal care within two days after delivery in 2012 (NSC et al. 2012). According to World Health Organization (2013) recommendations on the number and timing of postnatal contacts, there should be four times: at least 24 hours after birth, on day 3 (48-72 hours) after birth, between 7-14 weeks after birth, and six weeks after birth (World Health Organization 2013). It is clearly seen in this study that postnatal care is not given as often as antenatal care. Postnatal care is mostly focused on child health. In addition, the long time frame between the interview from the point in time when information about anaemia was received may explain that IB women did not recall causes, symptoms and prevention of anaemia significantly better than UB women. Nutritional education is said to improve nutritional knowledge, influence attitude and practices towards good nutrition (Masuku and Lan 2014). However, Masuko and Lan (2014) suggest that little is known on the impact of the nutrition counselling during prenatal and postpartum periods (Masuko and Lan 2014). This is clearly seen in the study where the impact of the information about anaemia in both IB and UB groups is questioned.

More than half of the women in the Osh and Talas regions had received information about anaemia, while less than half of the women in the Chui and Issyk-Kul regions had received information about anaemia. However, knowledge of causes, symptoms and prevention always were not always better in Osh and Talas regions than in Chui and Issyk-Kul regions. One reason can be that most of the women in all four regions were diagnosed with anaemia by health personnel. Our study supports that majority of the diagnosed women in all four regions received information about causes, prevention and treatment of anaemia besides medication from the health personnel. In addition, maternal health care and received information about anaemia can vary between regions. Prenatal care is given in early pregnancy (during the first trimester) and it is given every month throughout the pregnancy in the Kyrgyz Republic (UNICEF 2009). Effective prenatal care strategies have not been introduced in all provinces in the Kyrgyz Republic. Effective prenatal care improvements are needed especially in Osh and Chui provinces

(UNICEF 2009). However, some programmes on mother health care have been implemented at the level of the pilot regions (MOH et al. 2013). This can explain differences among regions in received information and knowledge about anaemia.

In our study, more women in rural areas (64.1%) received information about anaemia than women in urban areas (51.3%). However, women in urban and rural areas had mostly similar knowledge of causes, symptoms and prevention of anaemia. The MOH et al. (2015) survey also supports our findings and shows that there was a significant difference in receiving information about anaemia between 11 urban and 19 rural areas: in Osh there were 3 urban and 6 rural areas, in Talas there were 1 urban 5 rural areas, in Chui there were 4 urban and 3 rural areas and in Issyk-Kul there were 3 urban and 5 rural areas (MOH et al. 2015). However, it is seen that especially women in rural and remote areas have sustained access to reproductive health services (UNICEF 2009). Also, non-governmental organizations have focused on poorest areas, and provided health education in the Kyrgyz Republic over the past few years because of June 2010 riots in Osh region (Sydygalieva and Viljakainen, personal communication 28.5.2015).

The official language of the Kyrgyz Republic is Kyrgyz but Russian is spoken in “inter-ethnic” communication in the Kyrgyz Republic (NSC et al. 2012). However, especially in rural areas, people may not always speak and understand Russian well. In addition, the level of spoken Russian is not equal among regions. It is not very clear whether all the information and material on nutrition and health is always provided to women in both languages. This can explain the differences in regard to information received by the women and the knowledge about anaemia among regions and between urban and rural areas.

## **6.2 Iron deficiency anaemia related practices of pregnant and breastfeeding women in the Kyrgyz Republic**

Consumption of meat, green leafy vegetables and eggs more than three times a week was very common among pregnant and breastfeeding women, whereas frequent consumption of fruits, legumes, dairy products and vegetables was very low. The Republican Medical Information Centre of MOH reported that vegetables were consumed in the amount of 6.68 kg/month and fruits and berries in the amount of 2.24 kg/month in 2011 (MOH et al. 2013), which is less than the generally recommended 500 g of fruit and vegetables daily. However, parental roles, liking for fruits and vegetables among youth and having a garden as an adult increase the consumption of fruits and vegetables (Devine 2005). In addition, seasonality, wealth levels and food prices affects dietary diversity (MOH et al. 2015). Food choices are dependent on cultural influences, but also attitudes and beliefs contribute to food choices (Devine 2005). This can explain what affects food consumption and support our finding in terms of low consumption in fruits and vegetables.

The study shows that nutritional practices were different between IP and UP women. Of IP women, 76.8% took folic acid supplements and 47.9% took iron tablets during their current pregnancy. Of the UP women, 54.5% took folic acid supplements and 29.1% took iron tablets during their current pregnancy. Our findings are dissimilar to an earlier study (NSC et al. 2012), which showed that 44% of women between the years 15 and 49 years took iron tablets or syrup in current pregnancy in 2012. Most of the women took iron supplements for fewer than 60 days (NSC et al. 2012). Folic acid tablets were less common, and therefore 35% of women at the age of 15-49 years took folic acid in their current pregnancy in the Kyrgyz Republic in 2012 (NSC et al. 2012).

In our study, 62.7% of the women in Osh had used iron tablets, while in Talas, Chui and Issyk-Kul the corresponding rates were 26.1%, 44.0% and 36.0%. When comparing regions our findings do not support the earlier study done by NSC et al. (2012), where in Osh 34.2% of the women took iron tablets or syrup during current pregnancy. In Talas, Chui and Issyk-Kul the corresponding figures were 47.7%, 28.4% and 45.4% in 2012 (NSC et al. 2012).

There are some differences between the NSC et al. (2012) study and our study. The earlier study (NSC et al. 2012) reported that pregnant women took iron supplements for less than 60 days, while our study did not determine how long iron supplements were taken. In our study, responses from the region may not give a true picture of the situation due to small sample size (n=100 in Osh, n=97 in Talas, n=100 in Chui and n= in Issyk-Kul versus in NSC et al. (2012) study n=601 in Osh, n=189 in Talas, n=506 in Chui and n=277 in Issyk-Kul). Generally women had heard about folate less but they took more folic acid during their current pregnancy.

Mothers and mothers-in-law mostly made decisions on meal content in both IP and UP women families. Our findings also showed that fathers decided on the meal content more in IP women families (9.9%) than in UP women families (3.6%). This was also seen in IB and UB women families. Comparing regions, mother decided on meal content in Talas (67.0%), Chui (66.0%) and Issyk-Kul (65.0%), while this was not the case among women in Osh (41.0%). Traditions are very strongly present, in the family life, especially in rural and south part of the Kyrgyz Republic. Traditionally, in the Kyrgyz Republic, only women cook and prepare food. However, fathers are the heads of families and make decisions in the families. This can explain the roles in deciding meal content in the Kyrgyz Republic.

Tea drinking was more common among UP and UB women than among IP and IB women. This can be because more IP and IB women knew that tea affects iron absorption than UP pregnant and UB women. More women in urban areas drank always tea during or right after eating main meals than women in rural areas. Tea drinking practices were less common among pregnant and breastfeeding women in all regions and urban and rural areas if they knew that tea consumption affects iron absorption. High consumption of tea inhibits iron absorption. Tea drinking between meals is recommended instead of during the meals (Zijp et al. 2000). Our study result supports earlier studies (Masuko and Lan 2014) where good nutritional knowledge meant better eating practices among women.

### **6.3 Recommendations on awareness raising to mitigate and raise awareness of iron deficiency anaemia among pregnant and breastfeeding women in the Kyrgyz Republic**

From the results, significant differences in terms of knowledge of anaemia and its causes and prevention were not seen especially between the IB and UB groups. Even though, the women in Osh and Issyk-Kul regions and rural areas received more information about anaemia, they did not always have more knowledge about anaemia. Especially in health care, there is need for more equally distributed information in Kyrgyz and Russian languages on the causes, symptoms and prevention of anaemia that include not only pregnant women but also breastfeeding women equally in all four regions and between rural and urban areas. Semba and Bloem (2008) suggest further studies to determine if nutrition education based approach improves iron status in developing countries. In addition, there is need to assess to contents and timing of health education sessions.

As the results show, mostly health care workers but also media (radio and television programmes) were the providers of information on anaemia among pregnant and breastfeeding women in all four regions and urban and rural areas. VKontakte and Adnaklassniki are social media applications similar to Facebook used widely in the Kyrgyz Republic and 30% of every household in the Kyrgyz Republic have mobile phones. The fixed public network of Kyrgyztelecom has 475 300 lines (United Nations Economic Commission for Europe 2002). Mobile devices and applications in tele-education and tele-medicine or E-Health, videos and interactive workshops with local communities can be useful tools to spread information and are at the moment underutilised in anaemia mitigation and prevention, not only in the Kyrgyz Republic but also globally. More research and initiatives are needed on the possibilities to utilise social media and mobile applications to develop practical anaemia awareness and prevention tools for the pregnant and breastfeeding women.

The Kyrgyz National Health Care Reform Den Sooluk aims improving the awareness of women about the prevention of anaemia and maternal nutrition. Kenney (2007) and Kwapong (2013) suggest new materials on health topics and establishing anaemia status of pregnant and breastfeeding women in relation to awareness level (Kenney 2007, Kwapong 2013). Development of material with local communities based on tradition and utilising new available



technologies can result in the development of inclusive approaches to information sharing and mitigation of anaemia among pregnant and breastfeeding women.

The Kyrgyz Republic has formulated new evidence-based guidelines on anaemia prevention and control in April 2015 (Strengthening Partnerships, Results, and Innovations in Nutrition Globally 2015). It aims at screening, diagnosis, prevention, and treatment of iron-deficiency anaemia in the Kyrgyz Republic. Our study shows that gaps exist, especially in the knowledge of iron rich food and practices of tea drinking among pregnant and breastfeeding women among regions and between urban and rural areas. Food that has good source of iron is also important in mitigation of iron-deficiency anaemia and thus it is recommended that not only mothers, mother-in-laws or fathers participate in decision-making, but also the whole family needs to eat together and also take part in food decision-making.

New material for the mitigation of iron-deficiency anaemia should be developed and should include, for instance a list of local iron rich food and its preparation for food and emphases on how tea drinking affects iron absorption during and between main meals. In addition, videos that have information on maternal health and nutrition can be effective but are still undiscovered in pre-, antenatal and post-natal care in the Kyrgyz Republic. Further, during prenatal, antenatal and postnatal care, health care workers can explain good and easy cooking methods as well as disseminate information on healthy eating practices using tools such as videos.

In addition, it is advised to conduct a KAP study that gives a comprehensive outlook on anaemia in pregnant and breastfeeding women in the whole country and the impact of anaemia prevention practices. The results of this study show that attitudes and practices were not measured extensively and the results are very specific to the selected four regions and thus cannot be generalised to depict the situation in the entire country. A future KAP survey should also include an in-depth evaluation of attitudes and practices of pregnant and breastfeeding women.

#### **6.4 Reliability of the study**

Reliability was mostly affected by language differences. The survey was initially designed in English and then translated into Russian and Kyrgyz languages. Further, the survey was conducted in Russian and Kyrgyz languages. The Kyrgyz language may not have all the terms that Russian language has, for example, the term “basic nutrition training” was used in the questionnaire but it was not explained properly to the respondents. The content of nutrition training was not explained, nor was it clarified that it referred to being given information on anaemia, rather than formal training. In addition, the questionnaire was vague in some instances. In the option where respondents had to select options for mentioning measures to prevent anaemia, one of the options given was “to take a good diet”. It was not clarified what a good diet means. Insufficient dietary intake was also translated in various ways, for instance the Russian word used was undernutrition which is not correct. The questionnaire has replications in options, for instance in causes of anaemia section, excessive blood loss and blood loss during menstruation refer both to blood loss. In addition one option was medications (supplements). Medications and supplements do not mean the same.

The interviewed pregnant and breastfeeding women did not always understand the questions asked. They either did not know what anaemia was or why they had been prescribed supplements (MOH et al. 2015).

The study sample was small and from four different areas in the Kyrgyz Republic. The study was not designed to give the general picture of the situation in the whole country. Knowledge was measured extensively but attitude and practice were not measured extensively enough.

## 6.5 Conclusion

Findings from this study have an important role in anaemia mitigation among pregnant and breastfeeding women in the Kyrgyz Republic. This study showed that pregnant women who received information about anaemia had more knowledge of anemia, its causes and prevention than pregnant women who did not receive any information about anaemia from health personnel. There was no difference in the knowledge of anaemia between breastfeeding women who received information about anaemia and those who did not receive information about anaemia. There were differences in knowledge and practices of anaemia among the regions (Osh, Talas, Chui and Issyk-Kul), but not between urban and rural settings.

There is need to improve knowledge of anaemia and good nutrition practices among pregnant and breastfeeding women in the Kyrgyz Republic. New material for the mitigation of iron-deficiency anaemia should be developed and should include, for instance a list of iron rich food.

In this study, knowledge was assessed more thoroughly than attitude and practice. Further, the results are very specific to the selected regions. Any future KAP surveys on this topic should include an in-depth evaluation of attitudes and practices of pregnant and breastfeeding women and a larger regional coverage should be achieved.

Radio and television were significant sources of information on anaemia for pregnant and breastfeeding women. When designing comprehensive nutrition and anaemia programmes for pregnant and breastfeeding women, further studies on different media technology and its possibilities should be taken into account.

There is also a need for more equally distributed information in Kyrgyz and Russian languages on causes, symptoms and prevention on anaemia that include not only pregnant women but also breastfeeding women in all four regions and in urban and rural areas.

Traditions are very strongly present in the family life especially in rural and south part of the Kyrgyz Republic. Traditionally, in the Kyrgyz Republic, only women cook and prepare food. However, fathers are the heads of families and make decisions in the families. Mitigation of anaemia is very dependent on the meal content and it is therefore recommended that food decision making includes all the members of the family.

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## Appendix 1: Questionnaire

### Modified and uncertified translation

**Module A:** Nutrition KAP survey questionnaire of **PREGNANT and BREASTFEEDING** women (18-49yrs):

Region: \_\_\_\_\_

Rayon: \_\_\_\_\_

Rural: \_\_\_\_\_

Urban: \_\_\_\_\_

Name of interviewer: \_\_\_\_\_

Date of interview: \_\_\_\_\_

<b>Targeted women (circle one):</b>	Pregnant women= <b>2</b>	Lactating woman= <b>3</b>
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### Introduction for data collector:

1. Interviews should be conducted "face-to-face", not over the phone and not in a group. Please do not conduct an interview in a place where someone could hear a conversation.
2. Interviews should be conducted in an informal way and questionnaires should be filled by data collectors, not by respondents.
3. Please do not read options but circle all that apply.

### CONSENT:

Good morning (afternoon)! We are conducting the KAP Survey on nutrition among breastfeeding and pregnant women. This information will be used to make decisions on programs implementation. These programs seek to contribute to improve the practice of nutrition in the country.

The duration of interviews will be no more than 30 minutes. Your answers will remain highly confidential and will not be shared with others. You have a right to refuse to participate in the interview or not to answer any of the questions. However, we hope that you will agree to participate, because your answers are very important and will inform decisions.

No	Questions	Answer	Code
1	Age of the targeted women (Confirm with date of birth)  A girl who was born on September 1999 she will be 15 years and if she was born in September 1996, she will be 17 years and 11 months.	15-17	01 <b>Skip to No: 3</b>
		18-30	02
		31- 49	03
2	What is your marital status?	Married	01
		Single with child	02
		Single without child	03
3	Have you ever received information about anaemia?	Yes	01
		No	02 <b>Skip to No: 5</b>
4	If yes, who provided you information about anaemia?	Staff (hospital/health centre)	01
		Staff (international organizations)	02
		Village Health Committee	03
		I do not know	99
		Others	98

5	When did you have information about anaemia?	3 months ago	01
		6 months ago	02
		12 months ago	03
		I do not know	99
		Others	98
6	Have you ever heard about anaemia?	Yes	01
		No	02 <b>Skip to No:10</b>
7	Can you name some causes of anaemia?	Excessive blood loss	01
		Insufficient dietary-intake	02
		Gastric ulcer	03
		Blood loss during menstruation	04
		Heavy bleeding during surgery	05
		Cancer	06
		I don't know	99
Others specify	98		
8	Have you ever diagnosed by health personnel that you had anaemia in the last 3 months?	Yes	01
		No	02 Skip to No: 10
9	Did they explain the causes, prevention and treatment of anaemia besides medication?	Yes	01
		No	02 <b>Skip to No: 11</b>
10	What should you do if you were diagnosed by health personnel that you had anaemia?	Improve my eating habits	01
		Take medications (supplementations)	02
		I do not know what to do	99
		Other	98
11	Where did you get the information about anaemia?	Members of the family	01
		Health personnel/volunteers	02
		Radio/television programs	03
		School	04
		Others	98
12	Can you name some of the symptoms or health problems caused of anaemia?	I don't know	99
		Paleness	01
		Weakness	02
		Tiredness	03
		Craving for non-food items	04
		Shortness of breath	05
		Poor growth and development	06
		Others specify	98
13	Can you tell me some measures you should do to prevent anaemia?	I don't know	99
		Access to more information	01
		Good diet in value	02
		Take Iron/folic acid	03
		Other medical care	04
		Others:	98
14	Have you heard anything about the importance of iron in the diet?	I do not know	99
		Yes	01
		No	02
15	Anaemia can be caused by low consumption of food that has iron. Many foods contain iron; Can you name some foods that are good sources	I do not know	99
		Offal (liver)	01
		Meat	02
		Fish	03

	iron?	Eggs	04
		Legumes	05
		Green leafy vegetables	06
		I do not know	99
		Others: _____	98
16	Which of these products; liver, meat, meat, fish, eggs, legumes, green leafy vegetables do you consume at least three times a week?	Offal (Liver)	01
		Meat	02
		Fish	03
		Eggs	04
		Legumes	05
		Green leafy vegetables	06
		Others: _____	98
		I do not know	99
17	Have you ever heard about folate?	Yes	01
		No	02
18	In your current pregnancy, did you take any folic acid supplements during the first three months? ( <b>Ask her to show you</b> )	Yes	01
		No	02
19	In your current pregnancy, are you taking or did you take iron tablets? ( <b>Ask her to show you iron tablet</b> )	Yes	01
		No	02
20	In your current pregnancy, are you taking or did you take vitamin supplements?	Yes	01
		No	02
		No	02
21	How many meals do <b>YOU</b> eat usual in a regular day at home?	Once a day	01
		Two times a day	02
		Three times a day	03
		More than three times a day	04
22	How is the food served between your family members?	We eat together as a family	01
		Adults eat first (Father/mother)	02
		Father and young children eat first	03
		Children eat first	04
		The mother eats first	05
		Others	98
23	Who decides what the family members eat usually?	Mother	01
		Father	02
		Both father and mother	03
		Mother-in-law/Grandmother	04
		Father-in-law/Grandfather	05
		Others	98
24	Do you usually drink tea during or right after eating main meals?	Yes, always	01
		No, at all	02
		Yes, sometimes	03
		Yes, rarely	04
25	If yes, do you know that tea consumption affects iron absorption?	Yes	01
		No	02

## Appendix 2: Ethical permission



КЫРГЫЗ РЕСПУБЛИКАСЫНЫН САЛАМАТТЫК САКТОО МИНИСТРИВИГИНИН БИОЭТИКА КОМИТЕТИ  
 КОМИТЕТ ПО БИОЭТИКЕ ПРИ МИНИСТЕРСТВЕ ЗДРАВООХРАНЕНИЯ КЫРГЫЗСКОЙ РЕСПУБЛИКИ  
 THE COMMITTEE ON BIOETHICS UNDER THE MINISTRY OF HEALTH OF KYRGYZ REPUBLIC

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**Национальный центр охраны материнства и детства  
 Всемирная Продовольственная Программа (ВПП) ООН,  
 Фонд ООН в области народонаселения (ЮНФПА),  
 Швейцарское Посольство, GIZ**

Комитет по Биоэтике, рассмотрел пакет документов на проведение исследования: «Знание, отношение, практика девочек-подростков, беременных и кормящих женщин по питанию в Кыргызской Республике».

Исследование инициировано Министерством здравоохранения Кыргызской Республики при технической поддержке Всемирной Продовольственной Программы (ВПП) ООН, Фонда ООН в области народонаселения (ЮНФПА), Швейцарского Посольства, GIZ.

Комитет принял решение: «Одобрить».

Протокол заседания № 29 от 27 августа 2014 года.

**Председатель комитета по Биоэтике  
 Министерства здравоохранения  
 Кыргызской Республики, д.м.н.**

**У.М. Тилекеева**

## ОБЯЗАННОСТИ ИССЛЕДОВАТЕЛЕЙ И РУКОВОДИТЕЛЕЙ ПРОЕКТОВ

1. Участники исследовательских проектов со стороны Кыргызской Республики и других стран принимают на себя обязательства выполнять требования КБЭ при МЗ, а также условия Положения.
2. Участники проектов со стороны Кыргызской Республики и других стран совместно обсуждают любые изменения в протоколах и каждая сторона после получения необходимых разрешений, представляет список предполагаемых изменений на рассмотрение и утверждение КБЭ. Изменения не могут вноситься без утверждения КБЭ при МЗ, за исключением случаев, когда необходимо немедленное устранение видимой угрозы субъекту исследования.
3. Старшие исследователи со стороны Кыргызской Республики и других стран - участниц исследовательских проектов своевременно сообщают своим КБЭ обо всех, неожиданных проблемах или несчастных случаях, представляющих угрозу для участников и субъектов исследования или других лиц.
4. Старшие исследователи со стороны Кыргызской Республики и других стран - участниц обеспечивают возможность и условия: для встреч с представителем КБЭ, ознакомления с документами и ходом исследования на любом этапе исследования.

### Appendix 3: Home region of respondents

<b>Home region of respondents</b>		
<b>Region/home region</b>	<b>Pregnant women</b>	<b>Breastfeeding women</b>
<b>Osh region</b>	<b>50</b>	<b>50</b>
Osh urban	5	5
Nookat urban	5	5
Uzgen urban	5	5
Kara-Kulja rural	5	5
Gulcha rural	5	5
Aravan rural	10	10
Kara-Kulja rural	5	5
Daroot-Korgon rural	5	5
Sary-Tash rural	5	5
<b>Talas region</b>	<b>46</b>	<b>51</b>
Talas urban	15	15
Bakai-Ata rural	5	5
Maymak rural	6	11
Kyzil-Adyr rural	10	10
Pokrovka rural	5	5
Manas rural	5	5
<b>Chui region</b>	<b>50</b>	<b>50</b>
Bishkek urban	10	10
Kara-Balta urban	5	5
Kemin urban	5	5
Kant urban	5	5
Lebedinovka rural	10	10
Belovodskoe rural	10	10
Sokuluk rural	5	5
<b>Issyk-Kul region</b>	<b>50</b>	<b>50</b>
Karakol urban	10	10
Balykchi urban	4	5
Cholpon-Ata urban	6	5
Kadji-Say rural	5	5
Teploklyuchenka rural	10	10
Kyzil-Suu rural	5	5
Bokonbayevo rural	5	5
Tyup rural	5	5