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Ovulation frequency in women of childbearing age attending a population based health survey

- The relationship between self-reported cycles and measured serum progesterone levels in The North-Trøndelag health study , The HUNT3 - Survey 2006-2008

Master thesis in Public Health, 30.11.2011

Student - Marit Næss

Supervisor - Siri Forsmo,
professor at the Department of Public Health and General Practice,
NTNU

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Abstract

Objectives: The primary objective was to study the frequency of ovulatory menstrual cycles among women aged 20-50 years participating in the North-Trøndelag Health Study (HUNT) 2006-2008, the HUNT3-survey. Further, we wanted to investigate how the women's report of menstrual cycle day coincided with the increase in measured serum progesterone level. Finally, we also investigated the association between self-reported premenstrual symptoms and verified ovulatory cycle, in women who participated in an interview sub-study focusing on the prevalence of premenstrual symptoms (the Molimina interview).

Methods: We have used a cross-sectional study design and analysed data from 2063 women reporting no current use of hormonal contraception. This included participants with valid menstrual cycle data from the basic HUNT3 study (N = 1268) and 795 women who additionally participated in the interview about premenstrual symptoms, all with a blood sample taken at attendance. The menstrual cycle day was calculated based on the reported first day of the last menstruation. Serum progesterone concentrations were determined by chemiluminescence immunoassay. The cut-off progesterone level for ovulation was set at 8 nmol/L, and the women with progesterone level ≥8 nmol/L were defined as in the luteal phase. The proportion of women with or without progesterone level ≥8 nmol/L from menstrual cycle day 14 until day 20 was assessed, and women with the expected increased level were defined as in a "true" (ovulatory) phase. The women at this stage of the menstrual cycle, but without the increased progesterone level were defined as in a "false" (anovulatory) luteal phase. The two groups of women were compared according to selected characteristics that could possibly interfere with ovulation such as anthropometric-, lifestyle – and health related data. The association between the measured progesterone level and self-reported premenstrual symptoms was analysed by logistic regression.

Results: The median progesterone level reached ≥8 nmol/L at day 15, and 64% of the women were measured at this level at their cycle day 15. The proportion of women in ovulatory phase continued to increase until day 17 where 66% of the women had reached the expected level. From this follows a rather high prevalence of anovulation. No statistically significant differences were found between women in assumed ovulatory and anovulatory cycles concerning anthropometric data, lifestyle or relevant health conditions. Premenstrual symptoms as sore and tender breast (breast symptoms) were the only symptoms associated with being in "true" luteal phase, OR = 1.44, 95% CI 1.06 – 1.94.

Conclusions: In this study the prevalence of anovulatory cycles are more frequent than reported in other studies. The results should be regarded with caution: The reliability of the self-report of the first day of the last menstruation is unknown. The mean age of the women was rather high (40.5 years), and the frequency of anovulatory cycles is increasing with age. Also, the influence of storage at -80C over two-four years on the serum progesterone level represents a concern. The study also showed that premenstrual symptoms are relatively prevalent, but only premenstrual breast symptoms are related to ovulation on a statistically significant level.

Literature search criteria:

A literature search was done to identify previous studies on menstrual cycle, normal ovulation and disturbed ovulation / anovulation, progesterone validity and premenstrual symptoms.

Key words:

Ovulation; progesterone; ovulatory cycles; cycle length; luteal phase; molimina

Abbreviations

ANOVA	Analyses of variance
Anovulation	Lack of ovulation in the menstrual cycle
BMD	Body mineral density
C	Celsius (degrees)
CI	Confidence interval
COPD	Chronic obstructive pulmonary disease
GLM	General Linear Models
HUNT1	Nord-Trøndelag health survey 1984-1986
HUNT2	Nord-Trøndelag health survey 1995-1997
HUNT3	Nord-Trøndelag health survey 2006-2008
Molimina questions	structured interview on common symptoms during menstrual cycles
nmol/L	Nanomol per litre
N	Number
Oligomenorrea	Duration of menstrual cycles between 36 and 180 days
OR	Odds ratio
Polymenorrhea	Menstrual cycles with duration shorter than 21 days
P-value	Probability value
SD	Standard deviation
SOD	Subclinical ovulatory disturbances

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1 Introduction

Studies of Ovulation epidemiology in a population perspective are few and the knowledge insufficient related to the variation of ovulation and ovulatory cycles. Ovulation is necessary for fertility, but frequent anovulatory cycles will in addition to effect on fertility also lead to reduced progesterone levels which could conceivably be a risk factor for subsequent disease development as increased fracture risk due to low bone mineral density (BMD) [1] and breast cancer [2]. Ovulation is therefore important for the prevention of osteoporosis [1, 3], to reduce the risk of breast cancer [4] and for the prevention of cardio-vascular disease [5-7]. Subclinical ovulatory disturbances (SOD), which is the most common of abnormal cycles, are often unnoticeable for the woman, because they usually occur within what we perceive as regular cycles [8], and therefore have few symptoms and remains undiagnosed.
More knowledge concerning the frequency of ovulatory and anovulatory cycles in fertile women will be of importance, in order to study the significance of disease risk related to ovulation.

1.1 Menstrual cycle length

A menstrual cycle is defined from the first day of one menstrual bleeding until the day before the next menstrual bleeding. Based on literature from several studies, we find that the average cycle length is about 28 days, but that there will be a high variation related to this. A study performed by Fehring [9], shows a within-variation in cycle length of 7 - 14 days for as many as 40% of the women, while one study of Munster [10] concludes that an intra-individual variation of more than 5 days should be considered as a sign of disease in the women. Women at the same age usually have similar cycle duration (25-34 days) [11], and related to a study with 1,060 usable cycles of data, the mean cycle length was 28.9 days, and 95% of the cycles

had a length of 22 – 36 days [9]. The cycle duration is mostly regular at age group 25 – 40 years and there is a gradual decrease until the menopausal transition [12], though there is a most noticeably shortening from age 35 [11].

In a population-based study of premenopausal women aged 15 – 44 from Copenhagen, Denmark in 1988 [10], an average menstrual cycle length had a mean of 28.8 days ± 2.9 (SD), and these findings concur with earlier data published by Treloar [13] and Vollman [14]. However, the authors found a variability of more than 14 days in 30% of the women, and this support the classification of the normally used definitions of polymenorrhea (cycle length less than 21 days) and oligomenorrea (cycle length between 36-90 days) [10]. In the Nurses` Health Study II, a prospective cohort study with 26 421 female nurses aged 29 - 48 years [15], 87% reported regular cycles and 12% reported usually or always irregular cycles. Among women reporting regular cycles, cycle duration of 26 – 31 days were reported by 75% and usual cycle duration less than 21 days or 40 days or more were reported by 1,5%. Among women reporting irregular cycles only 7.4% reported cycle duration of 26 – 31 days, whereas cycle duration less than 21 days or 40 days or more were reported by 70.3%.

Belsey et al [16] found an average cycle to decrease slowly but steadily from age 20 (29,0 days) to age 40 (26,7 days), in a 35 years follow-up study of 1000 healthy women. Further; median menstrual cycle length in a Chinese study of 5,634 women [17] was 29.4 days prior to becoming pregnant, but 9% reported cycle lengths of 31 days or longer and 12% reported cycle lengths of 28 days or less. In a study among 130 healthy U.S. women, the cycle length seemed to vary, but an average cycle length based on 786 menstrual cycles was reported to be 29.1 ± 3.5 days [18].

1.2 Follicular and luteal phase

The menstrual cycle consists of a follicular and luteal phase, where the follicular phase begins at the onset of the menstrual bleeding, and ends with ovulation. The follicular phase extends for about 14-15 days from the first day of menstrual bleeding, before the ovum begins its immigration to the uterus. The luteal phase starts where the follicular phase ends and lasts at about 14 days from ovulation until onset of the next menstrual period, unless a pregnancy occurs [19, 20]

Progesterone is a steroid hormone. The production of progesterone varies during the menstrual cycle, and in a normal menstrual cycle, the level of progesterone is low during the follicular phase. Before ovulation there is a slight increase but it rises after ovulation with a peak in the mid-luteal phase [21] reaching a level 10-50 times higher than before ovulation [20]. When no fertilization occurs, progesterone levels fall sharply before menstruation begins (fig 1.1.) The period from ovulation to menstruation is called the luteal phase. Reference values for measured serum progesterone in the follicular and luteal phase slightly differ between various laboratories depending on method and instrument for the analysis. Nevertheless in women under 50 years of age, serum progesterone level in the follicular phase is measured to be in range 0.7 – 7.9 nmol/L, in the luteal phase 4.6 – 94.2 nmol/L, and in the mid-luteal phase 15 - 94.2 nmol/L [21, 22].

The menstrual cycle is used as a sign of women's health, thus it is important to be aware of normal variations of the menstrual cycle [9].

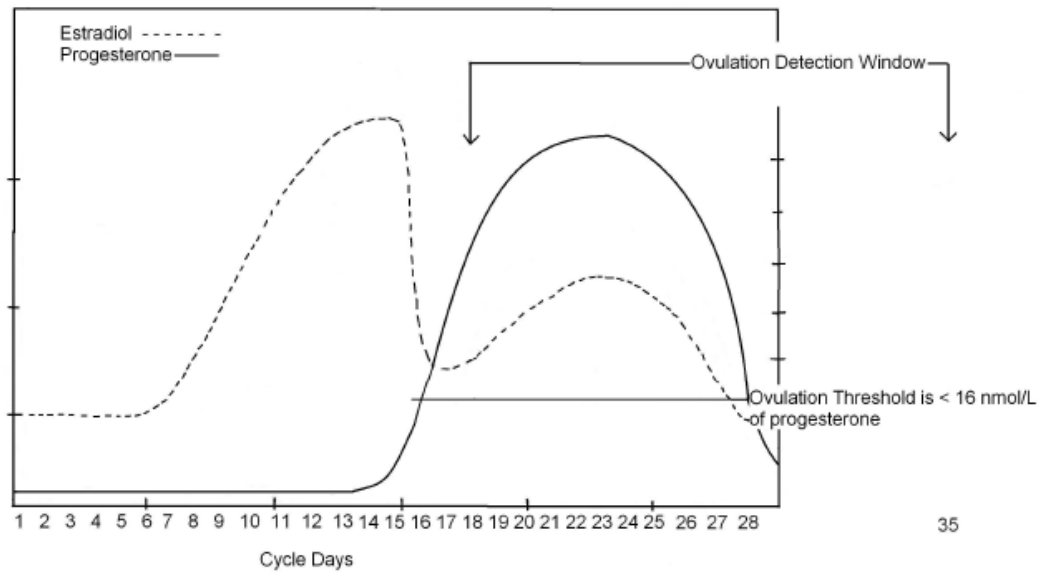

Fig 1.1 Ovulation Detection Window, from the Canadian International Opportunities Programme application (J.C. Prior and C.L. Hitchcock)

Studies on the lengths of the follicular – and luteal phases have concluded that variations in the menstrual length are caused by the variation in the early, follicular phase [19, 23-26], while there seems to be a more constant duration of the luteal phase [27-29]. Decrease in cycle length with increasing age, is attributable to a shorter follicular phase [30]. The mean length of the follicular phase has been reported to vary between 15,7 ± 3,0 days [9] in one study and 14,7 ± 2,4 days [31] in another, whilst the mean luteal phase seems to be more consistent with 13,3 ± 2,1 days and 13,2 ± 2,0 days reported duration in above mentioned studies. Ultrasound and hormonal studies have found a follicular phase duration of 14.6 days and luteal phases duration of 13.6 days in women aged 19-42 years [27].

1.2.1 Premenstrual ovulation symptoms (molimina symptoms)

The definition of molimina symptoms, also explained as premenstrual symptoms, include some mild symptoms such as mood swings, tender and sore breasts (mastalgia), fluid retention, fatigue, headaches and sleep problems that occur during the luteal phase. These problems are basically a mild form of premenstrual pains, and indicates the occurrence of ovulation [32, 33]. In a study performed by Magyar, 40 women aged 20-40 years participated

to test the assumption that women with regular menstrual cycles and premenstrual symptoms (premenstrual molimina) are ovulatory. The women were followed through 1-3 consecutive menstrual cycles during which luteal phase serum progesterone concentrations were determined by radioimmunoassay. They found a positiv association for 90 - 98% of the participants, based on the criteria for serum progesterone concentration [34]. It is of interest to validate these findings, and see if they are comparable to the prediction of ovulation based on the relationship between self-reported cycle day corresponding to luteal phase and high progesterone level. To evaluate the premenstrual symptoms, Molimina questions consist of two steps as described by J.C. Prior; First related to a question: 1) “Can you tell by the way you feel that your period is coming?", if “yes”: 2) a description of symptoms should mainly come spontaneously and volunteered from the women, with no prompting from the interviewer [33].

1.3 Anovulation, low level of progesterone, and the risk of developing diseases

Anovulation is most common in menstrual cycles with shorter or longer duration than normal. In women aged 25-39 years with cycles within normal duration, anovulation is found in about 7%, and it increases up to 34% in occurrence of anovulatory cycles among women over age 50 years [27]. The risks of diseases have been studied in relation to irregular menstrual cycles and anovulation. A low level of progesterone, as a consequence of no ovulation, seems to represent an increased risk of e.g. osteoporosis, breast cancer and cardiovascular disease.

Spinal Bone Loss

Several studies addressed associations between bone loss, osteoporosis and progesterone deficiency. The Iowa Women`s Health Study found an increased risk of self-reported hip-fractures in those who reported irregular versus regular cycles, (RR, 1.36) [35]. A study of 66 premenopausal women aged 21 – 42 years found an association between spinal bone density and asymptomatic disturbances of ovulation [3]. Further; a meta-analysis of 5 studies [8], showed that premenopausal women with regular cycles had lower bone mineral density (BMD) associated with subclinical ovulatory cycles (SODs). This might be due to a role of progesterone together with estradiol achieving optimal peak bone mass, during an ovulatory cycle [8].

Breast cancer

In a Swedish study the length of the menstrual cycle was compared in women with breast cancer, women with benign breast disease, and controls [36]. Breast cancer patients had a statistically significant shorter mean cycle length, and cycle duration < 21 days were present in 20% among breast cancer patients compared to 8% and 4% for the benign breast disease patients and the controls, respectively. Irregular menstrual cycles were present in 20% of benign breast disease patients compared to 10% in cancer patients and 8% in controls [36].
A prospective study of 1083 white women treated for infertility in the period 1946-1965, were followed until 1978 to examine the risk of premenopausal breast cancer. Women with endogenous progesterone deficiency had a 5.4 times greater risk than women with normal hormonal levels [37].

Cardiovascular disease (CVD) and Type 2 Diabetes mellitus

From a follow-up study for cardiovascular events during 14 years from the Nurses` Health Study (1982), women reporting irregular menstrual cycles had an increased risk for nonfatal or fatal coronary heart disease (CHD) (RR, 1.25 and 1.67, respectively) [15]. Correspondingly, another study from this population found a statistically significant increased risk for type 2 diabetes mellitus (2 DM) for women with long and highly irregular menstrual cycles [38] (RR, 2.08).

Additionally irregular menstrual cycles have been found to be associated with increased risk for cancer in the transverse colon [39], and endometrium [40].

1.4 Purpose and objectives

The purpose of this study was to enhance our understanding of variation in terms of ovulation and anovulation frequencies in a healthy population. An increased knowledge about this may provide an opportunity to more extensive studies in the future to explore the relationship between e.g. anovulation and the risk of diseases.

The aims of this Master Thesis are to study:

1. Ovulation frequency in women of childbearing age attending a population based health survey
2. The relationship between self-reported first day of last menstruation in terms of cycle day and measured serum progesterone levels
3. The association between reported premenstrual symptoms (molimina symptoms) and measured serum progesterone levels

2 Material and Methods

The Nord-Trøndelag Health Study (HUNT) is a multipurpose health survey of the population of Nord-Trøndelag, a county in the middle of Norway at the latitude of 64 degrees north. Three large data collections have been conducted in this county from 1984 up to 2006-08. HUNT1, took place during the years 1984-1986, and included only the adult population. The main objectives were to determine the prevalence of a specified assortment of diagnosis, basically cardiovascular diseases, diabetes and more general health issues, and to evaluate the quality of health care provided to patients with these clinical illnesses [41]. HUNT2, was carried out in the period 1995-1997 and was partly a follow-up study of HUNT1, but comprised a larger scientific program. The third study, HUNT3, was performed during 2006-2008 [42]. At HUNT1 and HUNT2; 77,216 and 65,215 participated with an attendance rate of respectively 88.1 % and 69.2 % [43]. From HUNT1, questionnaire data was collected and non-fasting blood glucose was measured in participants 40 years and older [41]. From HUNT2 blood samples were collected for DNA-extraction from the adult participants, and serum samples are available for biochemical analysis. HUNT3 comprises comprehensive questionnaires as well as the establishment of a state-of-the-art biobank with a broad collection of blood fractions, aliquots, buccal swabs and urine. Buffy coats were stored to provide an extensive possibility for future genetic studies (further emphasised underneath) [42, 44].

2.1 Design

In a cross-sectional design we studied the prevalence of ovulation based on i) self reported menstrual cycle data, ii) last menstrual first day and iii) measured serum progesterone level in blood samples drawn the screening station.

In addition, we also examined to what extend premenstrual symptoms may predict ovulation.

2.2 Subjects

The third survey (HUNT3) was conducted from October 2006 to June 2008. From 94,195 eligible individuals, about 50,700 (54 %) accepted the invitation and attended by answering questionnaires and met at clinical examinations [44]. HUNT3 followed a similar protocol as HUNT2 [41], but had an even broader scope. The number of women attending the survey were 27 754, which correspond to an attendance rate of 58.5 %.

HUNT 3 was organised as one basic study and in addition several sub-studies where inclusion was at random or based on specific criteria. For this study we included participants with valid menstrual cycle data from the basic study and women from one sub-study on premenstrual symptoms. These were:

i) From basic HUNT 3: Women aged <50 years, not being menopausal nor pregnant with no current use of hormonal contraception having answered menstrual cycle related questions, including the date of the first day of last menstruation, with an upper limit of 31 days prior to participation. These data were used to define the assumed luteal phase, and 1268 women fitted these criteria.
ii) A total of 949 women who participated in a sub-study including spirometry, bone densitometry and an interview on premenstrual symptoms (The Molimina questions). Adequate menstrual data to confirm whether the woman was in the follicular or luteal phase was not available for 154 of these women. In total 795 participants (aged <50 years, not being menopausal nor pregnant and with no current use of hormonal contraception) were included for further analysis related to the relationship between self-reported cycles and measured progesterone levels.

Women who participated in this sub-study (ii), were mainly selected based on criteria related to spirometry examination, and are described for more details in chapter 2.5.3.
In total, 2063 women were eligible for further analysis in the ovulation study (Fig. 2.1).

In addition to the ovulation study, we performed a smaller study in the 949 women who had participated in the sub-study (ii) and answered questions about premenstrual symptoms (molimina symptoms).

Figure 2.1 illustrates the selection of our study population based on the attendance in the HUNT3-survey. Women were excluded from our study if they reported hysterectomy or/and ovariectomy, were breastfeeding or without blood samples at the screening station.
The different selections / exclusions are also shown in Figure 2.1.

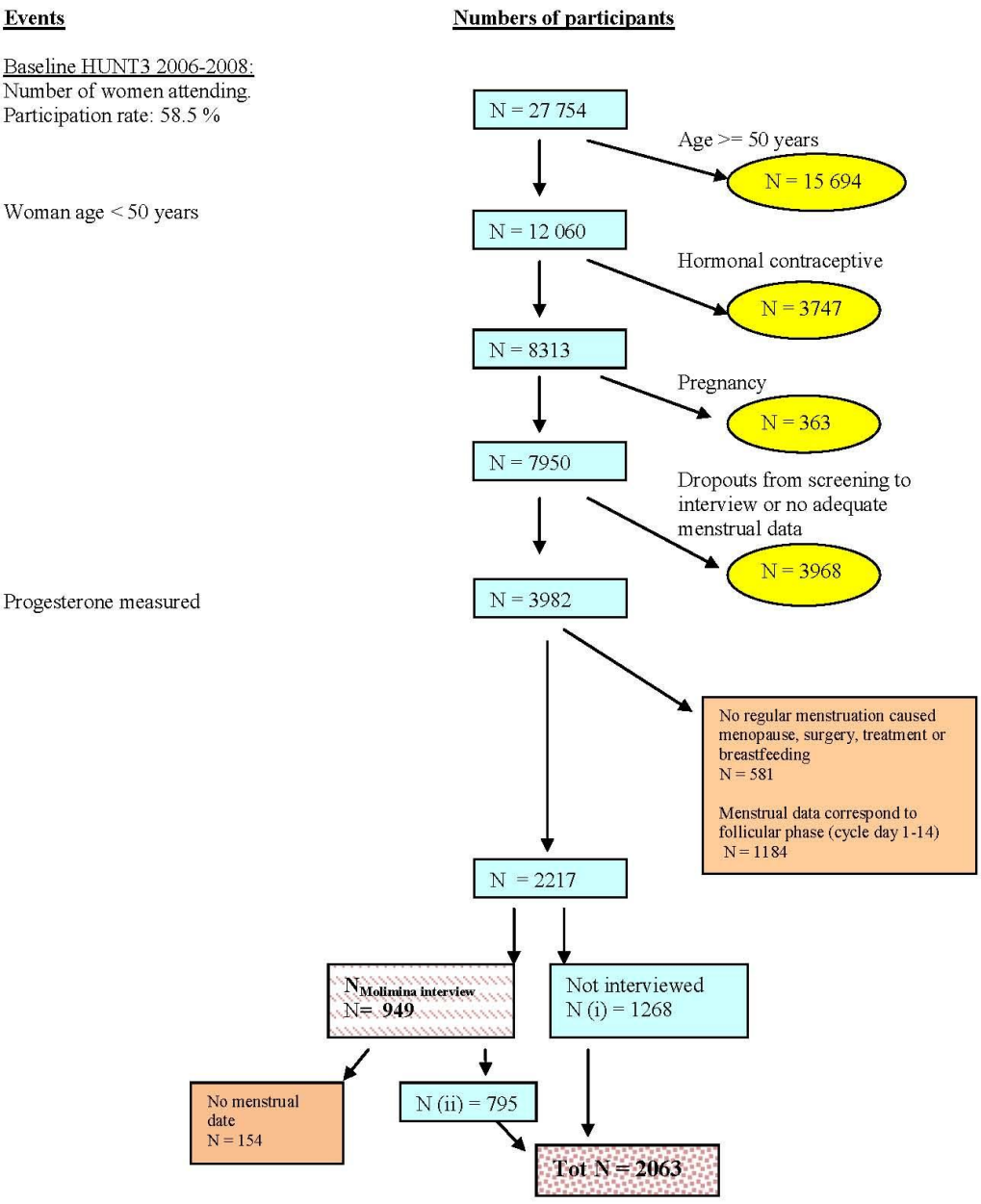

Fig 2.1 Selection of the study population.

= Number of participants for our sub-study with data from the Molimina questions (N = 949)

= Number of participants in the ovulation study (N = 2063).

Based on our selection criteria and low participation rates at ages 20-30 years, the distribution of women's age in our study is reflected in a histogram where the mean age is 40.5 years and median age is 41.6 years (Fig. 2.2).

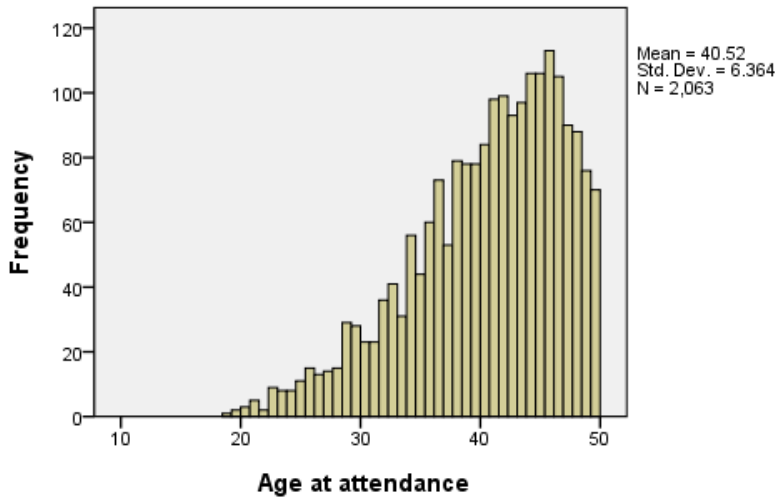

Fig 2.2 Histogram of the distribution of women`s age at attendance.

2.3 Measurements

Anthropometric -, demographic data and menstrual cycle data were obtained by examinations, questionnaires and interviews, as well as from measured progesterone levels in serum. Cycle day is defined as the day number since first day of last menstrual cycle. In our analysis we have used the information from the cycle day related to the self reported onset of last menstrual flow before screening, except for 41 women were we have estimated cycle day by making a conversion of first menstrual date after attendance from the reported investigation form. This is further explained in chapter 2.3.5. Based on examination of median serum progesterone level according to cycle day, we have defined luteal phase from cycle day 15-31. I.e. assumed "true" luteal phase (ovulation) is between cycle day 15 and 31 when measured serum progesterone level is ≥ 8 nmol/L, while assumed "false" luteal phase (anovulation) is also between cycle day 15 and 31, but measured serum progesterone level is < 8 nmol/L.

2.3.1 Questionnaires, examination and Molimina questions

Different questionnaires were used in the baseline survey in HUNT3. Participants filled out a form called common questionnaire 1; Q1 [45] at home, and they were given a questionnaire 2; Q2, depending on age and gender at the screening station. For our study we used the questionnaires for women aged 20-29 years [46], and 30-69 years [47]. In addition, they were also interviewed (Appendix 4), and could be allocated to other sub studies with even more data sampling and interviews. The women participating in the lung interview and / or bone mass examination answered two questions (Molimina questions) regarding symptoms prior to their menstrual period (premenstrual symptoms) (Appendix 5). Clinical measurements included height, weight, waist circumference, hip circumference, blood pressure and heart rate/minute. All measurements were performed according to standardized protocols and executed by trained personnel. Interviews included questions concerning health-related occupational exposure, pregnancy, childbirth and breastfeeding [46, 47]. In this study we used the following data:

Year of birth, anthropometric data (height, weight and BMI -used both as a continuous variable and categorized), menstrual data (cycle day, cycle duration (in days), progesterone measurements and premenstrual symptoms (for the sub-study), smoking as a dichotomous variable as well as self reported medical conditions, such as diabetes, COPD, asthma, cancer and hypo-/hyper thyreosis and treatment for gynaecological malignancies. Concerning the baseline characteristics, smokers were defined as women who smoked daily or more than 30 cigarettes per month, calculated from the number of cigarettes per month from the variable "sometimes smoking". Serum progesterone was used both as a continuous and dichotomous variable (dependent variable).

2.3.2 Menstrual cycle investigation form

All women who participated in the Molimina questions received a form to fill out at home with the date of their first flow after the interview. No reminders were provided in case of no response. Totally 289 women (30.4%) returned the form. Data from these women were used in order to estimate the accuracy of the self-reported cycle durations in the questionnaires. From a total of 41 women returning the investigation form, we had no reported first day of last menstruation before the attendance from the interview at the screening station. For these 41 women we used the reported date of first flow after attendance in relation to their self-reported cycle duration, and converted this to get adequate data to use in our analysis. This is described in chapter 2.3.5. Overall, 16 women reported stated cycle day to be more than 31 days, either from the interview or from the investigation form. This was not in accordance to their reported cycle duration, and they were taken out of our analysis related to confirm luteal phase.

2.3.3 The blood samples

The blood sample collection was conducted through stringent demands of handling [48]. At the screening station, blood-samples for further progesterone-analysis (and other analyses), were collected in Vacutainer^{TM} 10 ml tubes with a clot-gel (SST-vials). After coagulation at room temperature and centrifugation, the vials were kept at low temperature (4^{o} - 8^{o}C) through the whole transport from the place where the sample was collected to HUNT biobank. Time from sample collection to finally processed sample for freezing was less than 24 hours. The blood sample handling procedure is described in Fig 2.3. Serum-samples have been stored in freezers at -80^{o} C in vials made of polypropylene. For measuring progesterone, one serum sample aliquot was gently thawed and then mixed for 20 minutes before further auto analysis.

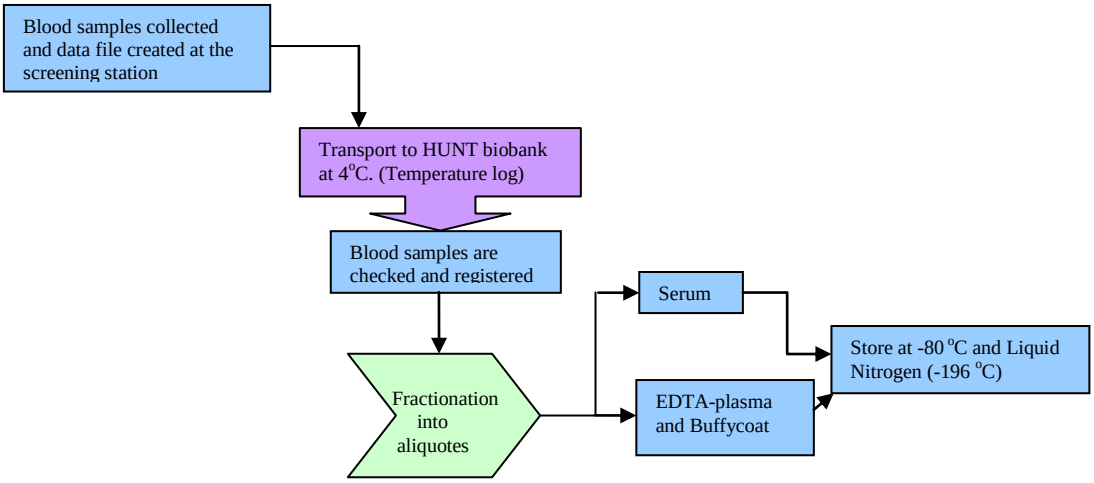

Fig. 2.3 Blood sample processing of EDTA-plasma and serum at HUNT3 from screening station to HUNT biobank, and further the sample handling at HUNT biobank from receiving the blood sample until freezing.

2.3.4 Progesterone measurements

The quantitative determination of progesterone in serum was measured on Liaison ® Analyzer from DiaSorin, with a chemiluminescence immunoassay (CLIA), as described in the manufacture for progesterone measurements, by DiaSorin [21]. The measured value of progesterone is given in nmol/L. The range is 1.2 – 126.3 nmol/L and the day-to-day variation coefficient (CV) was, by analyses in the lab, found to be 4.6 % at a level corresponding to 74.8 nmol/L and 11.4 % at a level corresponding to 5.2 nmol/L. According to the manufacture of Liaison Analyzer ® [21], values of progesterone up to 7,95 nmol/L are defined to be most likely measured at follicular phase and a progesterone level > =8 nmol/L is defined as assumed luteal phase, and the lowest progesterone threshold to state ovulation. Even though there is an overlap between follicular and luteal phase progesterone level from 3.82 nmol/L to 7.95 nmol/L, it seems to be a relevant cut-off to use the level 8 nmol/L or higher in order to define the luteal phase.

2.3.5 Missing data

Missing values for the variable;"Current breastfeeding" (N = 1845) and the variable; "Regular menstrual cycle the last 12 months" (N = 1) have been replaced by the value 0 = No, assuming that these questions were perceived as irrelevant among women who did not answer. Missing values for reported first day of last menstruation (N = 41) is replaced by converted data. We calculated the number of days between attendance and first day of next menstruation, and further; subtracted these from the number of days related to the woman`s cycle duration. From this we found the expected cycle day at attendance. For those who have not stated their cycle duration in the questionnaire, we have used 28 days defined as a full menstrual period.

2.3.6 Possible confounders and bias

Possible confounders could be anthropometric data and lifestyle. There were no questions on socioeconomic status, such as education and income. Such data can be achieved by linkage to other register. The total response rate for women was 58.5% in the HUNT3 study, and there is a lower attendance for women aged 20-40 (45%) than for participants above 40 years old (64%) [44]. The fact that there are more participants among women above 40 may imply biases, as these women are more often in luteal phase, related to a decreased cycle length from age 35. Also, the frequency of anovulatory cycles is higher among women above 40 years of age [11], hence, some of our analyses were adjusted for age.

2.4 Data analyses

All statistical analyses were done by the use of Statistical Package for the Social Sciences (SPSS) for Windows, version 18.0. The level of statistical significance was defined as, $p<0.05$.

As a dependent variable in the regression analysis, to estimate ovulatory / anovulatory cycles, we used serum progesterone level as a dichotomous variable with a cut-off at 8 nmol/L.

The analyses were performed by descriptive and analytical statistics. We looked at the variation in median progesterone level through the menstrual cycle of 28 days. In order to investigate the predictive value of menstrual cycle days 14-20 for being in luteal phase, i.e. having progesterone level ≥8 nmol/L, we calculated the sensitivity and specificity testes with corresponding 95% CI.

Based on the self-reported cycle day >14, the women were assumed to be in luteal phase. Some of these women did not have the expected progesterone level of 8 nmol/L. These women were defined as being in a "false" luteal phase. The remaining women in the same cycle period, but with the expected progesterone level increase, were defined as being in a "true" luteal phase, i.e. ovulation has occurred. Analysis of variance (ANOVA) was used to test differences between means in a group of women in assumed "true" and "false" luteal phase. Pearson Chi-Square was used in order to test for differences between dichotomous variables.

The equality of variances, Levene`s test, was used to test for possible heterogeneity in progesterone levels within age categories. General Linear Model (GLM) was used in order to check the assumptions of no multicollinearity for the association between progesterone level and age and BMI in a model, with cycle days 16-29 as fixed factors and age, BMI and the interaction term age*BMI as covariates.

The association between assumed luteal phase ("true" and "false") and BMI (in four categories), lifestyle, and health related data were tested in separate logistic regression models in order to study possible predictors of anovulatory cycles. Logistic regression was also used for investigations of associations between assumed luteal phase and premenstrual symptoms. The associations are reported as odds ratio (OR) with 95% CI.

2.5 Quality control

"*Don`t underestimate the simple elegance of quality improvement. Other than teamwork, training and discipline, it requires no special skills.*" *(Thomas Redman, 2001)* [49]

Redman [49] compared figuratively a database`s error like a lake where the pollution level rises and falls with the pollution levels of its incoming streams; If error rate for incoming data in the transaction stream is 10% and the control systems detect and prevent 50% of the stream, then the database error rate is 5%. The importance of validating the quality of variables are well described in M. Szklo and F.Javier Nieto`s "Epidemiology – Beyond the Basics" chapter 8 [50], concerning the risk of errors in the results, by taking variables into account where the validation haven't been carried out seriously enough.

2.5.1 Questions

Several of the questions used in HUNT3 have not yet been validated as such, but nevertheless, included in a wide range of publications. More over, the basis for the questionnaires in HUNT3 was questionnaires both from HUNT2 and HUNT1, in addition to questions also used in Cohort of Norway, CONOR [51].

The Molimina questions have been used previously and described by our collaborator Jerilynn Prior in the grant application bibliography [33], but has also been discussed in an earlier paper by Magyar [34]. Our study is a part of a larger study, aiming to study the predictive value of this instrument in identifying ovulation (Appendix 5).

2.5.2 Progesterone

The quantitative determination of progesterone in serum, which is measured on Liaison ® Analyzer is a CE-certificated method and has gone through an extended validation from the supplier. Quality Controls have been measured at different levels every morning, two or three times during the day and finally at the end of the day. There have been used controls delivered by the supplier, controls from external systems (Bio-Rad) [52], and a day-to-day control which is the laboratory's own serum sample analyzed over time at different days and different reagent lot, and where the calculating of mean, SD and % CV are done by the lab engineers.

2.5.3 Data collection

Data have been registered during the interview by computer assistants, and the questionnaires were read optically and transferred into HUNT Databank. There is a codebook with description of raw variables, corrected raw variables and computed variables. The staff was specially trained prior to the data collection. There were, however, a number of technicians involved during the two years of data collection, so inter rater reliability and deviations from selection into study parts according to protocols, could be influenced. This may explain some of the missing menstrual data among the participants included in the ovulation study.

About 70 % of the selected group should be in luteal phase (15 -31 days in cycle) according to cycle day. A total of 30 % of the sample is not in assumed luteal phase, but participate in the ovulation study because they were included in the Molimina questions (sub-study ii).

Women, who participated in this sub-study (ii), were selected according to criteria for the Lung Study. These were:

* Previous participation in Young-HUNT 1995-97 (from HUNT2)
* Affirmative answers in the questionnaires in HUNT3 [45] of having asthma or COPD, use of asthma medication in the last five years and attacks of wheezing or breathlessness in the last 12 months [53]
* A 10% random sample of all participants
* Participants in the Lung Study in HUNT2 according to the same criteria except for only a 5% random sample.

2.6 Ethical consideration and consent

The HUNT3 survey and the project "Ovulation in a normal population" were approved by the Regional Committee for Medical Research Ethics (REK) and the Norwegian Data Inspectorate. All subjects signed an informed consent for participation and linkage of data to other health registries and data sources.

3 Results

3.1 Baseline characteristics

Table 3.1.1 Baseline characteristics (Mean (SD), Range and %) of 2,063 menstruating women, with measurement of progesterone, participating in the ovulation study.

	N	Mean (SD)	Range	%
Age (year)	2063	40.5 (6.4)	19 - 50	
Weight (kg)	2059	73.4 (14.1)	40.1 – 151.7	
Height (m)	2058	166.4 (5.9)	141.1 – 184.6	
BMI	2058	26.5 (4.9)	15.8 – 55.9	
BMI <= 24.99	901			43.8
BMI 25.0 – 29.99	760			36.9
BMI 30.0 – 34.99	268			12.9
BMI >= 35.0	131			6.4
Menarche Age	2063	13.0 (1.4)	8 - 18	
Regular menstrual cycles, last 12 months	2021			98.0
Cycle duration (days)	2017	27.5 (2.5)	14 - 42	
Parity /median	1973	2.48/2 (0.9)	1 - 7	
Smokers	441			21.4
Diabetes	22			1.1
Hyper-/Hypo Thyreosis (self reported)	99			4.8

Per cent within this data selection

More than half were overweight / obese in this sample, and 2 % of the participants reported irregular menstrual cycles over the last 12 months. One woman reported early age at menarche (8 years old), but was kept in the dataset, as her reported and measured variables all over did not differ from the mean values in the dataset. Two women reported cycle duration to be 14 days. This is not in accordance to self reported day since first day of last menstruation, and makes the

information about cycle duration not valid in these cases. In total, cycle duration in days could be assessed among 2,017 of these overall participants (slightly below 98%). A total of 2,050 women in our study had been pregnant, and 1,973 women had given birth, with a mean parity of 2.48 (median = 2) (Table 3.1.1). Smoking was reported by 21.4% women (daily smoking or more than 30 cigarettes pr month).

3.2 Progesterone levels and ovulation according to menstrual cycle days

Progesterone levels according to the reported menstrual cycle day among the 2,063 women, is presented in Figure 3.1. Based on the manufacturer, the cut-off in serum progesterone level for reaching luteal phase is 8 nmol/L. The luteal phase occurred at approximately day 15 in the menstrual cycle.

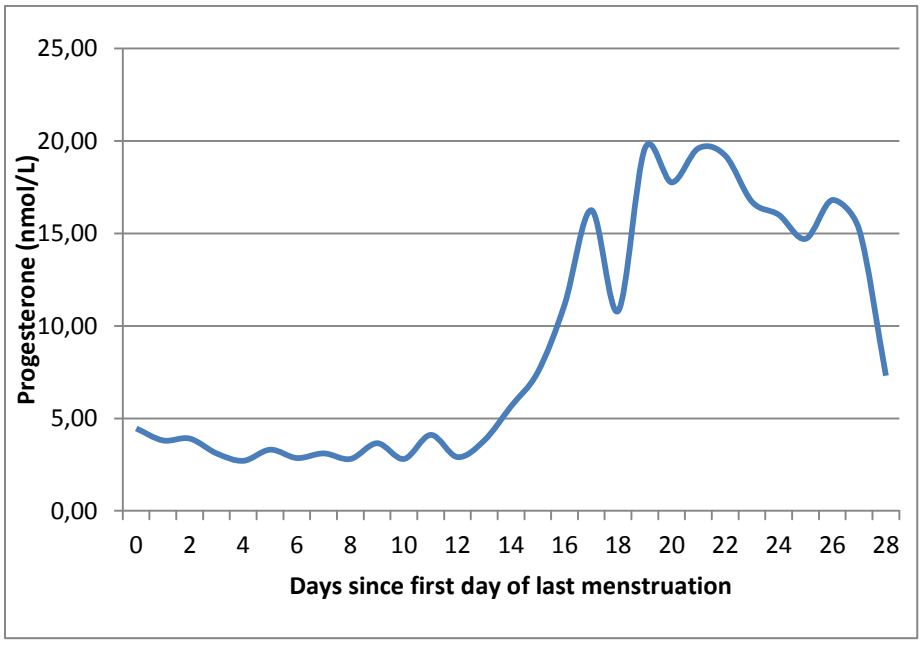

Figure 3.1 Median progesterone levels (nmol/L) by number of days since the first day in the last menstruation among 2,063 women.

Shown in Figure 3.1 there is a fall in progesterone level for cycle day 18. Reanalysing progesterone in serum did not reveal any methodological errors. By doing an Independent-Samples T-Test, we found a statistical significant difference between cycle day 17 and 18 ($p = 0.03$). We reject the null hypothesis of no difference between those two days measurement of progesterone level, but unfortunately we do have no explanation of this occurrence. These findings have to be investigated in a future study.

3.2.1 Predictive value of cycle day for luteal phase

To test our use of cycle day 15 as a threshold for assumed "true" luteal phase, we calculated the sensitivity and specificity of being in the luteal phase based on the cycle days 14-20 days and a progesterone level cut-off at 8 nmol/L.

Table 3.2.1 Cycle phase estimated from progesterone level

Phase	Progesterone level		
	≥ 8nmol/L	<8 nmol/L	Total
Cycle day 14-31	1007	650	1657
Cycle day < 14	47	359	406
Total	1054	1009	2063

Assumed luteal phase from cycle day
Sensitivity = 95.5 % / (Specificity = 35.6 %)

The predictive value for being in luteal phase at day 14 is 0.61 rising to 0.66 at day 19. Below are the results from cycle day 14, and further the results for doing the same analysis using cycle day 15 - 20 as cut off for assumed "true" luteal phase, with 95% CI.

Table 3.2.2 Predictive value (PPV)

Cycle day	*PPV luteal phase*	*95% CI*
14	**0.61**	**0.58 – 0.63**
15	**0.64**	**0.61 – 0.66**
16	**0.65**	**0.62 – 0.68**
17	**0.66**	**0.63 – 0.68**
18	**0.66**	**0.63 – 0.68**
19	**0.66**	**0.63 – 0.69**
20	**0.66**	**0.63 – 0.69**

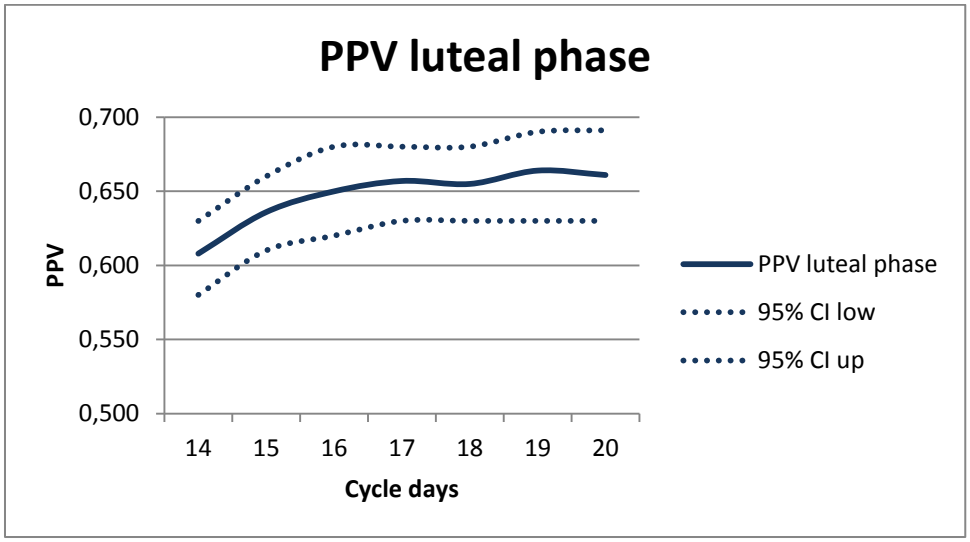

Figure 3.2 Predictive value of specific menstrual cycle day for being in luteal phase i.e. progesterone level ≥8 nmol/L with 95% CI.

As shown in figure 3.2, the predictive value for being in assumed "true" luteal phase (i.e. ovulatory cycle), based on women`s reported first day of last menstruation and verified by increased progesterone level, seems to have a significant increase from cycle day 14 (0.61) to cycle day 15 (0.64), and a further increase until cycle day19 (0.66) before the curve flattens.

Ovulation prevalence = 64% at cycle day 15, is a mean result from the whole sample. By dividing into 5-years age groups, the prevalence for ovulation at cycle day 15 proved to be for

women in age 19-24 years 40%, age 25-29 years 58%, age 30 - 45 years 66% and age 45-50 years nearly 61%. Differences between these age groups are nearly significant (p = 0.052).

3.3 "True" and "false" luteal phase - ovulatory and anovulatory cycles?

A total of 1,447 women were found to be in cycle day 15 – 31 according to self reported first day of last menstruation. Even though the probably main factor for "false" luteal phase is due to the inaccuracy in women`s reported first day of last menstruation, we investigated if there could be any possible differences in selected characteristics between women in "true" (N = 920) and "false" (N= 527) luteal phase.

Table 3.3.1 Comparisons of women in assumed "true" luteal phase with women in assumed "false" luteal phase

	"True" luteal phase progesterone level ≥ 8 nmol/L (N = 920)			*"False" luteal phase progesterone level < 8 nmol/L (N = 527)*			
	Mean (Median)	**95% CI**	**%**	**Mean (Median)**	**95% CI**	**%**	**p-value**
Age (year)	40.8	40.4 – 41.2		40.7	40.1 – 41.3		.794
Weight (kg)	73.1	72.2 – 74.0		73.3	72.1 – 74.5		.790
Height (m)	166,48	166.10 – 166.87		166,33	165.82 – 166.84		.627
BMI	26.35	26.04 – 26.66		26.47	26.07 – 26.88		.635
[a] BMI >= 30.0			18.1			19.4	.538
Menarche Age	13.07	12.9 – 13.16		13.07	12.96 – 13.19		.973
Cycle duration (days)	27.44	27.29 – 27.59		27.61	27.39 – 27.83		.205
[a] Regular menstrual cycles, last 12 months			98.9			97.7	.075
Time since last period (cycle day)	21.58	21.31 – 21.85		21.27	20.87 – 21.66		.185
Parity (median)*	2.5 (2)	2.44 – 2.56		2.45 (2)	2.37 – 2.54		.369
[a] Smokers			20.9			21.8	.670
[a] Diabetes			1.0			1.7	.228
[a] Hyper-/Hypo Thyreosis (self reported)			4.7			4.6	.917
Cancer mamma			0			0	
[a] Asthma			9.2			10.4	.458
[a] KOLS , pulmonary emphysema			1.8			1.3	.456
[a] Cancer			1.4			1.3	.894
[a] Gynecological surgery			1.2			0.8	.430

[a] = Pearson Chi-Square *Parity of childbirth

There was no difference in anthropometric, lifestyle data (smoking), age at menarche, parity or self-reported morbidity between the two groups of women (Table 3.3.1). Concerning menstrual cycle data, women in the "false" luteal phase reported slightly more often irregular cycles during the last 12 months, however, not at a 95% significance level (p=0.075). Doing the same analysis with a cut-off at cycle day 19 as "true" luteal phase, there were still no statistically significant differences in the characteristics between "false" and "true" luteal

phase, except that “false” luteal phase group reported time since last period to be half a day longer ($p = 0.010$).

Ovulation frequency may decrease with age, and in order to investigate the influence of age, the variation of progesterone levels during cycle days 16-29 was analyzed in a GLM-model, with each cycle day (16 through 29) as fixed factors and the women’s age as a covariate. Age did, however, not contribute in the model at a statistically significant level, thus age was no predictor of the variation of progesterone, i.e. ovulation.

BMI and the interaction term age*BMI was additionally added to the model, but did not contribute at a statistically significant level.

We controlled for differences in previous use of hormonal contraceptives between women in age 30 – 40 years and age 40 – 50 years, without significant findings.

Though there was no significant difference in any of the investigated characteristics between the groups of assumed “true” and “false” luteal phase, we decided to do a logistic regression among these two groups to calculate the Odds Ratio (OR) for being in assumed “false” luteal phase by BMI (categorical), smoke and cycle duration data. The associations between assumed “false” and “true” luteal phase was tested among 1,447 women at cycle day 15 – 31 using multivariate analysis adjusted by age.

Table 3.3.2 Associations (OR with 95% CI) between "false" luteal phase and BMI, smoking, and reported cycle duration, analyzed in separate models for each covariate, unadjusted and adjusted for age.

	N	OR (unadjusted)	95% CI	p-value	OR (age-adjusted)	95% CI	p-value
BMI cat <25	1444	Ref			Ref		
BMI cat 25-30		1.026	0.808-1.302	0.836	1.031	0.810-1.312	0.804
BMI cat 30-35		1.186	0,847-1.659	0.320	1.190	0.850-1.667	0.311
BMI cat >35		0.931	0.573-1.511	0.771	0.932	0.574-1.513	0.774
Smoking	1447	0.945	0.728-1.226	0.670	0.944	0.727-1.225	0.664
Cycle duration <27 ref	1421	Ref			Ref		
Cycle duration 27-29		1.082	0.816-1.435	0.583	1.079	0.813-1.432	0.599
Cycle duration >29		1.376	0.944-2.006	.0.097	1.371	0.939-2.000	0.102

From Table 3.3.2 there is no significant association between “false” luteal phase (no ovulation) and BMI as an independent variable in categories. Neither there is a significant association between “false” luteal phase and cycle duration as an independent categorical variable, or smoking as a dichotomous variable. This is consistent with our previous ANOVA analysis. Because there seemed to be a trend when looking at the increased cycle duration, we investigated this, but the p-value for trend was not statistical significant, either unadjusted ($p = 0.11$) or adjusted by age ($p = 0.12$).

We also studied if the time of season for the blood sample collection did affect the results of assumed luteal phase and progesterone level, by using Chi-square and Mantel-Haenszel test. We found that the frequency of ovulations varied by season, but there were no difference between the groups categorized as “true” and “false” luteal phase.

3.4 Clinical symptoms according to the Molimina questions

In our study of participants of premenstrual ovulation symptoms, a total of 758 out of 949 women reported regular menstrual cycle the last 12 months. 74 women were uncertain of regularity and 117 women reported mostly irregular cycles. Clinical symptoms were obtained from approximately 86% of the Molimina questioned (Table 3.4.1 and 3.4.2)

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Table 3.4.1 Molimina question for ovulation among 949 interviewed women

1) *Can you tell by the way you feel that your period is approaching?*

	Yes, every month	Yes, most months	Yes, less than half the time	Yes, once or twice a year	Never
N	595 **(63%)**	100 **(11%)**	17 **(2%)**	11 **(1%)**	81 **(9%)**

Table 3.4.2 Symptoms prior to a menstrual period, as reported by 949 interviewed women

2) *Descriptive symptoms:*

	Yes	%
Menstrual cramps, backache or feet	*512*	**54.0**
Mood variations	*412*	**43.4**
Fluid retention	*329*	**34.7**
All breast symptoms *	*238*	**25.1**
Increased appetite	*187*	**19.7**
Headache or migraine	*155*	**16.3**
Acne	*96*	**10.1**
Others	*72*	**7.6**

* A summary of all descriptive menstrual breast symptoms are further described in Table 3.4.3

The results indicate that menstrual cramps represent the most prevalent symptom of an imminent menstrual period among the participants at the interview. In addition, 43% reported mood variations, and breast symptoms are reported by about 25 % (Table 3.4.2). In the Molimina questions there were four elaborative questions on breast symptoms, these were pooled together as all breast symptoms in table 3.4.2. To go more deeply into each of these

breast symptoms, we have listed the answers of prevalence related to all the alternatives (Table 3.4.3). We have a respond of 817 women answering breast symptoms (yes or no) while 132 missing. Among women who reported breast symptoms, there were approximately 95% who reported more than one symptom.

Table 3.4.3 Descriptive menstrual breast symptoms by 949 interviewed women

	Yes	%
Sore in – or around the nipple	*76*	**8.0**
Sore on the side of the chest at armpit	*107*	**11.3**
Increased breast size	*129*	**13.6**
Swollen, tender breasts	*227*	**23.9**
All breast symptoms	*238*	**25.1**

Women reporting breast symptoms had 1.65 nmol/L (95 % CI = - 0.05 - 3.36), p=0,058 higher progesterone levels than women who did not report these symptoms. There was no difference in the reported menstrual cycle day between the women with and without breast symptoms, and the median cycle day was 14 in both groups.

Breast symptoms were reported among 30% of the women with measured serum progesterone level $\geq$ 8nmol/L, while 23% reported breast symptoms among women with serum progesterone < 8 nmol/L.

There was also a faintly higher report of moody symptoms among women with measured serum progesterone level $\geq$ 8nmol/L than women with lower levels.

In separate logistic regression models we calculated the Odds Ratio (OR) of being in a “true” luteal phase according to premenstrual symptoms. There was found a significant association between being in “true” luteal phase and breast symptoms (OR = 1.44, 95% CI, 1.06 – 1.94,

p = 0.020). This shows that among women reporting breast symptoms the odds ratio of being in "true" luteal phase was about 1.4 compared to women without such symptoms. There was no significant association between being in "true" luteal phase and moody symptoms. Controlling for anthropometric data did not change these associations.

To investigate the generalization of these results, we compared the 10 percent random selection group (N = 237), with those included according to respiratory disease or symptoms (N = 712). We investigated whether there were differences regarding age, body mass index (BMI), menstrual data, parity and smoking, and found statistic significant differences between these two groups in age, menarche age and smoking, where age and menarche age were significant higher and smoking (daily or more than 30 cigarettes pr month) significant lower in the randomized selected group. There was also reported a higher cycle duration among the women in the randomized group, with more than one day differ, but this was not statistical significant. (Tables located in Appendix 7). In spite of our findings, by doing a logistic regression model we found no statistic significant association to expect that premenstrual breast symptoms are different in the samples. By adjusting for age, menarche age and smoking there were still a statistic significant association between breast symptoms and "true" luteal phase (OR = 1.61, 95% CI, 1.02 – 2.55, p = 0.043).

3.5 Main results

We found a prevalence of 64% for women to be in ovulatory cycles, hence 36% to be in anovulatory cycles at cycle day 15. Between women in ovulatory / anovulatory cycles we found no statistical significant difference related to anthropometric -, lifestyle data (smoking), and age at menarche, parity or self-reported morbidity.

We investigated a possible trend for those with a cycle duration >29 days to have a greater probability of being in false luteal phase at cycle day 15 than women with a cycle duration of 27-29 days, but this trend was not statistically significant.

By examining the premenstrual ovulation symptoms (molimina symptoms) in the sub-study, we found a significant association between premenstrual breast symptoms and being in "true" luteal phase (ovulatory cycle).

4 Discussion

This study among fertile women attending a population-based health survey reveals the following on:

- An ovulation frequency, i.e. the expected number of women with progesterone rise to be lower than expected and according to the literature.
- The majority of the ovulating women seem to ovulate within cycle day15.
- The predictive value of cycle day related to ovulation in a normal population is lower than expected.
- Premenstrual symptoms are relatively common, but only sore and tender breasts were associated with serum progesterone levels in this study.

4.1 Methodological considerations

4.1.1 Study design and validity

Our findings must be viewed in the context of the limitations that exist for a cross-sectional study. It represents a snapshot of the situation, and may well be used to estimate ovulation frequency (progesterone rise) and premenstrual symptoms in a "normal population". The most uncertain measure in this study is the reported date for first day in last menstrual period. This date was used in order to assess the specific day in the menstrual cycle when the blood sample was taken for the progesterone measurement. If several women have reported the wrong date for the first day of last menstrual period, this will result in a misclassification of the cycle phase in conjunction with measured progesterone value. Thus, some of the women with an observed progesterone increase may well have been in a “true” luteal phase, but were sorted out of the analyses as they were classified as being in a follicular phase according to their reported last menstruation.

In our study there is also a concern related to the report of premenstrual symptoms. The women were expected to describe the symptoms impulsively through the Molimina interview, and the interviewer should note the symptoms. A possibility exist that the interviewer instead proposed the symptoms for the women and asked them to confirm. This may have lead to an over – or under reported estimate in favour of some symptoms. In order to study the relationship between self-reported premenstrual symptoms and progesterone, a longitudinal study over several menstrual cycles would have been preferable a better design. Symptoms and progesterone levels should then be measured repeatedly.

" If the design and procedures of a study are unbiased, the study is considered to be valid because, on average, its results will tend to be correct." (*M. Szklo and F.J. Nieto)* [50]

Validity tell us in what extent we measure the phenomenon we basically meant to measure [54]. Validity is divided in external validity, which refers to the generalization from the study population into the total population, and internal validity, which is related to the fact that we actually measure what we want to measure. High reproducibility is a prerequisite for high validity [54].

Reliability of a study tells us in what extent we can expect to trust the collected data, the use of these and the results they give, and whether the results agree when they are obtained by different observers, in different points of time or with different procedures [50]. High reliability is a presumption for high validity, and a study`s quality cannot expect to have a higher performance than the study`s design and the quality of measurements [54]. This implies the questions should be as precise as possible, and also that the answers cover what

we ask for. High reliability and validity extend the possibility to generalize the data from the study selection into the whole study population.

The external validity of our study is discussed below, and several aspects should be taken into account. These are related to the uncertainty of self-reported cycle date stated from the questionnaire and a possible decrease of the serum progesterone level during storage of the frozen samples before analyzing.

4.1.2 Reliability of stated menstrual period

Reporting the incorrect date for first day of last menstrual bleeding may be because some of the women do not remember, or only vaguely remember the exact date or they remember the wrong date. This is a challenge in all kind of questionnaire based studies where participants are not told in advance what they will be asked. The difficulties related to validity and accuracy of self- reporting menstrual cycle length has been emphasized in studies from Small et al. [55] and Jukic et al. [56]. Small et al. call attention to the importance of including questions about the cycle variations and take these into the consideration when calculate the estimates. Jukic et al. points out that women`s self-reports may have either a tendency to report the cycle length for the last period, when it is most natural to remember, though perhaps not the most representative. Some women may count only nonbleeding days when they estimate their cycle length, and further; as women grow older and their cycle lengths shortens [12], they may still report a lifetime estimate of cycle length that does not reflect their more recent and shorter cycle lengths [56].

From the questionnaires and the later investigation form, 263 women have reported both the date of the first day of last menstruation (before attendance), and the date of the first day of next menstruation (after attendance). Of these, 206 (78%) reported a first monthly cycle day

in each of these periods that were consistent, and it enabled us to state the women's cycle day at attendance with good accuracy. Among the remaining 57 women the variations of the cycle length were rather wide indicating erroneous reports of the next menstrual flow. A total of 304 women returned the investigation form, but from 41 of these we have no reported first day of last menstruation before attendance. A conversion to get adequate data for cycle day is further described in chap. 2.3.5. For those who did not report cycle duration we have used 28 days, as an assumed cycle length for calculating the conversion. We are aware that this may lead to incorrectness for assumed ovulation/anovulation for a few cases.

Only 304 of the 949 women who participated in the sub-study concerning premenstrual symptoms (Molimina questions) returned the investigation form where they should note the date of their next menstruation, an overall response rate of 32%. Due to technical reasons some women were not handed out the form after the interview, an error discovered and solved after a few months. Also, the women had to remember to fill in the form at their next menstruation, and we assume that most women simply forgot. No reminder was administered. Hence, the main information on menstrual cycle day was the report of the first day of last menstruation before attendance.

There is also a concern related to the reported cycle duration in this study. The variation in cycle duration is rather high and indicates that the question may have been misunderstood. We believe that some women stated the days between their menstrual bleeding periods (number of days without bleeding) as the cycle duration. This probably represents a random error, but could bias our study. A study has shown that women's self-reported cycle length may differ at least 2 days from their prospective cycle length, for as much as forty-three percent of participating women, and may lead to 21% misclassifications [55]. The alternative

is the use of prospective records of menstrual cycle length as we tried with the women attending the premenstrual symptoms interview. A follow-up of at least two cycles is necessary for an estimate of a woman's usual cycle length [55].

From our study selection 98% of the women reported regular menstrual cycles during the last 12 months. Among the few women reporting irregularities 34 (1.6%) reported irregular cycles as common, and 8 women (0.4%) were unsure whether their menopausal transition had started. We chose not to exclude the women as they had reported date of their next menstrual flow after attendance.

4.1.3 Reliability of measured progesterone

Both the sample quality and the quality of the analysis obtained from a sample, depends on the existing biological and pre-analytical variations in the sample [57]. The biological variation, which is a part of the pre-analytical variation, is due to several factors, for instance age, exercise, nutrition, smoking and genetic factors. This may lead to unexpected results concerning the measurement levels, and in this case related to the measured progesterone level.

For the pre-analytical, analytical and post-analytical phase of the blood sample handling, several factors are known which may lead to variations in the measurements [58]. The pre-analytical variations will be related to the time delay and storage temperature before processing and to the centrifugation time. Polymeric components may also be released from blood collection tubes or storage tubes which could bias the result [59, 60]. The analytical variation, described as the coefficient of variation (CV), is the degree of random errors in our results. From our CV-results, mentioned in chap. 2.3.4, we have to take into account the possibility of lack in accuracy for the progesterone measurement. It also has to be kept in

mind that only one single measurement was performed per sample, unless irregular measurements detected by the labs quality control system. Reported measurement errors are detected by daily routine controls at HUNT biobank. Factors that are affecting the different phases would be as described in a figure based on an original figure from R. Gislefoss [58].

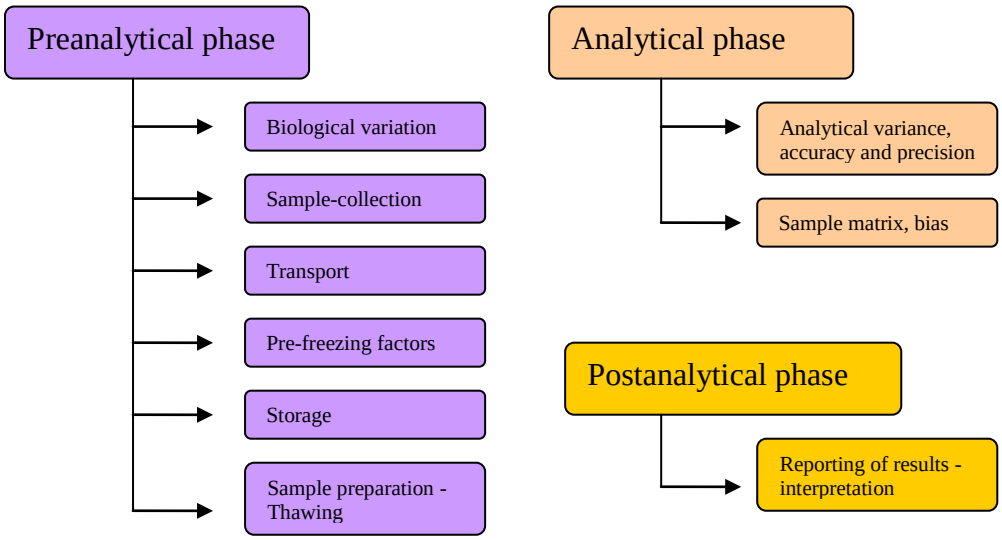

Fig. 4.1 Factors affecting analytical phases related to blood samples and for this study; the results of progesterone.

The uncertainty about the effect of long term storage on the serum progesterone level could be related to the undefined influence of the polypropylene tubes or the temperature while storing of the samples, or even by a combination. By contacting the manufacturer of the storing tubes we have been explained that polypropylene is a high-quality low binding surface, but nonbinding can not be guaranteed as no such surface exists. The binding is dependent on the buffer conditions and the hydrophilic/hydrophobic part of the molecules in the samples. Generally non irradiated polypropylenes are a bit less hydrophobic and therefore less binding of at least polar or hydrophilic compounds. Hence our use of non irradiated polypropylenes, we believe that the impact this may have on our measurement of serum progesterone is at a minimum level.

In our findings related to median progesterone levels by number of cycle days, there is an increase in median progesterone level from cycle day 14, but the increase were not as high as expected from the literature [20]. Progesterone measurements from other studies are basically determined by using radio-immunoassay and not the chemiluminescence immunoassay as in our study. We have, however, no reasons to believe that this could explain the difference in increased progesterone level, according to methodological comparisons delivered by the manufacturer [21]. We can not exclude that the progesterone results are biased as a consequence of storage time, as suggested elsewhere [61]. The progesterone analyses for our study were measured about two and a half year after finishing the sample collection. In the mean time period the serum has been stored frozen at temperatures - 80^{o} C and - 196^{o} C (LN). There are few published studies describing hormones durability after storage in the frozen state for a long time. One study has investigated the validity for long-term stability in frozen samples of plasma and serum for some hormone analysis over 3 years of cryoconservation. They found a continuous concentration decrease in the progesterone level and a total of 40 % decrease, from baseline to the third year of the study [61]. Even though, the study assume this is related to storage time of the samples, they cannot preclude that the material in the cryotubes used through the storing have absorbed progesterone, as described in another study [62]. Subsequently, we did additional statistical analyses comparing the time elapsed between sampling and serum analysis among the women in “true” and “false” luteal phase. There was a slight difference of 0.4 months longer storage time for women in the “true” luteal phase than in the “false” luteal phase, but the difference was not at a statistically significant level ($p<0.3$). Hence, the storage time do not seem to represent a differential misclassification bias.

4.1.4 Confounding

Validity may be reduced by bias or confounding. When an association between a given exposure and an outcome is observed as a result of influence of a third variable, we have a

confounding in our results [50]. The likelihood of anovulatory cycle's increases with age and increasing age is associated with shorter cycles, i.e. mid cycle may have less validity than in younger women. In our selection about 67 % of the women were above 40 years old. Studies have shown that the time between two menstrual periods decrease proportionately with increasing age [27]. Most of the cycle length variability is in the follicular phase and shortens by 3-7 days over time [11, 25]. Because of less variability in the luteal phase women aged 35 years and older could more often be in a luteal phase than younger women. This adds to the probable higher age-induced prevalence of anovulatory cycles. However, the women's age was not associated with the progesterone variation at a statistically significant level, and we conclude that age was not confounding the frequency of ovulation found in this sample. We also investigated whether there was any difference in prior use of hormonal contraceptives among women in the age groups 30 – 40 years and 40 – 45 years, assuming that this interfere with the pretest probability of being in a "true" or "false" luteal phase. No association was found.

One weakness in the dataset is the lack of socioeconomic factors such as educational level. On the other hand, it is unclear to what extent such factors represent covariates of ovulations frequency in the population.

4.1.5 Bias

Bias is the expected deviation of an estimate from the true quantity to be estimated [54]. The bias due to differential measurement errors from the questionnaire is difficult to predict. We will not know whether the participants under- or over report their habits, lifestyle, morbid conditions e.a. This could influence our results and represent information bias [54]. In our study there is also a possibility related to recall bias, especially due to the stated menstrual bleeding date from the questionnaire as explained above.

Selection bias is a systematic error in a study that stems from the procedures used to select subjects. For this study, the main purpose was to study women in luteal phase, and selection was made according to this. Our results are in accordance with this, but and we cannot predict if the occurrence of ovulation would have been somewhat different due to participation date of screening. That is if women in our study corresponding to follicular phase rather would have been similar to cycle day15-20 and thus not been excluded from the study. To get a better estimation of this we would need to follow women`s cycle duration over time.

The women interviewed about premenstrual symptoms, was selected among women who participated in an interview sub-study concerning airways symptoms, described in chapter 2.2. This selection was done due to pragmatic reasons at the screening stations and may have induced a selection bias as women with airways symptoms may be overrepresented. When we have a systematic bias, the study population will not reflect the total population and this will imply with generalizability. Even though we found a significant variation between age groups, menarche age and smoke habits, we did not observe any differences that explained the association found between premenstrual breast symptoms and progesterone level 8 nmol/L.

4.1.6 Co-morbidity

A part of the subjects selected to the Molimina interview took part in the bone-mass and lung examination if they had answered “Yes” to the question “Have you ever over the past five years used medications for asthma, chronic bronchitis, emphysema or COPD (Chronic obstructive pulmonary disease)?” in the questionnaire. Some of these medications could affect the menstrual cycle and the progesterone level. Use of hydrocortisone or prednisolone could lead to decreased progesterone levels, but in Norway these medications are barely in use

among women in fertile age. We have no information related to the use of these medications in our study group.

4.2 Findings

Our study is a large, population-based, cross-sectional study and the results provide a pattern of 2063 menstrual cycles. Most other studies on progesterone level and ovulation are performed with other types of study design, mainly longitudinal studies over two or more cycles and with only a few participants. There are very few studies investigating the ovulatory patterns in a large, mainly unselected population as this study. We found one global cross-sectional survey that investigated patterns of premenstrual symptoms experiences across reproductive age range and effects of other factors on premenstrual symptoms [63].

4.2.1 Ovulation and progesterone

Frequency of ovulation can be difficult to measure because the progesterone level in the menstrual cycle only increases to a diagnostic level after ovulation. The incidence of ovulation and luteal phase length are all factors that vary in individual women and also between women [33]. High occurrence of progesterone after ovulation is seen only in 30-40 % of cycle's length, and to have the value measured just in the correct phase can be difficult.

We measured the progesterone level in 2,063 women reporting regular menstrual cycles and the date of their last period, in order to assess the luteal phase. According to the literature and the findings in this study showing insignificant progesterone increase after cycle day 15, we set cycle day 15 as the cut-off for assuming a luteal phase. Independent of reported cycle day, a total of 70% of the women was measured with progesterone level beyond the cut-off for ovulation. However, considering menstrual cycle day and expected ovulation, we observed an

ovulation rate of 67%. This means that more than 30% of the women were in an anovulatory cycle. This is a much higher rate of anovulatory cycles than usually reported, where anovulation have been reported to affect 7 - 13% of the women, depending of restrictive definitions of anovulation, described below [27, 64]. Although some researchers have claimed that anovulatory cycles may occur in up to one third of apparently normal cycles [33], our findings seem somewhat high.

An expected increase of the occurrence are related to increased age [27]. From the observed mean age in this study, we may expected a slightly higher prevalence of anovulation, but the difference between our results and results reported from other studies seem too high to be only explained from this. We believe that several women have reported an incorrect first date of last menstrual bleeding, because in addition to find a higher proportion of women without the expected progesterone rise according to be in luteal phase, we also found a progesterone rise in some of the women who was not expected be in luteal phase compared to their reported cycle day.

We have used the progesterone measured levels, to confirm women's luteal phase in this cross sectional study, and this may give a somewhat insufficient basis to establish the luteal phase for sure. A more precise way to estimate the women's luteal phase would have been to analyze Follicle-stimulating hormone (FSH) and the Luteinizing hormone in relation to progesterone [65, 66].

Some of our findings might be due to progesterone instability, as described in chapter 4.1.3. Our results show the progesterone rise and indicate ovulation at 8 nmol / L, and this threshold are lower than used in a study of J.C. Prior, where serum progesterone $\geq$16 nmol/L were used

as a limit for ovulatory cycles [33]. Also in a prospective study with results of 252 healthy, regularly menstruating women aged 18-44 years, where women were followed up through two menstrual cycles, a limit for measured progesterone throughout the cycle period ≤ 5 ng / uL (i.e.15.9 nmol/L) were used for classifying anovulatory cycles [64]. Through the cycle periods, they found anovulatory cycles corresponding to 8%, and there were more women with anovulatory cycles in the first cycle period than the next. This will support the likelihood that a cross-sectional study provides a somewhat unclear picture for estimating ovulatory cycles when you have only one cycle period for estimating the results, but also that measurement of serum progesterone after long term storage, may reduce the validity of the results further.

4.2.2 Molimina questions related to premenstrual symptoms

Premenstrual symptoms were rather prevalent among the 949 interviewed women. Breast symptoms were the only symptoms associated to progesterone level among women in luteal phase. We did find significant association between "true" luteal phase and breast symptoms, though the reported number of this symptom in our study is lower and not in accordance to the previous studies [33, 34]. Some of the difference may be explained due to our use of a different study model, and that a cross-sectional study does not provide an adequate and good overview of the relationship between premenstrual symptoms and ovulation. Nevertheless, our findings support that breast symptoms is strongly associated to ovulation and thus progesterone. There was also a faintly higher report of moody symptoms among women with progesterone level ≥ 8 nmol/L than among women with lower levels, although this difference was not statistically significant. According to a study, who investigated menstrual cycle-related mood changes relative to ovulation and ovulation disturbances, negative moods tended to be more intense in ovulatory cycles, though not statistical significant [67]. Our finding support this result.

4.2.3 Strengths and weaknesses

Overall, the strength of this study is that the material is likely to be representative of the entire group of fertile women, because all women in North-Trøndelag were invited to participate into the study. A weakness might be that in the age group 20-40 years there seems to be a somewhat lower participation in HUNT 3 than what appears to be the reality for the age group 40-50 [44]. Our findings need to be viewed in relation to the age distribution.

4.2.4 Generalizability of the findings

In our study 67% of the women are in age 40 – 50 years, and by dividing the whole sample into 5-years age group we saw a difference in the predictive value for ovulation at cycle day 15 depended of age-groups, however, not at a 95% significance level ($p = 0.052$). In the age 19-24 years the prevalence of ovulation was considerable lower than for the older age-groups, but also age 25-29 years had a lower prevalence for ovulation at cycle day 15 than the overall prevalence for the whole sample. It seems that the ovulation will occur later in the cycle period among these youngest age-groups. This will be in accordance to studies showing a cycle decrease from age 20 to 40, and that a decrease in cycle length is attributable to a shorter follicular phase [16, 30]. Our findings have to be viewed in relation to age groups and the mean for the sample is a result of a high proportion of women aged 40 – 50 years.

Adjusting for factors which differ between the randomized group and the main selection group participated at the Molimina questions, there were still a significant association between breast symptoms and “true” luteal phase. Our results relating to this sub-study should therefore be possible to generalize.

4.3 Future studies

We know from Bolelli [61] that long-term cryoconservation has a decreasing effect of progesterone. The samples from HUNT3 have been stored up to three years at minus 80 degrees, and we have to believe that the progesterone level, which indicate ovulation and luteal phase also have decreased. Therefore we will strongly recommend further studies on durability of serum components, because there is a great lack of considerable research of this importance at discovered literature and there is a further need to evaluate in what extend long-term preservation affect the results of measured progesterone level in serum.

To increase the strength of accordance between assumed luteal phase and measurement of progesterone, a prospective longitudinal study to follow up women's self-reported stated cycle duration would be recommended.

5 Conclusion

Ovulation rates in this population of 2063 women ages 20-50 years was lower than expected, only 67% were observed with serum progesterone level beyond the cut-off value for ovulation. Most of the ovulating women seem to ovulate within cycle day 15 and the prevalence of anovulatory cycles is more frequent than reported in other studies. Nevertheless, the results should be regarded with caution: The reliability of the self-report of the first day of the last menstruation is unknown. We observed that the mean age of the women was rather high (40.5 years), and the frequency of anovulatory cycles is increasing with age. Also, the influence of storage at -80C over two-four years on the serum progesterone level represents a concern. The study also showed that premenstrual symptoms are relatively prevalent, but only premenstrual breast symptoms are related to ovulation on a statistically significant level.

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Appendix1

Questionnaire Q1

Invitasjon til HUNT 3

Viktig
Enkelt
Gratis

Du inviteres herved til å delta i den tredje store Helseundersøkelsen i Nord-Trøndelag (HUNT 3). Ved å delta får du en enkel undersøkelse av din egen helse, og du gir samtidig et viktig bidrag til medisinsk forskning.

Hver deltaker er like viktig, enten du er ung eller gammel, frisk eller syk, er HUNT-veteran eller møter for første gang. Tilsvarende undersøkelse er tidligere gjennomført i 1984-86 (HUNT 1) og 1995-97 (HUNT 2 og Ung-HUNT). For å kunne studere årsaker til sykdom, er det viktig at også de som tidligere har deltatt møter fram.

Vennligst fyll ut spørreskjemaet, og ta det med når du møter til undersøkelse.

Undersøkelsen tar vanligvis ca 1/2 time. Du vil få brev med resultater fra dine prøver etter noen uker. Dersom noen av resultatene er utenom det normale, vil du bli anbefalt undersøkelse hos fastlegen din.

Du kan lese mer om HUNT 3 i den vedlagte brosjyren eller på www.hunt.ntnu.no. Har du spørsmål, kan du også ringe til HUNT forskningssenter, tlf 74075180.

Vel møtt til undersøkelsen!

Vennlig hilsen

Steinar Krokstad
Førsteamanuensis
Prosjektleder HUNT 3

Jostein Holmen
Professor, daglig leder
HUNT forskningssenter

Stig A. Slørdahl
Professor, dekanus
Det medisinske fakultet, NTNU

Tid og sted for oppmøte

Dersom det foreslåtte tidspunktet ikke passer for deg, behøver du ikke bestille ny time. Du kan møte når det passer deg innenfor åpningstiden, men det kan da bli noe ventetid. Du kan også møte i en annen kommune, hvis det skulle passe bedre. Takk for at du deltar!

Åpningstida:

hunt 3
Helseundersøkelsen i Nord-Trøndelag

NTNU
HUNT forskningssenter

En time for bedre folkehelse

VESTVIK REKLAME AS. FOTO: HARALD SÆTEROY OG JOHAN ARNT NESGÅRD.

Slik fyller du ut skjemaet

- Skjemaet vil bli lest maskinelt.
- Det er derfor viktig at du krysser av riktig: Rett ☒ Galt ☒ ☑
- Krysser du feil sted, retter du ved å fylle boksen slik: ■
- Skriv tydelige tall: 0 1 2 3 4 5 6 7 8 9
- Bruk bare svart eller blå penn. Ikke bruk blyant eller tusj.

HELSE OG DAGLIGLIV

1 Hvordan er helsa di nå?

☐ Dårlig ☐ Ikke helt god ☐ God ☐ Svært god

2 Har du noen langvarig (minst 1 år) sykdom, skade eller lidelse av fysisk eller psykisk art som nedsetter dine funksjoner i ditt daglige liv? Ja ☐ Nei ☐

Hvis ja:
Hvor mye vil du si at dine funksjoner er nedsatt?

	Litt nedsatt	Middels nedsatt	Mye nedsatt
Er bevegelseshemmet	☐	☐	☐
Har nedsatt syn	☐	☐	☐
Har nedsatt hørsel	☐	☐	☐
Hemmet pga. kroppslig sykdom	☐	☐	☐
Hemmet pga. psykisk sykdom	☐	☐	☐

3 Har du kroppslige smerter nå som har vart mer enn 6 måneder? Ja ☐ Nei ☐

4 Hvor sterke kroppslige smerter har du hatt i løpet av de siste 4 uker?

Ingen	Meget svake	Svake	Mode-rate	Sterke	Meget sterke
☐	☐	☐	☐	☐	☐

5 I hvilken grad har din fysiske helse eller følelses-messige problemer begrenset deg i din vanlige sosiale omgang med familie eller venner i løpet av de siste 4 uker?

Ikke i det hele tatt	En del	Litt	Mye	Kunne ikke ha sosial omgang
☐	☐	☐	☐	☐

HELSETJENESTER

6 Har du i løpet av de siste 12 måneder vært hos:

	Ja	Nei
Fastlege/allmennlege	☐	☐
Annen legespesialist utenfor sykehus	☐	☐
Konsultasjon uten innleggelse		
- ved psykiatrisk poliklinikk	☐	☐
- ved annen poliklinikk i sykehus	☐	☐
Kiropraktor	☐	☐
Homøopat, akupunktør, soneterapeut, håndspålegger eller annen alternativ behandler	☐	☐

7 Har du vært innlagt i sykehus i løpet av de siste 12 måneder? Ja ☐ Nei ☐

SYKDOMMER OG PLAGER

8 Har du hatt noe anfall med pipende eller tung pust de siste 12 måneder? Ja ☐ Nei ☐

9 Har du noen gang de siste 5 år brukt medisiner for astma, kronisk bronkitt, emfysem eller KOLS? Ja ☐ Nei ☐

10 Bruker du, eller har du brukt, medisin mot høyt blodtrykk? Ja ☐ Nei ☐

11 Har du, eller har du noen gang hatt, noen av disse sykdommene/plagene:
(Sett ett kryss pr. linje)

	Ja	Nei	Hvis ja, hvor gammel var du **første** gang?
Eksempel:			34 år gammel
Hjerteinfarkt	☐	☐	år gammel
Angina pectoris (hjertekrampe)	☐	☐	år gammel
Hjertesvikt	☐	☐	år gammel
Annen hjertesykdom	☐	☐	år gammel
Hjerneslag/hjerneblødning	☐	☐	år gammel
Nyresykdom	☐	☐	år gammel
Astma	☐	☐	år gammel
Kronisk bronkitt, emfysem, KOLS	☐	☐	år gammel
Diabetes (sukkersyke)	☐	☐	år gammel
Psoriasis	☐	☐	år gammel
Eksem på hendene	☐	☐	år gammel
Kreftsykdom	☐	☐	år gammel
Epilepsi	☐	☐	år gammel
Leddgikt (reumatoid artritt)	☐	☐	år gammel
Bechterews sykdom	☐	☐	år gammel
Sarkoidose	☐	☐	år gammel
Beinskjørhet (osteoporose)	☐	☐	år gammel
Fibromyalgi	☐	☐	år gammel
Slitasjegikt (artrose)	☐	☐	år gammel
Psykiske plager som du har søkt hjelp for	☐	☐	år gammel

12 Har du noen gang fått påvist for høyt blodsukker? Ja ☐ Nei ☐

Hvis ja: I hvilken situasjon første gang?

Ved helseundersøkelse ☐ Under sykdom ☐
Under svangerskap ☐ Annet ☐

SKADER

13 Har du noen gang hatt:

	Ja	Nei	Hvis ja, hvor gammel var du **første** gang?
Eksempel:			34 år gammel
Lårhalsbrudd	☐	☐	___ år gammel
Brudd i handledd/underarm	☐	☐	___ år gammel
Brudd/sammenfall av ryggvirvler	☐	☐	___ år gammel
Nakkesleng (whiplash)	☐	☐	___ år gammel

14 Har du foreldre, søsken eller barn som har, eller har hatt, følgende sykdommer?
(Sett ett kryss pr. linje)

	Ja	Nei	Vet ikke
Hjerneslag eller hjerneblødning før 60 års alder	☐	☐	☐
Hjerteinfarkt før 60-års alder	☐	☐	☐
Astma	☐	☐	☐
Allergi/høysnue/neseallergi	☐	☐	☐
Kronisk bronkitt/emfysem/KOLS	☐	☐	☐
Kreftsykdom	☐	☐	☐
Psykiske plager	☐	☐	☐
Beinskjørhet (osteoporose)	☐	☐	☐
Nyresykdom (ikke nyresten, urinveisinfeksjon, urinlekkasje)	☐	☐	☐
Diabetes (sukkersyke)	☐	☐	☐

15 Har noen av dine besteforeldre, dine foreldres søsken eller dine søskenbarn fått diagnosen diabetes (type 1 eller type 2)?

Ja	Nei
☐	☐

HVORDAN FØLER DU DEG?

16 Har du de to siste uker følt deg:
(Sett ett kryss pr. linje)

	Nei	Litt	En god del	Svært mye
Trygg og rolig?	☐	☐	☐	☐
Glad og optimistisk?	☐	☐	☐	☐
Nervøs og urolig?	☐	☐	☐	☐
Plaget av angst?	☐	☐	☐	☐
Irritabel?	☐	☐	☐	☐
Nedfor/deprimert?	☐	☐	☐	☐
Ensom?	☐	☐	☐	☐

17 Har du noen gang i livet opplevd at noen over lengre tid har forsøkt å kue, fornedre eller ydmyke deg?

Ja	Nei
☐	☐

TOBAKK

18 Røykte noen av de voksne innendørs da du vokste opp? Ja ☐ Nei ☐

19 Røykte mora di da du vokste opp? Ja ☐ Nei ☐

20 Røyker du selv?

- **Nei**, jeg har aldri røykt ☐
  Hvis du aldri har røykt, hopp til spørsmål 22.
- **Nei**, jeg har sluttet å røyke ☐
- **Ja**, sigaretter av og til (fest/ferie, ikke daglig) ☐
- **Ja**, sigarer/sigarillos/pipe av og til ☐
- **Ja**, sigaretter daglig ☐
- **Ja**, sigarer/sigarillos/pipe daglig ☐

21 A Svar på dette hvis du nå røyker **daglig** eller tidligere har røykt **daglig**:

Hvor mange sigaretter røyker eller røykte du vanligvis daglig? ___ *sigaretter pr. dag*

Hvor gammel var du da du begynte å røyke daglig? ___ *år gammel*

Hvis du tidligere har røykt daglig, hvor gammel var du da du sluttet? ___ *år gammel*

21 B Svar på dette hvis du røyker eller har røykt **av og til**, men ikke daglig:

Hvor mange sigaretter røyker eller røykte du vanligvis i måneden? ___ *sigaretter pr. mnd*

Hvor gammel var du da du begynte å røyke av og til? ___ *år gammel*

Hvis du tidligere har røykt av og til, hvor gammel var du da du sluttet? ___ *år gammel*

22 Bruker du, eller har du brukt, snus?

Nei, aldri ☐ Ja, av og til ☐
Ja, men jeg har sluttet ☐ Ja, daglig ☐

Hvis du aldri har brukt snus, hopp til spørsmål 23.

Hvis ja:

Hvor gammel var du da du begynte med snus? ___ *år gammel*

Hvor mange esker snus bruker/brukte du pr. måned? ___ *esker snus pr. måned*

Hvis du bruker eller har brukt både sigaretter og snus, hva begynte du med først?

- Snus ☐
- Sigaretter ☐
- Omtrent samtidig (innenfor 3 måneder) ☐
- Husker ikke ☐

Da du begynte å bruke snus, var det for å prøve å slutte å røyke eller for å redusere røykinga?

- Nei ☐
- Ja, for å slutte å røyke ☐
- Ja, for å redusere røykinga ☐

MATVARER

23 Hvor ofte spiser du vanligvis disse matvarene? *(Sett ett kryss pr. linje)*

	0-3 ganger pr. mnd	1-3 ganger pr. uke	4-6 ganger pr. uke	1 gang pr. dag	2 ggr el mer pr. dag
Frukt/bær	☐	☐	☐	☐	☐
Grønnsaker	☐	☐	☐	☐	☐
Sjokolade/smågodt	☐	☐	☐	☐	☐
Kokte poteter	☐	☐	☐	☐	☐
Pasta/ris	☐	☐	☐	☐	☐
Pølser/hamburgere	☐	☐	☐	☐	☐
Fet fisk (laks, ørret, sild, makrell, uer som pålegg/middag)	☐	☐	☐	☐	☐

24 Bruker du følgende kosttilskudd? *(Sett ett kryss for hvert kosttilskudd)*

	Ja, daglig	Av og til	Nei
Tran	☐	☐	☐
Omega-3-kapsler	☐	☐	☐
Vitamin- og/eller mineraltilskudd	☐	☐	☐

25 Hvor mange glass drikker du vanligvis av følgende?
½ liter = 3 glass *(Sett ett kryss pr. linje)*

	Sjelden eller aldri	1-6 gl. pr uke	1 gl. pr. dag	2-3 gl. pr. dag	4 gl. eller mer pr. dag
Vann, farris o.l	☐	☐	☐	☐	☐
Helmelk (søt/sur)	☐	☐	☐	☐	☐
Annen melk (søt/sur)	☐	☐	☐	☐	☐
Brus/saft med sukker	☐	☐	☐	☐	☐
Brus/saft uten sukker	☐	☐	☐	☐	☐
Juice eller nektar	☐	☐	☐	☐	☐

26 Hvor mange kopper kaffe/te drikker du pr. døgn? *(Sett 0 dersom du ikke drikker kaffe/te daglig)*

	Koke-kaffe	Annen kaffe	Te
Antall kopper			

27 Hvor mange kopper kaffe drikker du om kvelden (etter kl 18)? Antall kopper ☐

ALKOHOLBRUK

28 Omtrent hvor ofte har du i løpet av de siste 12 måneder drukket alkohol? *(Regn ikke med lettøl)*

- 4-7 ganger pr. uke ☐
- 2-3 ganger pr. uke ☐
- ca 1 gang pr. uke ☐
- 2-3 ganger pr. måned ☐
- Ca 1 gang pr. måned ☐
- Noen få ganger pr. år ☐
- Ingen ganger siste år ☐
- Aldri drukket alkohol ☐

29 Har du drukket alkohol i løpet av de siste 4 uker? Ja ☐ Nei ☐

Hvis ja:
Har du drukket så mye at du har kjent deg sterkt beruset (full)?
- Nei ☐
- Ja, 1-2 ganger ☐
- Ja, 3 ganger eller mer ☐

30 Hvor mange glass øl, vin eller brennevin drikker du vanligvis i løpet av 2 uker? *(Regn ikke med lettøl)* *(Sett 0 hvis du ikke drikker alkohol)*

	Øl	Vin	Brenne-vin
Antall glass			

31 Hvor ofte drikker du 5 glass eller mer av øl, vin eller brennevin ved samme anledning?

- Aldri ☐
- Månedlig ☐
- Ukentlig ☐
- Daglig ☐

MOSJON/FYSISK AKTIVITET

Med mosjon mener vi at du f.eks går tur, går på ski, svømmer eller driver trening/idrett.

32 Hvor ofte driver du mosjon? *(Ta et gjennomsnitt)*

- Aldri ☐
- Sjeldnere enn en gang i uka ☐
- En gang i uka ☐
- 2-3 ganger i uka ☐
- Omtrent hver dag ☐

33 Dersom du driver slik mosjon, så ofte som en eller flere ganger i uka; hvor hardt mosjonerer du? *(Ta et gjennomsnitt)*

- Tar det rolig uten å bli andpusten eller svett ☐
- Tar det så hardt at jeg blir andpusten og svett ☐
- Tar meg nesten helt ut ☐

34 Hvor lenge holder du på hver gang? *(Ta et gjennomsnitt)*

- Mindre enn 15 minutter ☐
- 15-29 minutter ☐
- 30 minutter – 1 time ☐
- Mer enn 1 time ☐

35 Har du vanligvis minst 30 minutter fysisk aktivitet daglig på arbeid og/eller i fritida? Ja ☐ Nei ☐

36 Omtrent hvor mange timer sitter du i ro på en vanlig hverdag? *(Regn med både jobb og fritid)* Antall timer ____

ARBEID

37 Hvis du er i lønnet eller ulønnet arbeid, hvordan vil du beskrive arbeidet ditt? *(Sett ett kryss)*

- For det meste stillesittende arbeid *(f.eks skrivebordsarbeid, montering)* ☐
- Arbeid som krever at du går mye *(f.eks ekspeditørarbeid, lett industriarb., undervisning)* ☐
- Arbeid hvor du går og løfter mye *(f.eks postbud, pleier, bygningsarbeid)* ☐
- Tungt kroppsarbeid *(f.eks skogsarbeid, tungt jordbruksarbeid, tungt bygningsarbeid)* ☐

HØYDE/VEKT

38 Omtrent hva var din høyde da du var 18 år?

____ cm Husker ikke ☐

39 Omtrent hva var din kroppsvekt da du var 18 år?

____ kg Husker ikke ☐

40 Er du fornøyd med vekta di nå?

Ja ☐ Nei, for lett ☐ Nei, for tung ☐

41 Har du forsøkt å slanke deg i løpet av de siste 10 år?

Nei ☐ Ja, noen ganger ☐ Ja, mange ganger ☐

42 Er din kroppsvekt minst 2 kg lavere nå enn for 1 år siden? Ja ☐ Nei ☐

Hvis ja:

Hva er grunnen til dette?

Slanking ☐ Sykdom/stress ☐ Vet ikke ☐

ALVORLIGE LIVSHENDELSER SISTE 12 MÅNEDER

43 Har det vært dødsfall i nær familie? *(barn, ektefelle/samboer, søsken eller foreldre)* Ja ☐ Nei ☐

44 Har du vært i overhengende livsfare pga. alvorlig ulykke, katastrofe, voldssituasjon eller krig? Ja ☐ Nei ☐

45 Har du hatt samlivsbrudd i ekteskap eller i lengre samboerforhold? Ja ☐ Nei ☐

46 Hvis du har svart ja på et eller flere av spm 43, 44 eller 45; i hvilken grad har du hatt reaksjoner på dette de siste 7 dager?

- Ikke i det hele tatt ☐
- Litt ☐
- I moderat grad ☐
- I høy grad ☐

OPPVEKST - DA DU VAR 0-18 ÅR

47 Hvem vokste du opp sammen med?

- Mor ☐
- Far ☐
- Stemor/stefar ☐
- Andre slektninger ☐
- Adoptivforeldre ☐
- Foster-/pleieforeldre ☐

48 Ble dine foreldre skilt, eller flyttet de fra hverandre, da du var barn?

- Nei ☐
- Ja, før jeg var 7 år ☐
- Ja, da jeg var 7-18 år ☐

49 Døde noen av dine foreldre da du var barn?

- Nei ☐
- Ja, før jeg var 7 år ☐
- Ja, da jeg var 7-18 år ☐

50 Vokste du opp med kjæledyr?

- Nei ☐
- Ja, katt ☐
- Ja, hund ☐
- Ja, hest ☐
- Ja, annet levende dyr ☐

51 Hvor mye melk eller yoghurt drakk du vanligvis?

Sjelden/ aldri	1-6 gl. pr. uke	1 glass pr. dag	2-3 gl. pr. dag	Mer enn 3 glass pr. dag
☐	☐	☐	☐	☐

52 Vokste du opp på gård med husdyr? Ja ☐ Nei ☐

53 Når du tenker på barndommen/oppveksten din, vil du beskrive den som:

- Svært god ☐
- God ☐
- Middels ☐
- Vanskelig ☐
- Svært vanskelig ☐

ALT I ALT

54 Når du tenker på hvordan du har det for tida, er du stort sett fornøyd med tilværelsen eller er du stort sett misfornøyd? *(Sett ett kryss)*

- Svært fornøyd ☐
- Meget fornøyd ☐
- Ganske fornøyd ☐
- Både/og ☐
- Nokså misfornøyd ☐
- Meget misfornøyd ☐
- Svært misfornøyd ☐

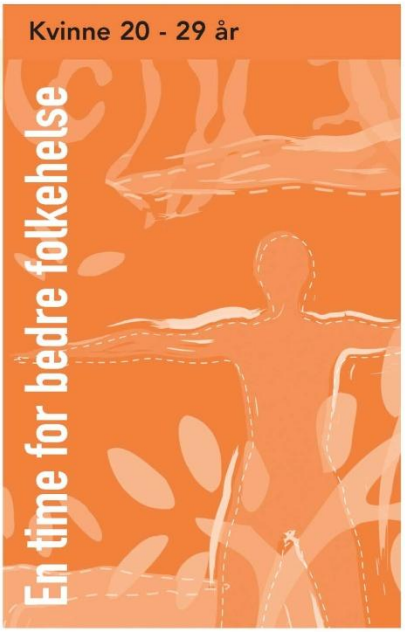
Appendix2

Questionnaire Q2 (Women age 20-29)

hunt 3
Helseundersøkelsen i Nord-Trøndelag

Kjære HUNT-deltaker

Takk for at du møtte til Helseundersøkelsen. Vi vil også be deg om å fylle ut dette spørreskjemaet. Noen av spørsmålene likner de som du har svart på før, men det er viktig at du allikevel besvarer alt. Opplysningene blir brukt til forskning og forebyggende helsearbeid. Forskere vil kun ha tilgang til avidentifiserte data, det vil si at opplysningene ikke kan spores tilbake til en enkeltperson.



Slik fyller du ut skjemaet

- Skjemaet vil bli lest maskinelt.
- Det er derfor viktig at du krysser av riktig: **Rett** ☒ **Galt** ☐ ☑
- Krysser du feil sted, retter du ved å fylle boksen slik: ■
- Skriv tydelige tall: 0 1 2 3 4 5 6 7 8 9
- Bruk bare svart eller blå penn. Ikke bruk blyant eller tusj.

Dato for utfylling: ___ / ___ 20___

Dag / Måned / År

Vennligst fyll ut skjemaet, og post det snarest mulig. Porto er betalt.

BOLIGFORHOLD OG VENNER

1 Hvem bor du sammen med?
(Sett ett eller flere kryss)

- Ingen ☐
- Foreldre ☐
- Ektefelle/samboer ☐
- Andre personer over 18 år ☐
- Personer under 18 år ☐
- Antall under 18 år ..

2 Er det kjæledyr i boligen?

- Nei ☐
- Ja, katt ☐
- Ja, hund ☐
- Ja, andre pelsdyr/fugl ☐

3 Har du venner som kan gi deg hjelp når du trenger det? Ja ☐ Nei ☐

4 Har du venner som du kan snakke fortrolig med? Ja ☐ Nei ☐

DITT NÆRMILJØ, DVS. NABOLAGET/GRENDA

5 Jeg føler et sterkt fellesskap med de som bor her
(Sett ett kryss)

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

6 Man kan ikke stole på hverandre her *(Sett ett kryss)*

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

7 Folk trives godt her *(Sett ett kryss)*

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

AKTIVITET

8 Hvordan har din fysiske aktivitet i fritida vært det siste året? *(Tenk deg et ukentlig gjennomsnitt for året. Arbeidsvei regnes som fritid.)*

	Timer pr. uke: Ingen	Under 1	1-2	3 el. mer
Lett aktivitet *(ikke svett/andpusten)*	☐	☐	☐	☐
Hard fysisk aktivitet *(svett/andpusten)*	☐	☐	☐	☐

9 Hvor lang tid bruker du til sammen daglig foran dataskjerm? (*Sett 0 hvis du ikke bruker data)*

I arbeid ☐☐ timer I fritid ☐☐ timer

10 Hvor mange timer ser du på TV/video/DVD daglig?

Mindre enn 1 time ☐ 4-6 timer ☐
1-3 timer ☐ Mer enn 6 timer ☐

KULTUR/LIVSSYN

11 Hvor mange ganger har du i løpet av de siste 6 måneder vært på/i: *(Sett ett kryss pr. linje)*

	Mer enn 3g /mnd	1-3g /mnd	1-6g siste 6 mnd	Aldri
Museum, kunstutstilling	☐	☐	☐	☐
Konsert, teater, kino	☐	☐	☐	☐
Kirke, bedehus	☐	☐	☐	☐
Idrettsarrangement	☐	☐	☐	☐

12 Hvor mange ganger har du i løpet av de siste 6 måneder selv drevet med: *(Sett ett kryss pr. linje)*

	Mer enn 1g /uke	1g /uke	1-3g /mnd	1-5g siste 6 mnd	Ingen gang
Foreningsvirksomhet	☐	☐	☐	☐	☐
Musikk, sang, teater	☐	☐	☐	☐	☐
Menighetsarbeid	☐	☐	☐	☐	☐
Friluftsliv	☐	☐	☐	☐	☐
Dans	☐	☐	☐	☐	☐
Trening, idrett	☐	☐	☐	☐	☐

13 Hvilket livssyn vil du si ligger nærmest opp til ditt eget? *(Sett ett kryss)*

Kristent livssyn ☐ Ateistisk livssyn ☐
Humanetisk livssyn ☐ Annet livssyn ☐

14 Når det skjer vonde ting i livet mitt, tenker jeg: "det er ei mening med det".

Ja ☐ Nei ☐ Vet ikke ☐

15 Jeg søker hjelp hos Gud når jeg trenger styrke og trøst.

Aldri ☐ Av og til ☐ Ofte ☐

PERSONLIGHET

16 Beskriv deg selv slik du vanligvis er:

	Ja	Nei
Klarer du å få fart i et selskap?	☐	☐
Er du stort sett stille og tilbakeholden når du er sammen med andre?	☐	☐
Liker du å treffe nye mennesker?	☐	☐
Liker du å ha masse liv og røre rundt deg?	☐	☐
Er du forholdsvis livlig?	☐	☐
Tar du vanligvis selv initiativet for å få nye venner?	☐	☐
Er du ofte bekymret?	☐	☐
Blir dine følelser lett såret?	☐	☐
Hender det ofte at du "går trøtt"?	☐	☐
Plages du av "nerver"?	☐	☐
Har du ofte følt deg trøtt og likeglad uten grunn?	☐	☐
Bekymrer du deg for at fryktelige ting kan skje?	☐	☐

HODEPINE

17 Har du vært plaget av hodepine det siste året? *Hvis nei, gå til spørsmål 24.* Ja ☐ Nei ☐

Hvis ja:
Hva slags hodepine: Migrene ☐ Annen hodepine ☐

18 Omtrent antall dager pr. måned med hodepine:

Mindre enn 1 dag ☐ 7-14 dager ☐
1-6 dager ☐ Mer enn 14 dager ☐

19 Hvor sterk er hodepina vanligvis?

Mild *(hemmer ikke aktivitet)* ☐
Moderat *(hemmer aktivitet)* ☐
Sterk *(forhindrer aktivitet)* ☐

20 Hvor lenge varer hodepina vanligvis?

Mindre enn 4 timer ☐ 1-3 døgn ☐
4 timer – 1 døgn ☐ Mer enn 3 døgn ☐

21 Er hodepina vanligvis preget av eller ledsaget av: *(Sett ett kryss pr. linje)*

	Ja	Nei
Bankende/dunkende smerte?	☐	☐
Pressende smerte?	☐	☐
Ensidig smerte (høyre eller venstre)?	☐	☐
Forverring ved moderat fysisk aktivitet?	☐	☐
Kvalme og/eller oppkast?	☐	☐
Lys- og lydskyhet?	☐	☐

22 Før eller under hodepina; kan du ha forbigående: *(Sett ett kryss pr. linje)*

	Ja	Nei
Synsforstyrrelse? *(takkede linjer, flimring, tåkesyn, lysglimt)*	☐	☐
Nummenhet i halve ansiktet eller i handa?	☐	☐

23 Angi hvor mange dager du har vært borte fra arbeid eller skole siste måned på grunn av hodepine: ☐☐ dager

LUFTVEIER

24 Hoster du daglig i perioder av året? Ja ☐ Nei ☐

Hvis ja:
Er hosten vanligvis ledsaget av oppspytt? Ja ☐ Nei ☐

Har du hatt hoste med oppspytt, i minst 3 måneder, sammenhengende i hvert av de to siste åra? Ja ☐ Nei ☐

25 Har du, eller har du hatt, høysnue eller neseallergi? Ja ☐ Nei ☐

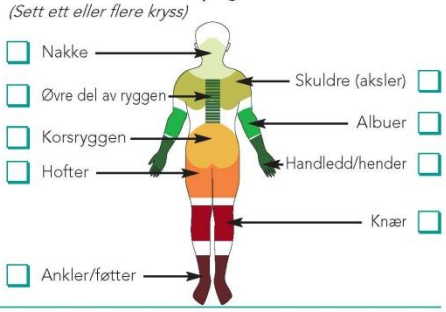
Hvis ja:
Har du hatt slike plager i løpet av de siste 12 måneder? Ja ☐ Nei ☐

26 Har du i løpet av de siste 12 måneder blitt vekket av anfall med tung pust? Ja ☐ Nei ☐

MUSKLER OG LEDD

27 Har du i løpet av det siste året vært plaget med smerter og/eller stivhet i muskler og ledd, som har vart i minst 3 måneder sammenhengende? Ja ☐ Nei ☐
Hvis nei, gå til spørsmål 30.

Hvis ja:
Hvor har du hatt disse plagene?
(Sett ett eller flere kryss)



28 Har du vært plaget både i høyre og venstre kroppshalvdel? Ja ☐ Nei ☐

29 Har plagene hindret deg i å utføre daglige aktiviteter?

	Ja	Nei
I arbeid	☐	☐
I fritid	☐	☐

30 Er du operert for ryggplager? Ja ☐ Nei ☐

Hvis ja: Hvilken type operasjon?

Prolaps/ischias-operasjon ☐ Annet ☐
Avstivning ☐

STOFFSKIFTE

31 Har du noen gang fått påvist for lavt stoffskifte (hypotyreose)? Ja ☐ Nei ☐

Hvis ja, hvor gammel var du **første** gang?
Eksempel: 34 *år gammel*
_____ *år gammel*

32 Har du noen gang fått påvist for høyt stoffskifte (hypertyreose)? Ja ☐ Nei ☐

Hvis ja, hvor gammel var du **første** gang?
Eksempel: 34 *år gammel*
_____ *år gammel*

Hvis ja:
Har du brukt Neo-Mercazole? ☐ ☐ _____ *år gammel*
Har du fått radiojodbehandling? ☐ ☐ _____ *år gammel*

MAGE OG TARM

33 Har du vært plaget med smerter eller ubehag fra magen de siste 12 måneder?
Ja, mye ... ☐ Ja, litt.. ☐ Nei, aldri .. ☐
Hvis nei, gå til spørsmål 34.

Hvis ja:	Ja	Nei
Er disse lokalisert øverst i magen?	☐	☐
Har du de siste 3 måneder hatt disse plagene så ofte som 1 dag i uka i minst 3 uker?	☐	☐
Blir smertene eller ubehaget bedre etter at du har hatt avføring?	☐	☐
Har smertene eller ubehaget noen sammenheng med hyppigere eller sjeldnere avføring enn vanlig?	☐	☐
Har smertene eller ubehaget noen sammenheng med at avføringen blir løsere eller fastere enn vanlig?	☐	☐
Kommer smertene eller ubehaget etter måltid?	☐	☐

34 I hvilken grad har du hatt følgende plager i de siste 12 måneder?

	Aldri	Litt	Mye
Kvalme	☐	☐	☐
Halsbrann/sure oppstøt	☐	☐	☐
Diaré	☐	☐	☐
Treg mage	☐	☐	☐
Vekslende treg mage og diaré	☐	☐	☐
Oppblåsthet	☐	☐	☐

HVORDAN FØLER DU DEG

Her kommer noen utsagn om hvordan du føler deg. For hvert spørsmål setter du kryss for ett av de fire svarene som best beskriver dine følelser den siste uken. Ikke tenk for lenge på svaret – de spontane svarene er best.

35 Jeg føler meg nervøs og urolig
- Nei ☐ En god del ☐
- Litt ☐ Svært mye ☐

36 Jeg gleder meg fortsatt over ting slik jeg pleide før
- Avgjort like mye ☐ Bare lite grann ☐
- Ikke fullt så mye ☐ Ikke i det hele tatt ☐

37 Jeg har en urofølelse som om noe forferdelig vil skje
- Ja, og noe svært ille ☐ Litt, bekymrer meg lite ☐
- Ja, ikke så veldig ille ☐ Ikke i det hele tatt ☐

38 Jeg kan le og se det morsomme i situasjoner
- Like mye nå som før ☐ Avgjort ikke som før ☐
- Ikke like mye nå som før. ☐ Ikke i det hele tatt ☐

39 Jeg har hodet fullt av bekymringer
- Veldig ofte ☐ Av og til ☐
- Ganske ofte ☐ En gang i blant ☐

40 Jeg er i godt humør
- Aldri ☐ Ganske ofte ☐
- Noen ganger ☐ For det meste ☐

41 Jeg kan sitte i fred og ro og kjenne meg avslappet
- Ja, helt klart ☐ Ikke så ofte ☐
- Vanligvis ☐ Ikke i det hele tatt ☐

42 Jeg føler meg som om alt går langsommere
- Nesten hele tiden ☐ Fra tid til annen ☐
- Svært ofte ☐ Ikke i det hele tatt ☐

43 Jeg føler meg urolig som om jeg har sommerfugler i magen
- Ikke i det hele tatt ☐ Ganske ofte ☐
- Fra tid til annen ☐ Svært ofte ☐

44 Jeg bryr meg ikke lenger om hvordan jeg ser ut
- Ja, har sluttet å bry meg ☐ Kan hende ikke nok ☐
- Ikke som jeg burde ☐ Bryr meg som før ☐

45 Jeg er rastløs som om jeg stadig må være aktiv
- Uten tvil svært mye ☐ Ikke så veldig mye ☐
- Ganske mye ☐ Ikke i det hele tatt ☐

46 Jeg ser med glede fram til hendelser og ting
- Like mye som før ☐ Avgjort mindre enn før ☐
- Heller mindre enn før ☐ Nesten ikke i hele tatt. ☐

47 Jeg kan plutselig få en følelse av panikk
- Uten tvil svært ofte ☐ Ikke så veldig ofte ☐
- Ganske ofte ☐ Ikke i det hele tatt ☐

48 Jeg kan glede meg over gode bøker, radio/TV
- Ofte ☐ Ikke så ofte ☐
- Fra tid til annen ☐ Svært sjelden ☐

SØVN

49 Hvor ofte har det hendt i løpet av de siste 3 måneder at du:	Aldri/ sjelden	Av og til	Flere ggr/ uka
Snorker høyt og sjenerende?	☐	☐	☐
Får pustestopp når du sover?	☐	☐	☐
Har vanskelig for å sovne om kvelden?	☐	☐	☐
Våkner gjentatte ganger om natta?	☐	☐	☐
Våkner for tidlig og får ikke sove igjen?	☐	☐	☐
Kjenner deg søvnig om dagen?	☐	☐	☐
Har plagsom nattesvette?	☐	☐	☐
Våkner med hodepine?	☐	☐	☐
Får ubehag, kribling eller mauring i bein?	☐	☐	☐

ALKOHOL

Hvis du ikke drikker alkohol, gå til spørsmål 54.

	Ja	Nei
50 Har du noen gang følt at du burde redusere alkoholforbruket ditt?	☐	☐
51 Har andre noen gang kritisert alkoholbruken din?	☐	☐
52 Har du noen gang følt ubehag eller skyldfølelse pga. alkoholbruken din?	☐	☐
53 Har det å ta en drink noen gang vært det første du har gjort om morgenen for å roe nervene, kurere bakrus eller som en oppkvikker?	☐	☐

KOSTHOLD

54 Hvor mange skiver brød spiser du vanligvis?
(Sett ett kryss for hver type brød)

	0-4 /uke	5-7 /uke	2-3 /dag	4-5 /dag	6 el flere /dag
Loff/fint brød	☐	☐	☐	☐	☐
Kneipp/mellomgrovt	☐	☐	☐	☐	☐
Grovt brød	☐	☐	☐	☐	☐

55 Hvor ofte spiser du vanligvis disse måltidene?
(Sett ett kryss pr. måltid)

	Sjelden /aldri	1-2 g /uke	3-4 g /uke	5-6 g /uke	Hver dag
Frokost	☐	☐	☐	☐	☐
Formiddagsmat	☐	☐	☐	☐	☐
Varm middag	☐	☐	☐	☐	☐
Kveldsmat	☐	☐	☐	☐	☐
Annet måltid	☐	☐	☐	☐	☐
Nattmat (kl 24-06)	☐	☐	☐	☐	☐

56 Hva slags fett bruker du oftest?
(Sett ett kryss pr. linje)

	Meieri-smør	Margarin Hard	Margarin Myk /lett	Oljer	Bruker ikke
På brød	☐	☐	☐	☐	☐
I matlaging	☐	☐	☐	☐	☐

TANNHELSE

57 Har du de siste 12 måneder vært hos tannlege/tannhelsetjeneste? Ja ☐ Nei ☐

58 Hvordan vurderer du tannhelsa di?

Meget dårlig ☐ God ☐
Dårlig ☐ Meget god ☐
Verken god eller dårlig ☐

59 Hva betyr god tannhelse for helsa di ellers?

Svært mye ☐ Lite ☐
Mye ☐ Svært lite ☐
Både og ☐

BRUK AV RESEPTFRIE MEDISINER

60 Hvor ofte har du brukt reseptfrie medisiner mot følgende plager i løpet av den siste måneden?
(Sett ett kryss pr. linje)

	Sjelden /aldri	1-3 g /uke	4-6 g /uke	Dag-lig
Halsbrann/sure oppstøt	☐	☐	☐	☐
Treg mage	☐	☐	☐	☐
Hodepine	☐	☐	☐	☐
Smerter i muskler/ledd	☐	☐	☐	☐

61 Har du brukt noen av disse reseptfrie medisinene minst en gang i uka i løpet av den siste måneden?

	Ja	Nei
Paracetamol, Paracet, Panodil, Pamol, Pinex, Perfalgan	☐	☐
Albyl E (500 mg), Aspirin, Globoid, Dispril	☐	☐
Ibuprofen, Ibux, Ibuprox, Ibumetin, Brufen	☐	☐
Naproxen, Naprosyn, Ledox	☐	☐
Andre	☐	☐

HVORDAN FØLER DU DEG NÅ

62 Føler du deg stort sett sterk og opplagt, eller trøtt og sliten?

Meget sterk og opplagt ☐
Sterk og opplagt ☐
Ganske sterk og opplagt ☐
Både – og ☐
Ganske trøtt og sliten ☐
Trøtt og sliten ☐
Svært trøtt og sliten ☐

SVANGERSKAP OG PREVENSJON

63 Når du ser bort fra svangerskap og barselperiode, har du noen gang vært blødningsfri i minst 6 måneder? Ja ☐ Nei ☐

Hvis ja:
Hvor mange ganger? ____ ganger

64 Hvor mange ganger har du i alt vært gravid? ____ ganger

65 Har du noen gang prøvd i mer enn ett år å bli gravid? Ja ☐ Nei ☐

Hvis ja:
Hvor gammel var du første gang du hadde problemer med å bli gravid? ____ år gammel

66 Bruker du eller har du brukt:
(Sett ett kryss pr. linje)

	Nå	Før, ikke nå	Aldri
P-piller?	☐	☐	☐
P-plaster?	☐	☐	☐
Annen hormonprevensjon? *(P-sprøyte, P-ring, P-implantat, hormonspiral)*	☐	☐	☐

67 Hvis du har brukt P-piller:

Hvor gammel var du første gang du begynte med dette? ____ år gammel

Hvor mange år har du i alt brukt P-piller?

Mindre enn 1 år ☐ 4-10 år ☐
1-3 år ☐ Over 10 år ☐

URINVEIER

68 Har du ufrivillig urinlekkasje? *Hvis nei, gå til spørsmål 72.* Ja ☐ Nei ☐

Hvis ja:

Hvor ofte har du urinlekkasje?

- Mindre enn 1 gang pr. mnd ☐
- En eller flere ganger pr. mnd ☐
- En eller flere ganger pr. uke ☐
- Hver dag og/eller natt ☐

Hvor mye urin lekker du vanligvis hver gang?

- Dråper ☐
- Små skvetter ☐
- Større mengder ☐

69 Har du lekkasje av urin i forbindelse med hosting, nysing, latter eller tunge løft? Ja ☐ Nei ☐

70 Har du lekkasje av urin i forbindelse med plutselig og sterk vannlatingstrang? Ja ☐ Nei ☐

71 Hvordan opplever du lekkasjeplagene dine?

- Ikke noe problem ☐
- En liten plage ☐
- En del plaget ☐
- Mye plaget ☐
- Svært stort problem ☐

ARBEID

72 Er arbeidet ditt så fysisk anstrengende at du ofte er sliten i kroppen etter en arbeidsdag? *(Sett ett kryss)*

- Ja, nesten alltid ☐
- Ganske ofte ☐
- Ganske sjelden ☐
- Aldri, eller nesten aldri ☐

73 Krever arbeidet ditt så mye konsentrasjon og oppmerksomhet at du ofte føler deg utslitt etter en arbeidsdag? *(Sett ett kryss)*

- Ja nesten alltid ☐
- Ganske ofte ☐
- Ganske sjelden ☐
- Aldri, eller nesten aldri ☐

74 Hvordan trives du alt i alt med arbeidet ditt? *(Sett ett kryss)*

- Veldig godt ☐
- Godt ☐
- Ikke særlig godt ☐
- Dårlig ☐

FØLELSE SISTE 14 DAGER

75 Har du vært plaget av noe av dette de siste 14 dager? *(Sett ett kryss pr. linje)*

	Ikke plaget	Litt plaget	Ganske plaget	Veldig plaget
Vært stadig redd og engstelig?	☐	☐	☐	☐
Følt deg anspent eller urolig?	☐	☐	☐	☐
Følt håpløshet når du tenker på framtida?	☐	☐	☐	☐
Følt deg nedfor og trist?	☐	☐	☐	☐
Bekymret deg for mye om forskjellige ting?	☐	☐	☐	☐

LIVSHENDELSER

76 Har du opplevd noe av følgende de siste 10 år? *(Sett ett kryss pr. linje)*

	Nei	Siste 12 mnd	Ja, tidligere
Hatt problemer på arbeidsplassen eller der du utdanner deg?	☐	☐	☐
Hatt økonomiske problemer?	☐	☐	☐
Hatt problemer eller konflikter med familie eller venner?	☐	☐	☐
Hatt store problemer i kjærlighetslivet?	☐	☐	☐
Vært alvorlig syk eller skadet?	☐	☐	☐
Hatt alvorlig sykdom eller skade blant dine nærmeste?	☐	☐	☐

SPISEVANER

77 Nedenfor er en liste over ting som gjelder spisevaner. Kryss av for hva som passer deg. *(Sett ett kryss pr. linje)*

	Aldri	Sjelden	Ofte	Alltid
Når jeg først har begynt å spise, kan det være vanskelig å stoppe	☐	☐	☐	☐
Jeg bruker for mye tid til å tenke på mat	☐	☐	☐	☐
Jeg føler at maten kontrollerer livet mitt	☐	☐	☐	☐
Når jeg spiser, skjærer jeg maten opp i små biter	☐	☐	☐	☐
Jeg bruker lengre tid enn andre på et måltid	☐	☐	☐	☐
Eldre mennesker synes at jeg er for tynn	☐	☐	☐	☐
Jeg føler at andre presser meg til å spise	☐	☐	☐	☐
Jeg kaster opp etter at jeg har spist	☐	☐	☐	☐

PENGESPILL

78 Har du noensinne følt behov for å spille med stadig økte pengebeløp? Ja ☐ Nei ☐

79 Har du noensinne måttet lyve for personer som er viktige for deg om hvor mye du har spilt for? Ja ☐ Nei ☐

NB!

Det utfylte skjemaet returneres i den vedlagte svarkonvolutten. Porto er betalt.

Takk for hjelpa!

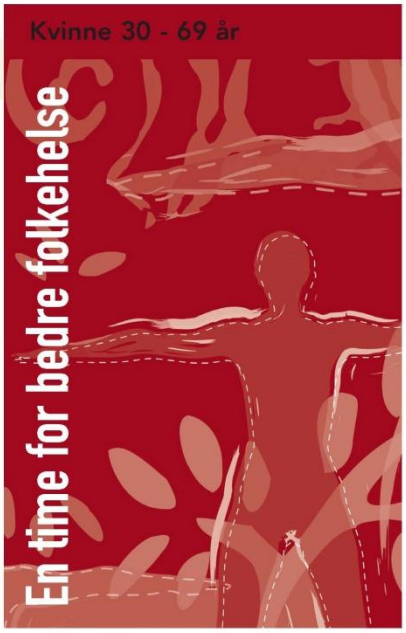
Appendix3

Questionnaire Q2 (Women age 30-69)

hunt 3
Helseundersøkelsen i Nord-Trøndelag

Kjære HUNT-deltaker

Takk for at du møtte til Helseundersøkelsen. Vi vil også be deg om å fylle ut dette spørreskjemaet. Noen av spørsmålene likner de som du har svart på før, men det er viktig at du allikevel besvarer alt. Opplysningene blir brukt til forskning og forebyggende helsearbeid. Forskere vil kun ha tilgang til avidentifiserte data, det vil si at opplysningene ikke kan spores tilbake til en enkeltperson.



Slik fyller du ut skjemaet

- Skjemaet vil bli lest maskinelt.
- Det er derfor viktig at du krysser av riktig: **Rett** ☒ **Galt** ☐ ☑
- Krysser du feil sted, retter du ved å fylle boksen slik: ■
- Skriv tydelige tall: 0 1 2 3 4 5 6 7 8 9
- Bruk bare svart eller blå penn. Ikke bruk blyant eller tusj.

Dato for utfylling: ____ / ____ 20____

Dag / Måned / År

Vennligst fyll ut skjemaet, og post det snarest mulig.
Porto er betalt.

BOLIGFORHOLD OG VENNER

1 Hvem bor du sammen med?
(Sett ett eller flere kryss)

Ingen ☐ — Andre personer over 18 år ☐
Foreldre ☐ — Personer under 18 år ☐
Ektefelle/samboer ☐ — Antall under 18 år ____

2 Er det kjæledyr i boligen?

Nei ☐ — Ja, katt ☐ — Ja, hund ☐ — Ja, andre pelsdyr/fugl ☐

3 Har du venner som kan gi deg hjelp når du trenger det? Ja ☐ Nei ☐

4 Har du venner som du kan snakke fortrolig med? Ja ☐ Nei ☐

DITT NÆRMILJØ, DVS. NABOLAGET/GRENDA

5 Jeg føler et sterkt fellesskap med de som bor her
(Sett ett kryss)

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

6 Man kan ikke stole på hverandre her *(Sett ett kryss)*

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

7 Folk trives godt her *(Sett ett kryss)*

Helt enig	Delvis enig	Usikker	Delvis uenig	Helt uenig
☐	☐	☐	☐	☐

AKTIVITET

8 Hvordan har din fysiske aktivitet i fritida vært det siste året? *(Tenk deg et ukentlig gjennomsnitt for året. Arbeidsvei regnes som fritid.)*

	Timer pr. uke			
	Ingen	Under 1	1-2	3 el. mer
Lett aktivitet *(ikke svett/andpusten)*	☐	☐	☐	☐
Hard fysisk aktivitet *(svett/andpusten)*	☐	☐	☐	☐

9 Hvor lang tid bruker du til sammen daglig foran dataskjerm? (*Sett 0 hvis du ikke bruker data)*

I arbeid ____ timer I fritid ____ timer

10 Hvor mange timer ser du på TV/video/DVD daglig?

Mindre enn 1 time ☐ 4-6 timer ☐
1-3 timer ☐ Mer enn 6 timer ☐

KULTUR/LIVSSYN

11 Hvor mange ganger har du i løpet av de siste 6 måneder vært på/i: *(Sett ett kryss pr. linje)*

	Mer enn 3g /mnd	1-3g /mnd	1-6g siste 6 mnd	Aldri
Museum, kunstutstilling	☐	☐	☐	☐
Konsert, teater, kino	☐	☐	☐	☐
Kirke, bedehus	☐	☐	☐	☐
Idrettsarrangement	☐	☐	☐	☐

12 Hvor mange ganger har du i løpet av de siste 6 måneder selv drevet med: *(Sett ett kryss pr. linje)*

	Mer enn 1g /uke	1g /uke	1-3g /mnd	1-5g siste 6 mnd	Ingen gang
Foreningsvirksomhet	☐	☐	☐	☐	☐
Musikk, sang, teater	☐	☐	☐	☐	☐
Menighetsarbeid	☐	☐	☐	☐	☐
Friluftsliv	☐	☐	☐	☐	☐
Dans	☐	☐	☐	☐	☐
Trening, idrett	☐	☐	☐	☐	☐

13 Hvilket livssyn vil du si ligger nærmest opp til ditt eget? *(Sett ett kryss)*

Kristent livssyn ☐ Ateistisk livssyn ☐
Humanetisk livssyn ☐ Annet livssyn ☐

14 Når det skjer vonde ting i livet mitt, tenker jeg: "det er ei mening med det".

Ja ☐ Nei ☐ Vet ikke ☐

15 Jeg søker hjelp hos Gud når jeg trenger styrke og trøst.

Aldri ☐ Av og til ☐ Ofte ☐

PERSONLIGHET

16 Beskriv deg selv slik du vanligvis er:

	Ja	Nei
Klarer du å få fart i et selskap?	☐	☐
Er du stort sett stille og tilbakeholden når du er sammen med andre?	☐	☐
Liker du å treffe nye mennesker?	☐	☐
Liker du å ha masse liv og røre rundt deg?	☐	☐
Er du forholdsvis livlig?	☐	☐
Tar du vanligvis selv initiativet for å få nye venner?	☐	☐
Er du ofte bekymret?	☐	☐
Blir dine følelser lett såret?	☐	☐
Hender det ofte at du "går trøtt"?	☐	☐
Plages du av "nerver"?	☐	☐
Har du ofte følt deg trøtt og likeglad uten grunn?	☐	☐
Bekymrer du deg for at fryktelige ting kan skje?	☐	☐

HODEPINE

17 Har du vært plaget av hodepine det siste året? *Hvis nei, gå til spørsmål 24.* Ja ☐ Nei ☐

Hvis ja:
Hva slags hodepine: Migrene ☐ Annen hodepine ☐

18 Omtrent antall dager pr. måned med hodepine:

Mindre enn 1 dag ☐ 7-14 dager ☐
1-6 dager ☐ Mer enn 14 dager ☐

19 Hvor sterk er hodepina vanligvis?

Mild *(hemmer ikke aktivitet)* ☐
Moderat *(hemmer aktivitet)* ☐
Sterk *(forhindrer aktivitet)* ☐

20 Hvor lenge varer hodepina vanligvis?

Mindre enn 4 timer ☐ 1-3 døgn ☐
4 timer – 1 døgn ☐ Mer enn 3 døgn ☐

21 Er hodepina vanligvis preget av eller ledsaget av: *(Sett ett kryss pr. linje)*

	Ja	Nei
Bankende/dunkende smerte?	☐	☐
Pressende smerte?	☐	☐
Ensidig smerte (høyre eller venstre)?	☐	☐
Forverring ved moderat fysisk aktivitet?	☐	☐
Kvalme og/eller oppkast?	☐	☐
Lys- og lydskyhet?	☐	☐

22 Før eller under hodepina; kan du ha forbigående: *(Sett ett kryss pr. linje)*

	Ja	Nei
Synsforstyrrelse? *(takkede linjer, flimring, tåkesyn, lysglimt)*	☐	☐
Nummenhet i halve ansiktet eller i handa?	☐	☐

23 Angi hvor mange dager du har vært borte fra arbeid eller skole siste måned på grunn av hodepine: ____ dager

LUFTVEIER

24 Hoster du daglig i perioder av året? Ja ☐ Nei ☐

Hvis ja:
Er hosten vanligvis ledsaget av oppspytt? Ja ☐ Nei ☐

Har du hatt hoste med oppspytt, i minst 3 måneder, sammenhengende i hvert av de to siste åra? Ja ☐ Nei ☐

25 Har du, eller har du hatt, høysnue eller neseallergi? Ja ☐ Nei ☐

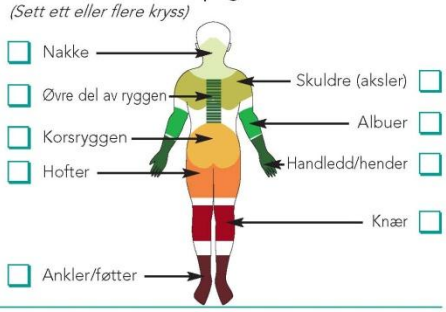
Hvis ja:
Har du hatt slike plager i løpet av de siste 12 måneder? Ja ☐ Nei ☐

26 Har du i løpet av de siste 12 måneder blitt vekket av anfall med tung pust? Ja ☐ Nei ☐

MUSKLER OG LEDD

27 Har du i løpet av det siste året vært plaget med smerter og/eller stivhet i muskler og ledd, som har vart i minst 3 måneder sammenhengende? Ja ☐ Nei ☐
Hvis nei, gå til spørsmål 30.

Hvis ja:
Hvor har du hatt disse plagene?
(Sett ett eller flere kryss)



28 Har du vært plaget både i høyre og venstre kroppshalvdel? Ja ☐ Nei ☐

29 Har plagene hindret deg i å utføre daglige aktiviteter?

	Ja	Nei
I arbeid	☐	☐
I fritid	☐	☐

30 Er du operert for ryggplager? Ja ☐ Nei ☐

Hvis ja: Hvilken type operasjon?

Prolaps/ischias-operasjon ☐ Annet ☐
Avstivning ☐

STOFFSKIFTE

31 Har du noen gang fått påvist for lavt stoffskifte (hypotyreose)? Ja ☐ Nei ☐
Hvis ja, hvor gammel var du **første** gang?
Eksempel: 34 *år gammel*
___ *år gammel*

32 Har du noen gang fått påvist for høyt stoffskifte (hypertyreose)? Ja ☐ Nei ☐
Hvis ja, hvor gammel var du **første** gang?
Eksempel: 34 *år gammel*
___ *år gammel*

Hvis ja:
Har du brukt Neo-Mercazole? ☐ ☐ ___ *år gammel*
Har du fått radiojodbehandling? ☐ ☐ ___ *år gammel*

MAGE OG TARM

33 Har du vært plaget med smerter eller ubehag fra magen de siste 12 måneder?
Ja, mye ... ☐ Ja, litt.. ☐ Nei, aldri.. ☐
Hvis nei, gå til spørsmål 34.

Hvis ja:	Ja	Nei
Er disse lokalisert øverst i magen?	☐	☐
Har du de siste 3 måneder hatt disse plagene så ofte som 1 dag i uka i minst 3 uker?	☐	☐
Blir smertene eller ubehaget bedre etter at du har hatt avføring?	☐	☐
Har smertene eller ubehaget noen sammenheng med hyppigere eller sjeldnere avføring enn vanlig?	☐	☐
Har smertene eller ubehaget noen sammenheng med at avføringen blir løsere eller fastere enn vanlig?	☐	☐
Kommer smertene eller ubehaget etter måltid?	☐	☐

34 I hvilken grad har du hatt følgende plager i de siste 12 måneder?

	Aldri	Litt	Mye
Kvalme	☐	☐	☐
Halsbrann/sure oppstøt	☐	☐	☐
Diaré	☐	☐	☐
Treg mage	☐	☐	☐
Vekslende treg mage og diaré	☐	☐	☐
Oppblåsthet	☐	☐	☐

HVORDAN FØLER DU DEG

Her kommer noen utsagn om hvordan du føler deg. For hvert spørsmål setter du kryss for ett av de fire svarene som best beskriver dine følelser den siste uken. Ikke tenk for lenge på svaret – de spontane svarene er best.

35 Jeg føler meg nervøs og urolig

Nei ☐ | En god del ☐
Litt ☐ | Svært mye ☐

36 Jeg gleder meg fortsatt over ting slik jeg pleide før

Avgjort like mye ☐ | Bare lite grann ☐
Ikke fullt så mye ☐ | Ikke i det hele tatt ☐

37 Jeg har en urofølelse som om noe forferdelig vil skje

Ja, og noe svært ille ☐ | Litt, bekymrer meg lite ☐
Ja, ikke så veldig ille ☐ | Ikke i det hele tatt ☐

38 Jeg kan le og se det morsomme i situasjoner

Like mye nå som før ☐ | Avgjort ikke som før ☐
Ikke like mye nå som før. ☐ | Ikke i det hele tatt ☐

39 Jeg har hodet fullt av bekymringer

Veldig ofte ☐ | Av og til ☐
Ganske ofte ☐ | En gang i blant ☐

40 Jeg er i godt humør

Aldri ☐ | Ganske ofte ☐
Noen ganger ☐ | For det meste ☐

41 Jeg kan sitte i fred og ro og kjenne meg avslappet

Ja, helt klart ☐ | Ikke så ofte ☐
Vanligvis ☐ | Ikke i det hele tatt ☐

42 Jeg føler meg som om alt går langsommere

Nesten hele tiden ☐ | Fra tid til annen ☐
Svært ofte ☐ | Ikke i det hele tatt ☐

43 Jeg føler meg urolig som om jeg har sommerfugler i magen

Ikke i det hele tatt ☐ | Ganske ofte ☐
Fra tid til annen ☐ | Svært ofte ☐

44 Jeg bryr meg ikke lenger om hvordan jeg ser ut

Ja, har sluttet å bry meg ☐ | Kan hende ikke nok ☐
Ikke som jeg burde ☐ | Bryr meg som før ☐

45 Jeg er rastløs som om jeg stadig må være aktiv

Uten tvil svært mye ☐ | Ikke så veldig mye ☐
Ganske mye ☐ | Ikke i det hele tatt ☐

46 Jeg ser med glede fram til hendelser og ting

Like mye som før ☐ | Avgjort mindre enn før ☐
Heller mindre enn før ☐ | Nesten ikke i hele tatt. ☐

47 Jeg kan plutselig få en følelse av panikk

Uten tvil svært ofte ☐ | Ikke så veldig ofte ☐
Ganske ofte ☐ | Ikke i det hele tatt ☐

48 Jeg kan glede meg over gode bøker, radio/TV

Ofte ☐ | Ikke så ofte ☐
Fra tid til annen ☐ | Svært sjelden ☐

SØVN

49 Hvor ofte har det hendt i løpet av de siste 3 måneder at du:

	Aldri/ sjelden	Av og til	Flere ggr/ uka
Snorker høyt og sjenerende?	☐	☐	☐
Får pustestopp når du sover?	☐	☐	☐
Har vanskelig for å sovne om kvelden?	☐	☐	☐
Våkner gjentatte ganger om natta?	☐	☐	☐
Våkner for tidlig og får ikke sove igjen?	☐	☐	☐
Kjenner deg søvnig om dagen?	☐	☐	☐
Har plagsom nattesvette?	☐	☐	☐
Våkner med hodepine?	☐	☐	☐
Får ubehag, kribling eller mauring i bein?	☐	☐	☐

ALKOHOL

Hvis du ikke drikker alkohol, gå til spørsmål 54.

	Ja	Nei
50 Har du noen gang følt at du burde redusere alkoholforbruket ditt?	☐	☐
51 Har andre noen gang kritisert alkoholbruken din?	☐	☐
52 Har du noen gang følt ubehag eller skyldfølelse pga. alkoholbruken din?	☐	☐
53 Har det å ta en drink noen gang vært det første du har gjort om morgenen for å roe nervene, kurere bakrus eller som en oppkvikker?	☐	☐

KOSTHOLD

54 Hvor mange skiver brød spiser du vanligvis?
(Sett ett kryss for hver type brød)

	0-4 /uke	5-7 /uke	2-3 /dag	4-5 /dag	6 el flere /dag
Loff/fint brød	☐	☐	☐	☐	☐
Kneipp/mellomgrovt	☐	☐	☐	☐	☐
Grovt brød	☐	☐	☐	☐	☐

55 Hvor ofte spiser du vanligvis disse måltidene?
(Sett ett kryss pr. måltid)

	Sjelden /aldri	1-2 g /uke	3-4 g /uke	5-6 g /uke	Hver dag
Frokost	☐	☐	☐	☐	☐
Formiddagsmat	☐	☐	☐	☐	☐
Varm middag	☐	☐	☐	☐	☐
Kveldsmat	☐	☐	☐	☐	☐
Annet måltid	☐	☐	☐	☐	☐
Nattmat (kl 24-06)	☐	☐	☐	☐	☐

56 Hva slags fett bruker du oftest?
(Sett ett kryss pr. linje)

	Meieri-smør	Margarin Hard	Margarin Myk /lett	Oljer	Bruker ikke
På brød	☐	☐	☐	☐	☐
I matlaging	☐	☐	☐	☐	☐

TANNHELSE

57 Har du de siste 12 måneder vært hos tannlege/tannhelsetjeneste? Ja ☐ Nei ☐

58 Hvordan vurderer du tannhelsa di?

Meget dårlig ☐ God ☐
Dårlig ☐ Meget god ☐
Verken god eller dårlig ☐

59 Hva betyr god tannhelse for helsa di ellers?

Svært mye ☐ Lite ☐
Mye ☐ Svært lite ☐
Både og ☐

BRUK AV RESEPTFRIE MEDISINER

60 Hvor ofte har du brukt reseptfrie medisiner mot følgende plager i løpet av den siste måneden?
(Sett ett kryss pr. linje)

	Sjelden /aldri	1-3 g /uke	4-6 g /uke	Dag-lig
Halsbrann/sure oppstøt	☐	☐	☐	☐
Treg mage	☐	☐	☐	☐
Hodepine	☐	☐	☐	☐
Smerter i muskler/ledd	☐	☐	☐	☐

61 Har du brukt noen av disse reseptfrie medisinene minst en gang i uka i løpet av den siste måneden?

	Ja	Nei
Paracetamol, Paracet, Panodil, Pamol, Pinex, Perfalgan	☐	☐
Albyl E (500 mg), Aspirin, Globoid, Dispril	☐	☐
Ibuprofen, Ibux, Ibuprox, Ibumetin, Brufen	☐	☐
Naproxen, Naprosyn, Ledox	☐	☐
Andre	☐	☐

HVORDAN FØLER DU DEG NÅ

62 Føler du deg stort sett sterk og opplagt, eller trøtt og sliten?

Meget sterk og opplagt ☐
Sterk og opplagt ☐
Ganske sterk og opplagt ☐
Både – og ☐
Ganske trøtt og sliten ☐
Trøtt og sliten ☐
Svært trøtt og sliten ☐

SVANGERSKAP OG PREVENSJON

63 Når du ser bort fra svangerskap og barselperiode, har du noen gang vært blødningsfri i minst 6 måneder før overgangsalder? Ja ☐ Nei ☐

Hvis ja: Hvor mange ganger? ____ ganger

64 Hvor mange ganger har du i alt vært gravid? ____ ganger

65 Har du noen gang prøvd i mer enn ett år å bli gravid? Ja ☐ Nei ☐

Hvis ja:
Hvor gammel var du første gang du hadde problemer med å bli gravid? ____ år gammel

66 Har du noen gang fått hormonbehandling for å bli gravid? Ja ☐ Nei ☐

Hvis ja: Har du fått slik behandling *siste 3 måneder?* ☐ ☐

67 Bruker du, eller har du brukt:
(Sett ett kryss pr. linje)

	Nå	Før, ikke nå	Aldri
P-piller?	☐	☐	☐
P-plaster?	☐	☐	☐
Annen hormonprevensjon? *(P-sprøyte, P-ring, P-implantat, hormonspiral)*	☐	☐	☐

68 Hvis du har brukt P-piller:
Hvor gammel var du første gang du begynte med dette? ____ år gammel

Hvor mange år har du i alt brukt P-piller?

Mindre enn 1 år ☐ 4-10 år ☐
1-3 år ☐ Over 10 år ☐

OVERGANGSALDER

Hvis ikke kommet i overgangsalder, hopp til spm. 75.

69 Merker/merket du hetetokter i forbindelse med overgangsalder?

Om dagen ☐ Begge deler ☐
Om natten ☐ Merket ikke ☐

Hvis du merket hetetokter, hvordan vil du beskrive plagene?

Store ☐ Middels ☐ Små ☐

	Ja	Nei
Oppsøkte du lege i forbindelse med plagene?	☐	☐

70 Har du noen gang brukt medisiner som inneholder østrogen?

	Nå	Før	Aldri
Tabletter eller plaster (på resept fra lege)	☐	☐	☐
Krem eller stikkpiller	☐	☐	☐

71 Hvis du har brukt reseptpliktig østrogen, hvor gammel var du da du begynte? ☐☐ år gammel

72 Hvis du bruker eller har brukt reseptpliktig østrogen, hvor gammel er/var du siste gang du brukte dette? ☐☐ år gammel

73 Hvis du bruker eller har brukt østrogentabletter eller -plaster, hvorfor begynte du?

Lindre plager i overgangsalder ☐
Forebygge beinskjørhet ☐ Annet ☐

74 Hvis du tidligere har brukt østrogentabletter eller -plaster, hvorfor sluttet du?

Er/var kvitt plagene ☐ Redd for bivirkninger ☐
Fikk plagsomme bivirkninger ☐ Annet ☐

OPERASJONER/STRÅLEBEHANDLING I UNDERLIVET

	Ja	Nei	Vet ikke
75 Har du noen gang blitt operert for nedsunken livmor eller skjedevegg?	☐	☐	☐

Hvis ja:
Hvor gammel var du da? ☐☐ år gammel

	Ja	Nei	Vet ikke
76 Har du ved operasjon fått fjernet begge eggstokkene (totalt)?	☐	☐	☐

Hvis ja:
Hvor gammel var du da? ☐☐ år gammel

	Ja	Nei	Vet ikke
77 Har du ved operasjon fått fjernet hele livmoren?	☐	☐	☐

Hvis ja:
Hvor gammel var du da? ☐☐ år gammel

	Ja	Nei	Vet ikke
78 Har du noen gang hatt stråle-behandling mot underlivet?	☐	☐	☐

Hvis ja:
Hvor gammel var du da? ☐☐ år gammel

URINVEIER

79 Hvor ofte later du vanligvis vannet om dagen?

1-4 ganger ☐ 8-11 ganger ☐
5-7 ganger ☐ Over 11 ganger ☐

80 Hvor mange ganger må du opp om natta for å late vannet?

Ingen	1 gang	2 ganger	3 ganger	4 ganger	5 ganger eller mer
☐	☐	☐	☐	☐	☐

81 Hvis du må opp om natta for å late vannet, hvordan opplever du dette?

Ikke noe problem ☐ Mye plaget ☐
Litt plaget ☐ Svært stort problem ☐

82 Opplever du plutselig og/eller sterk vannlatings-trang som er vanskelig å holde tilbake?

Aldri ☐ Flere ganger i uka ☐
Månedlig ☐ Daglig ☐

	Ja	Nei
83 Har du ufrivillig urinlekkasje? *(Hvis nei, gå til spm. 84)*	☐	☐

Hvis ja:

Hvor ofte har du urinlekkasje?

Mindre enn 1 gang/mnd ☐ En el. flere ganger /uke ☐
En eller flere ganger/mnd ☐ Hver dag og/eller natt ☐

Hvor mye urin lekker du vanligvis hver gang?

Dråper ☐ Større mengder ☐
Små skvetter ☐

	Ja	Nei
Har du lekkasje av urin i forbindelse med hosting, nysing, latter, tunge løft?	☐	☐
Har du lekkasje av urin i forbindelse med plutselig og sterk vannlatingstrang?	☐	☐

Hvordan opplever du lekkasjeplagene dine?

Ikke noe problem ☐ Mye plaget ☐
En liten plage ☐ Svært stort problem ☐
En del plaget ☐

Hvor gammel var du da du fikk urinlekkasje? ☐☐ år gammel

	Ja	Nei
84 Har du søkt lege for urinlekkasje?	☐	☐

85 Har du noengang fått behandling for ufrivillig urinlekkasje?

Nei, jeg har aldri hatt urinlekkasje ☐
Nei, jeg hadde urinlekkasje, men ble bra av meg selv ☐
Ja ☐

Hvis ja: ***Hvilken behandling?***
(Du kan sette flere kryss)

Operasjon ☐ Medisiner ☐
Bekkenbunnstrening ☐ Annet ☐

AVFØRING

	Aldri/ sjelden	Hver uke	Hver dag
86 Har du hatt ukontrollert lekkasje av luft fra tarmen i løpet av den siste måneden?	☐	☐	☐
87 Har du hatt lekkasje av avføring fra tarmen i løpet av den siste måneden?	☐	☐	☐
88 Hvis ja på spm 86 eller 87; har plagene med lekkasje fra endetarmen innvirkning på ditt hverdagsliv?	☐	☐	☐

	Ja	Nei
89 Har du evne til å holde igjen avføring og utsette toalettbesøk i 15 minutter etter første følelse av trang?	☐	☐

VURDERING AV DIN ARBEIDSPLASS

Besvares hvis du er eller har vært i arbeid. Ta stilling til følgende påstander/spørsmål om arbeidsplassen din og arbeidet ditt.

90 Det er et godt samhold på arbeidsplassen

Stemmer helt ☐ Stemmer ikke særlig ☐
Stemmer ganske bra ☐ Stemmer slett ikke ☐

91 Mine kolleger stiller opp for meg (gir meg støtte)

Stemmer helt ☐ Stemmer ikke særlig ☐
Stemmer ganske bra ☐ Stemmer slett ikke ☐

92 Jeg trives godt med mine arbeidskamerater

Stemmer helt ☐ Stemmer ikke særlig ☐
Stemmer ganske bra ☐ Stemmer slett ikke ☐

93 Er du blitt mobbet/trakassert på din arbeidsplass

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

94 Krever arbeidet ditt at du må arbeide veldig hurtig?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

95 Krever arbeidet ditt at du må arbeide svært hardt?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

96 Krever arbeidet ditt for stor arbeidsinnsats?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

97 Krever arbeidet ditt oppfinnsomhet?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

98 Har du mulighet til selv å bestemme hvordan arbeidet skal utføres?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

99 Har du mulighet til selv å bestemme hva som skal gjøres i arbeidet ditt?

Ja, ofte ☐ Nei, sjelden ☐
Ja, iblant ☐ Nei, så godt som aldri ☐

100 Er arbeidet ditt så fysisk anstrengende at du ofte er sliten i kroppen etter en arbeidsdag?

Ja, nesten alltid ☐ Ganske sjelden ☐
Ja, ganske ofte ☐ Aldri eller nesten aldri. ☐

SMERTER I BEINA

	Ja	Nei
101 Har du sår på tå, fot eller ankel som ikke vil gro?	☐	☐
102 Har du smerter i det ene eller i begge beina når du går?	☐	☐

Hvis ja:

Hvor gjør det mest vondt?
Fot ☐
Legg ☐
Lår ☐
Hofte ☐

	Ja	Nei
Forsvinner smertene når du står stille en stund?	☐	☐
103 Har du smerter i beina når du er i ro?	☐	☐

Hvis ja:

	Ja	Nei
Er smertene verst når du ligger i senga?	☐	☐
Får du mindre vondt når beinet ligger lavt, f.eks. om beinet henger utfor sengekanten?	☐	☐
Har du hatt smertene i beina sammenhengende i mer enn 14 dager?	☐	☐
104 Har du brukt smertestillende medisin pga. smerter i beina?	☐	☐

SYN

105 Har du noen av disse øyesykdommene?

	Ja	Nei
Katarakt *(grå stær)*	☐	☐
Glaukom *(grønn stær, høyt trykk i øyet)*	☐	☐
Aldersrelatert makuladegenerasjon *(forkalkning på netthinna)*	☐	☐

HUKOMMELSE

103 Har du problemer med hukommelsen?

Nei ..... ☐ Ja, noe .... ☐ Ja, store ..... ☐

107 Har hukommelsen endret seg siden du var yngre?

Nei ..... ☐ Ja, noe .... ☐ Ja, mye ..... ☐

108 Har du problemer med å huske:

	Aldri	Av og til	Ofte
Hendelser for få minutter siden?	☐	☐	☐
Navn på andre mennesker?	☐	☐	☐
Datoer?	☐	☐	☐
Å gjøre det du har planlagt?	☐	☐	☐
Hendelser som skjedde for noen dager siden?	☐	☐	☐
Hendelser som skjedde for år siden?	☐	☐	☐
Å holde tråden i samtaler?	☐	☐	☐

SPISEFORSTYRRELSER

Sett en ring rundt det tallet som best beskriver dine spisevaner, slik du synes det har vært den siste måneden.

109 Hvor fornøyd har du vært med dine spisevaner?

Svært fornøyd 1 2 3 4 5 6 7 Svært misfornøyd

110 Har du trøstespist eller spist ekstra på grunn av at du har vært nedstemt eller følt deg utilfreds?

Ikke i det hele tatt 1 2 3 4 5 6 7 Hver dag

111 Har du hatt skyldfølelse i forbindelse med spising?

Ikke i det hele tatt 1 2 3 4 5 6 7 Hver dag

112 Har du følt at det er nødvendig for deg å følge strenge dietter eller andre matritualer for å holde kontroll med hvor mye du spiser?

Ikke i det hele tatt 1 2 3 4 5 6 7 Hver dag

113 Har du følt at du er for tykk?

Ikke i det hele tatt 1 2 3 4 5 6 7 Hver dag

NB!

Det utfylte skjemaet returneres i den vedlagte svarkonvolutten.
Porto er betalt.

Takk for hjelpa!

Appendix4

Interview at the screening station

Følgende spørsmål kommer opp dersom KJØNN = KVINNE

Innledning: Så har vi noen spørsmål som gjelder menstruasjon og fødsler.

Hvor gammel var du da du fikk menstruasjon første gang? ÅR
Har aldri hatt menstruasjon

Hvis alder 19 – 55
Har du de siste 12 måneder hatt regelmessig menstruasjon? Nei Ja

Hvis nei: hva mener du er grunnen til dette?
* sluttet av seg selv
* usikkert om menstruasjonen har sluttet
* sluttet etter operasjon, strålebehandling eller cellegift eller andre medisiner
* har ikke kommet tilbake etter svangerskap / er fortsatt uregelmessig etter svangerskap
* kan hos meg ha pauser på mer enn tre måneder
* kan hos meg være uregelmessig
* annet

Hvis nei eller ved alder > 55 år:
Hvor gammel var du da menstruasjonen sluttet? ÅR

Hvis ja: (regelmessig mens)
Hva er det vanlige intervallet mellom menstruasjonene -fra første dag i en menstruasjon til første dag i neste? dager

Omtrent hvilken dato startet din siste menstruasjon? _____

Alle:
Har du noen gang vært gravid? Ja Nei

Hvis ja;
Hvor mange barn har du født?
(hvis f.eks 3 barn, kommer det opp spørsmål om amming av barn 1-3)

Dette feltet droppes ved kø på stasjonen (rød tekst)
Hvis > 0: Hvor lenge ammet du? Barn 1 ? ___ mnd Barn 2? ___ mnd Barn 3? ___ mnd osv

Appendix5

Molimina questions

Molimina Questions

Identifikasjon: ☐☐ ☐☐ ☐☐ ☐☐☐☐☐

Navn: ……

DATO ☐☐ ☐☐ **2006**

Besvares av kvinner under 50 år som har målt benmasse på HUNT3

Kan du merke på deg selv når du venter menstruasjon?

1: Ja, hver måned ☐
2: Ja, de fleste måneder ☐
3: Ja, mindre enn halvparten av månedene ☐
4: Ja, en eller et par ganger i året ☐
5: Nei, aldri ☐
6: Ikke aktuelt ☐

Hvordan merker du at du venter menstruasjon (hvilke symptomer)?
(Det kan settes flere kryss)

1: Menstruasjonssmerter, smerter i rygg eller ben ☐
2: Hevelse/oppblåsthet i kroppen ☐
3: Større appetitt (enten generelt eller spesielt (søtsaker m.m.) ☐
4: Humørsvingninger ☐
5: Ømme bryst rundt eller i brystvorte ☐
6: Ømme bryst på siden (opp mot armhulen) ☐
7: Hevelse i brystene ☐
8: Hodepine (migrene / spenningshodepine) ☐
9: Kviser/utslett ☐
10: Annet ☐

Appendix6

Investigation form

Forespørsel om deltakelse i forskningsprosjekt

Menstruasjonssyklus og eggløsning

Et av forskningsprosjektene i HUNT 3 undersøker symptomer og tegn knyttet til eggløsning og menstruasjon hos kvinner i fruktbar alder. Vi ber om at du noterer dato for første dag av din neste menstruasjon og returnerer dette arket til oss i konvolutten som du fikk det i. Porto er betalt.

Første dag i menstruasjon: (eks 151106)

Dag Måned År

Ditt fødselsnummer (11 siffer):

Bruker du prevensjon som inneholder hormoner (p-pille, minipille, hormonspiral, p-sprøyte eller liknende)? (Sett ett kryss)

Ja ☐ Nei ☐

Takk for hjelpen!

Vennlig hilsen
Siri Forsmo
Førsteamanuensis dr. med
Institutt for samfunnsmedisin, NTNU
Tel. 73 59 75 82

Appendix7

Tables

Table 4.1.1 Compare the main selection group against the random selection group by anthropometrical – and menstrual data analysis by using one way ANOVA.

	Main selection (N = 712)		Random selection (N = 237)		
	Mean	**95 % CI for mean**	**Mean**	**95 % CI for mean**	**Sig.**
Age	39.9	39.39 – 40.45	41.6	40.82 – 42.42	.001
BMI	27.30	26.89 – 27.71	26.85	26.27 – 27.43	.258
Menarche	12.93	12.83 – 13.03	13.14	12.97 – 13.31	.048
Cycle duration (days)	27.46	27.22 – 27.70	28.84	26.18 – 31.51	.089
Parity	2.39	2.31 – 2.47	2.36	2.22 – 2.49	0.725

Table 4.1.2 Compare the main selection group against the randomized selection group by lifestyle data by Crosstab (Chi-square) analysis.

	Main selection (N = 712)	Random selection (N = 237)	
	%	**%**	**Sig.**
Smoking	27.9	18.1	.003