THE OSLO IMMIGRANT HEALTH STUDY, NORWAY

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BACKGROUND AND OBJECTIVES

In 2000-2001, the Oslo Health Study (HUBRO), a population based cross sectional study encompassing residents in Oslo, Norway was conducted by the National Health Screening Service (now Norwegian Institute of Public Health) in collaboration with the Oslo City Council and the University of Oslo. HUBRO has been described in detail elsewhere http://www.fhi.no/tema/helseundersokelse/oslo/index.html. As a result of HUBRO, a large number of immigrants participated in a population based study for the first time in Norwegian history. However no attempt was made to select specific ethnic groups. Therefore this material has 2900 immigrant respondents from over 109 nationalities and these broad categories make it rather difficult to study specific health problems.

Therefore following the Oslo Health Study and based on the experiences from HUBRO the Oslo Immigrant Health Study was conducted in 2002 with the following main objectives:

1. To collect health data from 5 of the largest ethnic groups in Oslo. Selection of these ethnic groups was also based on their participation rates in the HUBRO study.
2. By focusing on fewer ethnic groups researchers were able to tailor some aspects of the survey (especially questions) to gain a better understanding regarding some of the major health problems
3. As major alterations in the design and methods were not made this study would still be comparable to the main study thereby making comparisons with the ethnic Norwegian population possible.
4. This additional study would enable us to provide better estimates of the prevalence and later incidence of chronic diseases as the sum total number of immigrants studied in Oslo would increase.
5. The health needs and priorities within the immigrant community particularly those of public health interest could be better identified through the more relevant and appropriate additional research questions.

SUBJECTS AND METHODS

The Oslo Immigrant Health Study was conducted by the Norwegian Institute of Public Health and the University of Oslo in 2002. Individuals born in Pakistan, Sri Lanka, Turkey, Iran and Vietnam between 1942 and 1982 were invited, except for 7 birth cohorts (1940/41, 1954/55, 1960, 1969/70) who had been previously invited to HUBRO. All individuals in the selected age groups living in Oslo and born in Sri Lanka, Turkey, Iran and Vietnam were invited, whereas a 30% random sample of the Pakistanis, the largest immigrant group, was invited. As per the design of the study, the participants were divided into two cohorts; the main adult cohort born in the period 1942 to 1971 and the younger cohort born 1972 to 1982.

Eligible Subjects
According to the 2001 population register, 7972 individuals in the main cohort (born 1942-71) were eligible for participation. Of these, 11 individuals had died and 71 had emigrated

prior to the invitation, leaving 7890 eligible for participation. Of these 7607 were reached by mail.
From the young cohort (born 1972-82) 4116 individuals were eligible for participation. Of these 60 individuals were either dead (n=2) or had emigrated (n=58) prior to the invitation, leaving 4056 eligible for participation. Of these 3782 were reached by mail.

Participation
Main Cohort:
Of the 7607 reached by mail, 3019 gave their written consent and met the criteria of inclusion (attended the screening or completion of at least one question in either of the questionnaires) attaining a final response rate of 39.7% of those reached by mail. Corresponding response rates according to country of birth were as follows; Turkey 32.7%, Sri Lanka 50.9%, Iran 38.8%, Pakistan 31.7% and Vietnam 39.5% respectively.

Young Cohort:
Of the 3782 reached by mail in the young cohort, 707 (18.7% of those invited) participated. The participation rates for the 20-30 year olds were as follows; Turkey 18.3%, Sri Lanka 24.7%, Iran 20.4%, Pakistan 15.4% and Vietnam 15.2%.

Data collection and data entry methods
After the approvals and clearances for conducting the survey were obtained and the local districts and population informed through mass –media using various information strategies regarding the survey, an invitation was sent to all eligible participants. A letter of invitation was mailed two weeks prior to the clinical screening containing:

- Invitation to participate with time and place of appointment
- A three-page questionnaire
- Instructions about how to fill out the questionnaire and a letter of consent, to be handed in personally at the screening station
- Information brochure containing the aims of the study, content, procedures, etc
- Map showing the exact location of the screening station
- All enclosures of this postal package were translated into the 5 appropriate languages of the 5 immigrant groups in addition to the official Norwegian version.

Three local districts were selected as screening sites. At the screening standardised baseline measurements included height, weight, waist and hip circumference, blood pressure, heart rate, and non-fasting blood tests to analyse serum total cholesterol, HDL-cholesterol, triglycerides, glucose and HbA1C. A supplementary questionnaire was handed out at the survey, and could be filled in at the screening site with the assistance of field workers that spoke the same language as the respondents or sent back in pre-stamped self-addressed envelope. Four weeks after attending the clinical examination, a letter with results of this examination and blood tests was sent to all participants. Those with unusually high values of blood sugar (> 25/mmol) or blood pressure (> 125 mmHg diastolic after the second or third measurement) were informed immediately and referred to a referral hospital/ clinic. However others with values that exceeded normal limits were asked to contact their General Practioner for further follow up. Those with random blood sugars ≥6.1/mmol were invited to undertake a fasting blood sugar that included total cholesterol, HDL- cholesterol, triglycerides and serum insulin analysis.

The data was entered by punching and the same unit was responsible for entry of all the data. Previously, a random sample of 200 HUBRO questionnaires was double punched and showed high correspondence (99.9%).

Questionnaire
The questionnaires developed were based on previously conducted studies in Norway, existing scientific knowledge and current needs and priorities of researchers. A pilot study of the main questionnaire (common for both HUBRO and Oslo Immigrant Study) was carried out before HUBRO started. The *main questionnaire* covered the following main topics: Self-reported health and diseases such as diabetes, asthma, coronary heart disease, stroke and mental distress, musculo-skeletal pains, family history of disease, risk factors and lifestyles (food habits, physical activity, smoking, alcohol use), environment while growing up, social network and social support, quality of life, education, work and housing, use of health services, use of medicine and reproductive history (women).

The main questionnaire is identical for both HUBRO and the Oslo Immigrant Health study and includes questions that form part of the larger CONOR (Cohort Norway) data bank encompassing several large population studies from the regions of Norway. Several of the questions, but not all, have been used and validated in National Health Screening Service's previous studies (Tretli et al., 1982, Jacobsen & Thelle, 1987, Løchen & Rasmussen, 1992, Thune I et al., 1997, Joakimsen et al., 1998). Other questions have been used and evaluated by others (Saltin & Grimsby, 1968, Derogatis et al., 1974, Ainsworth et al., 1996, Brugha et al., 1985, Strand BH, 2003).

The supplementary questionnaire covered many of the topics of the main questionnaire in greater detail. This questionnaire has been adapted for the Oslo Immigrant Health Study based on the experiences of HUBRO and additional relevant research (questions). The participants were asked questions about life events, weight change and winter depression. The questionnaire also had a special section targeted at immigrants – with questions about why and when they moved to Norway, how they cope with the Norwegian language, the health services and their every day life, and whether they had ever experienced any discrimination. The food and drink section included changes in the diet after migration and this part of the questionnaire has been modified to meet the additional requirements of these groups. An "in depth study" of the questions on food habits was carried out among one of the ethnic groups using the HUBRO questionnaires before the final changes to the supplementary questionnaire were made. The original questionnaires along with official English translations can be found at the following website: http://www.fhi.no/artikler/?id=28217

Efforts to increase attendance including reminding non-attenders
Special efforts made to reach the immigrant groups were as follows:

- The questionnaires (main), the brochure and the declaration of consent were translated to 5 different languages. The supplementary questionnaire was translated into English only.
- The Norwegian information brochure also contained short information in 5 languages on how to obtain the translated material.
- Field workers at the screening-station spoke the respective 5 languages in order to assist the 5 immigrant groups.
- The project coordinator (immigrant background) worked with various immigrant groups, organisations and media, through lectures, formal and informal meetings with health personnel, political leaders, imams and other key persons. This included visits to the

mosques as well as special radio/ TV-programs for immigrants. Announcements and reports in immigrants' newspapers and *stand*s in the streets with information about survey also got the information out to the immigrant groups.

Non-responders from the main cohort (born 1942-71) received one reminder 3-8 months after the original invitation. The young cohort (born 1972-82) years was not sent any reminders. In order to increase participation rates during this round, different strategies were used including telephone calls to non responders. The reminder invited participants to a mobile screening unit (bus) parked in the neighbourhood of those invited. The bus visited 7 such sites in the city over a period of 12 weeks.

The problems connected to low attendance rate and possible self-selection in population-based surveys as HUBRO, are presented previously (Søgaard et al.2005).

Determining Ethnicity

Norwegian population registers identify all residents with a unique 11 digit identification code in addition to other demographic data and this was used as the basis of the invitation file. Based on the population registers only those with the 5 selected countries of birth were included. Thus only first generation immigrants are included. Ethnicity was therefore determined on the basis of the country of birth. A cross check with SSB registers confirmed that only in 0.2% of cases the country of birth was not identical to the " country of origin".

Measurements

Serum total cholesterol, serum HDL cholesterol, glucose and serum triglycerides were measured directly by an enzymatic method (Hitachi 917 auto analyzer, Roche Diagnostic, Switzerland). All the laboratory investigations were performed by the Department of Clinical Chemistry, Ullevål University Hospital, Oslo, Norway. Pulse recordings, systolic and diastolic blood pressures were measured by an automatic device (DINAMAP, Criticon, Tampa, USA), which measured the blood pressure in mm Hg automatically by an oscillometric method. Three recordings were made at one-minute intervals. The values of the mean of the second and third systolic blood pressure measurements were used in calculating the cardiovascular risk score (CVD risk score) (Tverdal A et al., 1989).

Anthropometry

Body weight (in kilograms, one decimal) and height (in cm, one decimal) was measured with electronic Height and Weight Scale with the participants wearing light clothing without shoes. BMI (kg/m^2) was calculated based on weight and height. Waist circumference, defined as the midpoint between the iliac crest and lower margin of ribs was measured to the nearest 0.1cm with the subject standing and breathing normally. Hip circumference was measured as the maximum circumference around the buttocks posteriorly and at the symphysis pubis anteriorly. Both waist and hip were measured with a measuring tape of steel. Waist and hip circumference were used to calculate the waist-hip ratio using the formula waist (cm)/ hip circumference (cm).

Socio-Demographic Variables

Statistics Norway's population registers provided information on the age, gender and residential address. Occupation, employment status and social security information and years of education were obtained from the questionnaires

Ethics and approvals

The study protocol was approved by the Norwegian Data Inspectorate and cleared by the Regional Committee for Medical Research Ethics. This study has been conducted in full accordance with the ethical principles as per the World Medical Association Declaration of Helsinki. This study was not conducted anonymously but the data set available to researchers, including data obtained from registers, has been encrypted to ensure confidentiality. All concerned personnel and staff involved with the survey are bound by an oath of confidentiality. All the participants of the Oslo Health Study have given their written signed consent. This also consents to subsequent control and follow-up, to the use of data and blood samples for research purposes, and to the possible link to other registers (subject to the approval of the Data Inspectorate).

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