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Direct health measures surveys in Finland

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Abstract

In Finland the first national health examination surveys were carried out in the 1960s. Comprehensive surveys of nationally representative population samples have been carried out in 1978-1980 (The Mini-Finland Health Survey) and in 2000-2001 (Health 2000). Surveys of cardiovascular risk factors, so called FinRisk surveys, have assessed their trends every five years. The health examination surveys are an important tool of health monitoring, and, linked with registers also a rich source of data for epidemiological research. The paper also gives examples on reports published from several of these studies.

KEY WORDS: health examinations, registers, epidemiology, health monitoring

1. Introduction

In Finland, national health examinations have a forty year long history. Finnish surveys are forerunners in Europe. This paper provides an overview of the past, present and probable future of examination surveys.

2. Health examinations in the 1960s and 70s

2.1 Early screening examinations

National health examination surveys were initiated in Finland by the Mobile Clinic of the Social Insurance Institution in 1965 (Heinonen 1966). At first, the aim was to screen for diseases and their risk factors. A trigger was the development of automated laboratory analyses. Actually, the Mobile Clinic was established in the hope that it would bring health services to people having limited access to medical care. This motivation was appropriate in rural Finland of the 1960s. Random samples of persons aged 15 and above were selected from rural, urban and industrial communities. In various parts of the country close to 60 000 adults were examined. These studies comprised measurements of body composition (height, weight, skin folds), blood biochemistry, haematology, urinalysis, blood pressure, ECG and chest-X-rays as well as dietary interviews. Other units screened for diabetes. A study in North Finland evaluated mammography, thermographs and palpation in screening for breast cancer.

Figure 1. The Mobile Clinic of the Social Insurance Institution, Finland



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In 12 communities the original surveys were carried out as a so called Coronary Heart Disease Study. In these areas some 20 000 persons were re-examined from 1973 to 1976, with the aim of being able to analyze the impact of baseline findings on future risk factor levels and diseases.

An abbreviated version of the survey was carried out as part of the baseline assessments of the North Karelia project in 1972. Since then comparable surveys have been carried out every five years. These studies have been called FinMonica and FinRisk surveys. The latest FinRisk survey is being carried out in year 2007 with a sample size of over 10 000. They have resulted in a huge number of epidemiological cross-sectional and follow-up studies and data on the development over time of coronary heart disease risk factors. In general, the risk factor levels have been decreasing. Perhaps the most important international collaboration has been the co-ordination of and participation in the WHO Monica project (WHO 1983).

2.2. From screening to epidemiological research

In addition to the classical causes of death registers, Finland has national registers of early retirement pensions, of hospital discharges, use of medicines, and cancer, to name just a few. The populations of the Mobile Clinic Health Examination Survey are being continuously followed-up by these registers. The possibilities for record-linkage with a complete follow-up provided excellent possibilities for epidemiological research and the research programme has run since the early 1970s.

The data from the Mobile Clinic have resulted in large numbers of publications on cardiovascular diseases and risk factors, obesity, anaemia, diet and nutrition, risk and protective factors of cancer, diabetes, hypertension and coronary heart disease. The first publications in the 1970s were methodological papers, cross-sectional descriptions of risk factor distributions, analyses of thyroid disease, of height and weight, disease prevalence and cross-sectional analyses of associations. Later and until today the data and stored samples have been used to analyse risk factors and protective factors for example of hypertension and other cardiovascular diseases, cancer, diabetes, obesity and leanness in association with mortality, sciatica, thoracic compression fractures and falls. Several examples are given in the references. (Aromaa,1981, Aromaa et al, 1994, Autoklinikka, 2006, Björkstén, 1972, Heinonen et al, 1970, Heinonen et al, 1972, Heliövaara, 1988, Härmä et al, 1986, Knekt, 1988, Malmivaara et al, 1993, Reunanen et al, 1978, Reunanen et al, 1979, Reunanen et al, 1983, Rissanen et al, 1989, Rissanen et al, 1990, Suhonen et al, 1985, Takkunen et al, 1983).

3. The comprehensive health examination surveys

3.1 Mini-Finland – the first comprehensive health examination survey

The first in a series of national health interview surveys evaluating the sickness insurance scheme (Purola et al 1968) was carried out in 1964, a year in advance of introduction of the insurance, and the following ones in 1968, 1976, 1987, and 1995. The combined experience of these national health interview surveys and the Mobile Clinic Health Examination Surveys was the starting point for planning the national comprehensive Mini-Finland Health Survey. It was carried out in 1978 – 1980 by the Social Insurance Institution (SII) of Finland (Aromaa et al. 1989). The Mobile Clinic Unit examined over 7200 (of a two stage sample of 8000) persons in 40 regions selected to represent the entire population aged 30 and over. After an interview in the subject's home (or institution), symptom and disease specific interviews and questions on functioning and disability, a vast range of measurements and tests was carried out. These comprised anthropometrics, casual blood pressure, resting ECG, chest and hand x-ray, respiratory function (spirometry), hand grip strength, reaction time and blood biochemistry. The General Health Questionnaire and a structured psychiatric interview (PSE) were also carried out. Finally, after a dentist's examination a physician's examination centred on cardiovascular, respiratory and musculoskeletal diseases as well as functional capacity and its limitations was carried out by specially trained doctors.

The whole concept was unprecedented in Europe. The Mini-Finland Survey was designed to strike a balance between technology driven measurements, interview methods, and clinical measurements in providing information on topics such as disease occurrence and determinants, need and unmet need for care, and functional limitations.

The studies of functional limitations were a first in national population surveys. Many of the methods were based on established examples of ADL and IADL-assessments (questionnaires and interviews). In regard of others there were no earlier examples. However, the early drafts of the WHO ICIDH classification (WHO, 1980) were used as a reference when constructing the questions. In the 1970s there were few suitable tests and therefore not many could be included in the survey.

During the survey proper great efforts were made to ensure good quality and to assess it. Ten percent of the persons attending the examination were invited to a re-examination within six weeks to assess short-term reliability. Thorough instructions and repeated training of personnel as well as regular calibration of instruments were part of the protocol.

The data comprising also the follow-up information was analysed in detail during the 1980s and 1990s by the SII medical research team. The work continued when the same team moved to the National Public Health Institute (KTL) in 1995. The initial publications described distributions, prevalence and associations in the cross-sectional setting. Of particular interest were the assessments of met and unmet need for care demonstrating that the treatment situation was best in cardiovascular diseases and poorest in those with mental problems. Further follow-up by registers provided an excellent starting point for longitudinal studies. The study topics ranged from oral health, through cardiovascular, respiratory and musculoskeletal conditions to mental health and dementia. Also topics such as digitalis treatment, haemostatic variables, and impact of infections on cardiovascular diseases were studied. The selection of articles shows examples of these studies. (Heliövaara et al, 1993, Heliövaara et al, 2000, von Hertzen et al, 2000, Impivaara et al, 1986, Mäkelä 1993, Mäkelä and Heliövaara, 1991, Mäkelä et al, 1993, Reunanen et al, 2002, Sulkava et al, 1985, Tuominen et al, 2003). To name just a few, the studies on musculoskeletal disorders, fibromyalgia, oral health, dementia and respiratory functioning were the first of their kind in Finland. Also elsewhere, not many comparable studies have been carried out in nationally representative populations.

3.2 Health 2000 – the most recent comprehensive examination survey

In 1998 time was ripe for a new national comprehensive survey, Health 2000. In KTL's coordination Health 2000 was carried out in 2000 and 2001 in 80 regions (Figure 2) representative of Finland. The cluster sample comprised 10 000 people aged 18 or over. Health examinations were carried out only in the sample of 8 028 persons aged 30 and over. The main aims were to examine health status and functional capacity, their determinants and distribution, and to assess changes after the earlier Mini-Finland study. Several researchers of the original Mobile Clinic Health surveys and the Mini-Finland survey were able and willing to participate in planning and implementation of Health 2000. On one hand, we wanted to ensure comparability with the previous survey, and on the other to up-date methodology, in particular the tests for functioning. After an extensive home interview the participants were asked to fill in and bring with them to the examination a lengthy questionnaire. A full description of the survey can be found in its baseline report (Aromaa and Koskinen 2004). In contrast to the Mini-Finland Health Examination Survey Health 2000 did not have its own mobile units. Instead, we established five regional survey teams comprising 17 persons each. Examination sites were organized in collaboration with local health centres either in their premises or in other suitable premises in the municipality. The equipment was transported by hired trucks from one site to the other. For a once for all action this solution is much more cost-effective than special mobile equipment. In addition, a large number of examination units can be run at the same time. Drawbacks are related to time needed for packing and un-packing and the possible risks of damaging the equipment. Also, mobile units allow the use of larger, heavier and more sensitive equipment.

The core programme comprised anthropometrics (height, weight, abdominal circumference) and blood pressure measurement, heel ultrasound, bio impedance, blood samples (plasma and whole blood for DNA) and saliva samples, digital dental x-ray and a dentist's examination, various tests of functioning (physical and cognitive), a physician's structured clinical examination, and finally a psychiatric interview (M-CIDI). The tests of physical functioning comprised both observation (chair stand, walking speed, and step test) and computerized tests of reaction time and postural balance. We both inquired about vision and hearing and tested them during the examination. The data were linked with many registers both to complement cross-sectional information and to enable longitudinal analyses.

Figure 2. Map of the study locations.



Now, six years after the field work, we have reported on many of the findings and hope to publish summarising reports between 2007 and 2009. Many of the methods and findings can be viewed on our trilingual web-site (www.ktl.fi/health2000). Some examples can be found in the selected references. (Ahola et al, 2005, Ahola et al, 2006, Era et al, 2006, Kattainen et al, 2004, Kattainen et al, 2006, Laitinen et al, 2005, Niiranen et al, 2006, Miranda et al, 2005, Perälä et al, 2007, Pirkola et al, 2005, Rutkiewicz et al, 2006, Saarni et al, 2006, Sainio et al, 2006, Shiri et al, 2006). The time trends of cardiovascular diseases and functional limitations have been analyzed. Occurrence and strong cross-sectional associations between burn-out and depressive disorders has been demonstrated, postural balance in the population has been analysed, the association between childhood adversities on smoking in young adults has been demonstrated, isolated hypertension based on home measurements has been characterised, the impact of various chronic conditions on health related quality of life has been analysed, self-reported and test-based mobility limitations have been described and compared, lateral epicondylitis and its determinants have been studied, and finally the lifetime prevalence of psychotic and bipolar disorders has been shown to be much higher than has been hitherto believed.

4. Visions of the future

In Finland, plans have been drafted for a comprehensive population survey system for health monitoring. The Adult Health Behaviour Postal Questionnaire Surveys will be carried out every year, and the FinRisk surveys every five years. The FinRisk and Health 2000 type surveys will be merged every 10 to 15 years. Thus, if resources permit, the next comprehensive survey, Health 2012, will be carried out in six year's time. In addition, the plans of Eurostat for a national health interview survey every five years in all EU countries, have to taken into account.

An EU-funded project (FEHES, Feasibility of a European Health Examination Survey, www.ktl.fi/fehes) coordinated by KTL is currently creating the framework for health examination surveys in Europe and is next expected to initiate pilot studies in some countries. Currently there are fewer than ten countries with any health examination elements in their national surveys. The ongoing development work is expected to lead to more comprehensive surveys in many more countries. The motivation is, of course, that examination findings provide added value to information available from registers and interviews.

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