Summary

In this dissertation, utilization of sex steroid hormones used for contraception and for HRT among German women under ambulant care was investigated in the five National Health Surveys conducted between 1984 and 1999 in Germany. Many differences concerning sociodemographic factors, personal lifestyle and economic background were compared between hormone users and their age-matched controls in each survey. Determinants of OC and HRT use were analyzed in mutlivariable logistic regression models, from which ORs and their 95% CI were also calculated. Meanwhile the trends for determinants of steroid hormone use and for health and disease from 1984 to 1999 were also described. Possible outcomes following steroid hormone use in history of specific diseases, prevalence of unspecific diseases, blood pressure and laboratory measurements as well as self-assessed health status, subjective satisfaction with health and overall with life, health service utilization and comedications in the last seven days were also compared between steroid hormone users and their age-matched controls in an effort to check outcomes from the point of drug exposure. In addition, the associations of hypertension and hyperlipidemia with OC use in younger women and the associations of diabetes and arthritis with HRT use in elderly women were analyzed in case-control studies that derived from National Health Surveys in an effort to check drug exposure from established diseases.

Sex steroid hormones were used mainly for the purpose of contraception and for HRT among German women under ambulant care, the use of which increased steadily from 13.53% in 1984 to 28.26% in 1999 among women population aged 25-69. From 1984 to 1999, the proportion of OC use in the indications of all steroid hormones decreased from 80.4% to 58.3% whereas the proportion of HRT use increased from 14.3% to 40.1%, which contributed mostly to the increase of all steroid hormones use. Use of steroid hormones in former East Germany differed greatly from its western counterpart with much higher prevalence rate of OC use, such differences remained after the reunification even in 1998/99. In West Germany, the use of OCs changed very little from 1984 to 1999 in women population aged 25-

Summary

69 (10.9% to 12.2%) whereas the use of HRT rose rapidly from 1.9% to 15.4%; in East Germany, however, use of OCs declined obviously from 26.1% in 1991 to 18.3% in 1999, meanwhile HRT use rate doubled from 5.4% to 10.6% in women of the same age range.

Use of OCs in general population, quite naturally, declined along with age till 54 years old in all five NHS, the highest OC use rate was found in the 20-24 age group from survey BGS98, whereas HRT use displayed a bell-shaped distribution along with age, peaking around the women's climacteric in the age range of 50-59 years. In German women aged 25-54 years, the prevalence rate of OC use was 15.1%, 18.7%, 17.6%, 35.6% and 20.9% (East 27.9% and West 17.5%) in surveys T0 (1984/85), T1 (1987/88), T2 (1990/91), T3 (1991/92, in East Germany only) and BGS98 (1998/99, in reunified Germany), respectively. In German women aged 40-69 years, the prevalence rate of HRT use was 3.0%, 4.4%, 12.3%, 8.7% and 21.2% (East 15.8% and West 24.1%) in surveys T0, T1, T2 , T3 and BGS98, respectively, which was comparable to that of European countries but lower than that of USA. It is estimated that a total of 4.8 million German women over 17 years of age (West 3.7, East 1.1 million) and 3.58 million women under 80 years of age (West 3.15, East 0.43 Million) were using steroid hormones for contraception and for HRT, respectively in 1998/1999. The use of HRT among German women might peak in 2002 when the first results of WHI study were published.

Monophasic OCs were the main preparation used in Germany, the use of which increased steadily from 1984 to 1999. There was a declining trend for the use of biphasic contraceptives while the use of triphasic contraceptives doubled between 1984 and 1999. Progestin-only contraceptives were used very seldom, accounting for less than 1% of contraceptives in all five surveys. Over 95% contraceptives used ethinyl estradiol as the estrogen component. High-dose ethinyl estradiol contraceptives were more often recorded in the earlier survey T0 or in the survey T3, their use and proportion in each survey declined along with time from 43.6% in 1984 to 12.5% in 1999 in contrast to the use of low-dose ethinyl estradiol contraceptives, whose proportion increased from 56.4% in 1984 to 87.5% in 1999. Levonorgestrel, desogestrel and norethisterone were the three mostly used progestins in all contraceptives. Unopposed regime of HRT (estrogen only) was more often used in

Summary

the earlier surveys with the proportion of 78.3% in survey T0 and 54.3% in survey T1 whereas opposed regime (estrogen and progestogen) was more often used in the last survey BGS98, the proportion of which increased from 19.6% in survey T0 to 58.8% in survey BGS98.

Compared with age-matched nonusers, HRT users showed significant differences in body mass index (BMI), residence place, education, social class, smoking status, household income, and the time spent on sports. This holds true especially in the surveys T2 and BGS98, in which the number of HRT users was relatively large. Generally, HRT users weighted less and were better educated, more of them had quitted smoking, lived in large cities and spent more hours in sports each week. Besides, more HRT users belonged to upper social class and their household income was higher. In contrast, no significant differences were found between OC users and age-matched nonusers for most selected personal and socioeconomic factors except for body weight or body mass index. In the earlier surveys, OC users weighted less, more of them were current smokers. In survey BGS98, OC users were better educated, more from middle and upper social class, and had a better household income due to the influence of OC use in the eastern part of Germany. Women with middle or higher education and women with middle or upper social class would more like to use OCs than do women with lower one, as shown by higher prevalence rates among these women. Multivariate logistic regression analysis showed that determinants of OC or HRT use varied in different surveys along with time.

Generally, there were no significant differences between steroid hormone users and age-matched controls regarding self-assessed health status and the overall health-related satisfaction with life, but contraceptive users tended to have a better whereas HRT users tended to have a worse health status compared with age-matched controls. Differences in the satisfaction with health and overall with life were significantly enlarged between steroid hormone users and controls in the last ten years when use of HRT increased rapidly, HRT users were less satisfied whereas contraceptive users were more satisfied with their health.

Summary

For most selected disease histories in the last 12 months, no significant differences were found between steroid hormone users and nonusers in each survey. Nevertheless, contraceptive user showed generally a lower prevalence rate particularly in diseases like varicosity, thrombosis and other circulation disorders in lower limbs whereas HRT users showed a higher prevalence rate particularly in diseases such as cerebral circulation disorders, arthritis, gastritis, urinary diseases (cystic calculus, cystourethritis, nephritis), respiratory diseases (asthma and chronic bronchitis), lumbago and sciatica and allergic diseases other than hay fever. The prevalence rate of myocardial ischemia, myocardial infarction and stroke was very low both in steroid hormone users and nonusers who were under ambulant care, and no significant differences could be found between them. By and large, steroid hormone users and nonusers showed similar trends in disease history from 1984 to 1998. In addition, contraceptive users tended to be less hospitalized and had a shorter duration of hospitalization during the last 12 months, used overall less co-medications other than oral contraceptives in the last 7 days, particularly for the subgroups of A00 (medications for alimentary tract and metabolism) and B00 (medications for blood and blood forming organs). HRT users visited more often their internists and gynecologists in the last 4 weeks, tended to use more psycholeptics including hypnotics and sedatives, psychoanaleptics like antidepressants, as well as non-therapeutic medications such as vitamins, mineral supplements and tonics.

It was found that menstrual cycles in OC users were more regular than controls and OC users had a significantly higher blood level in ferric ions, ferritin, transferrin, which may be associated with a lower incidence of iron-deficiency anemia. Moreover, significantly higher average SBP, total cholesterol, triglycerides and HDL-cholesterol were found in contraceptive users, which were of little clinical significance, yet resulted in significantly higher prevalence of hypertension and hyperlipidemia. HRT users appeared superior to nonusers with respect to the glycemic status and lipid profiles with significantly lower levels of fasting glucose, total cholesterol, triglycerides, LDL-C and significantly higher HDL-C level. In addition, significantly lower levels in inorganic phosphate, calcium, albumin, bilirubin and cholinesterase were found in OC users and a significantly lower level in anorganic phosphate, gamma-GT, cholinesterase, albumin and red blood cells count were found in HRT

users, the clinical significance of these biochemical examination was to be studied further.

Use of steroid hormones in the general population showed different profiles of health-related outcomes in young women for contraception and in elderly women for HRT. In general, OC users showed overall a better health status than nonusers in satisfaction with health and in disease histories though the effect of healthy users could not be excluded completely. While women may usually overestimate the risks following OC use, non-contraceptive health benefits such as a better cycle control, less blood loss, lower prevalence of anemia etc. are often neglected. For women without increased blood pressures, use of modern OCs is rather safe and more benefits than risks should be expected. Though HRT use was closely associated with socioeconomic factors and personal lifestyle which may favor better health, HRT users did not show any significant improvements in cardiovascular disease despite a favorable lipid profile and lower blood pressure. Indeed there may be even less health-related satisfaction with life and with health. The better glycemic status found in HRT users should be further investigated in well-designed studies and needs to be balanced against the higher risks of cardiovascular diseases associated with HRT use. For postmenopausal women, use of HRT showed no more benefits than risks and therefore should not be recommended for long-term use.