GENERAL GYNECOLOGY

Factors associated with age of onset and type of menopause in a cohort of UK women

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OBJECTIVE: We sought to describe the pattern of age at menopause and factors associated with type of menopause.

STUDY DESIGN: This was a prospective cohort study of 5113 postmenopausal health survey respondents in the Royal College of General Practitioners' Oral Contraception Study. Logistic regression was used to evaluate associations between sociodemographics, lifestyle, and medical history and menopause type.

RESULTS: Median age at natural menopause (n = 3650) was 49.0 years (interquartile range, 45.0–51.0), and at surgical menopause (n = 1463) was 42.4 years (38.0–46.4). Early natural menopause was associated with smoking, ever-use of oral contraception, sterilization, and history of endometriosis (all increased odds ratios) and ever-use of hormone replacement therapy (decreased). Surgical menopause was associated with manual social class, sterilization, and having a history of endometriosis, menorrhagia, or painful menstruation (all increased), and ever-use of hormone replacement therapy (decreased).

CONCLUSION: Age at natural menopause was younger in this cohort than in other studies. More associations were found for surgical menopause than early natural menopause.

Key words: age, menopause, natural menopause, onset, risk factors, surgical menopause

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Menopause is an important point in a woman's life because it signals the end of her reproductive life. The menopause transition is often accompanied by a number of symptoms, such as vasomotor symptoms and vaginal atrophy.[1,2] A woman's age at menopause may affect the type and severity of her menopausal symptoms. A prospective cohort study of 6917 Swedish women found that those aged >53 years at natural menopause had reduced frequency and intensity of vaginal dryness and atrophy, but increased frequency of hot flashes than women experiencing menopause at a younger age.[3] Age at menopause may also influence subsequent health. A prospective study of 5287 Californian women showed that young age at natural menopause (<40 years) was associated with an increased risk of subsequent all-cause mortality compared to natural menopause occurring at 50-54 years.[4] Other studies have shown that earlier age at both natural and surgical menopause is a risk factor for future osteoporosis[5] and cardiovascular disease.[6]

Age at menopause is likely to be affected by numerous genetic, environmental, and sociodemographic factors that differ between populations. Cigarette smoking has been consistently shown to affect menopause onset, with smokers frequently reaching menopause as much as 1.5 years sooner than nonsmokers,[7] and smokers at greater risk of surgical menopause than nonsmokers.[8] Evidence regarding the effects of other sociodemographic and lifestyle factors (eg, social class, alcohol consumption, body mass index [BMI], parity, prior oral contraceptive [OC] use) on age and type of menopause are conflicting.

Age at menopause has been investigated in US,[9-14] Dutch,[15,16] and Australian[17,18] women, but only to a small extent in United Kingdom women.[19] Due to its possible association with future ill health, it is important to know the mean age at, and factors associated with, menopause in United Kingdom women. We report here our findings from the ongoing Royal College of General Practitioners' (GPs) Oral Contraception Study (RCGP OCS).

Materials and Methods

The RCGP OCS

Beginning in May 1968, 1400 GPs across the United Kingdom recruited approximately 23,000 women who were using OCs and a comparable number of women who had never done so.[20] Participants were mostly white (98%) and all were either married or living as married. Both pill users and never-users were of a similar age (mean 29 years, SD 6.6 years) at recruitment. Information collected at

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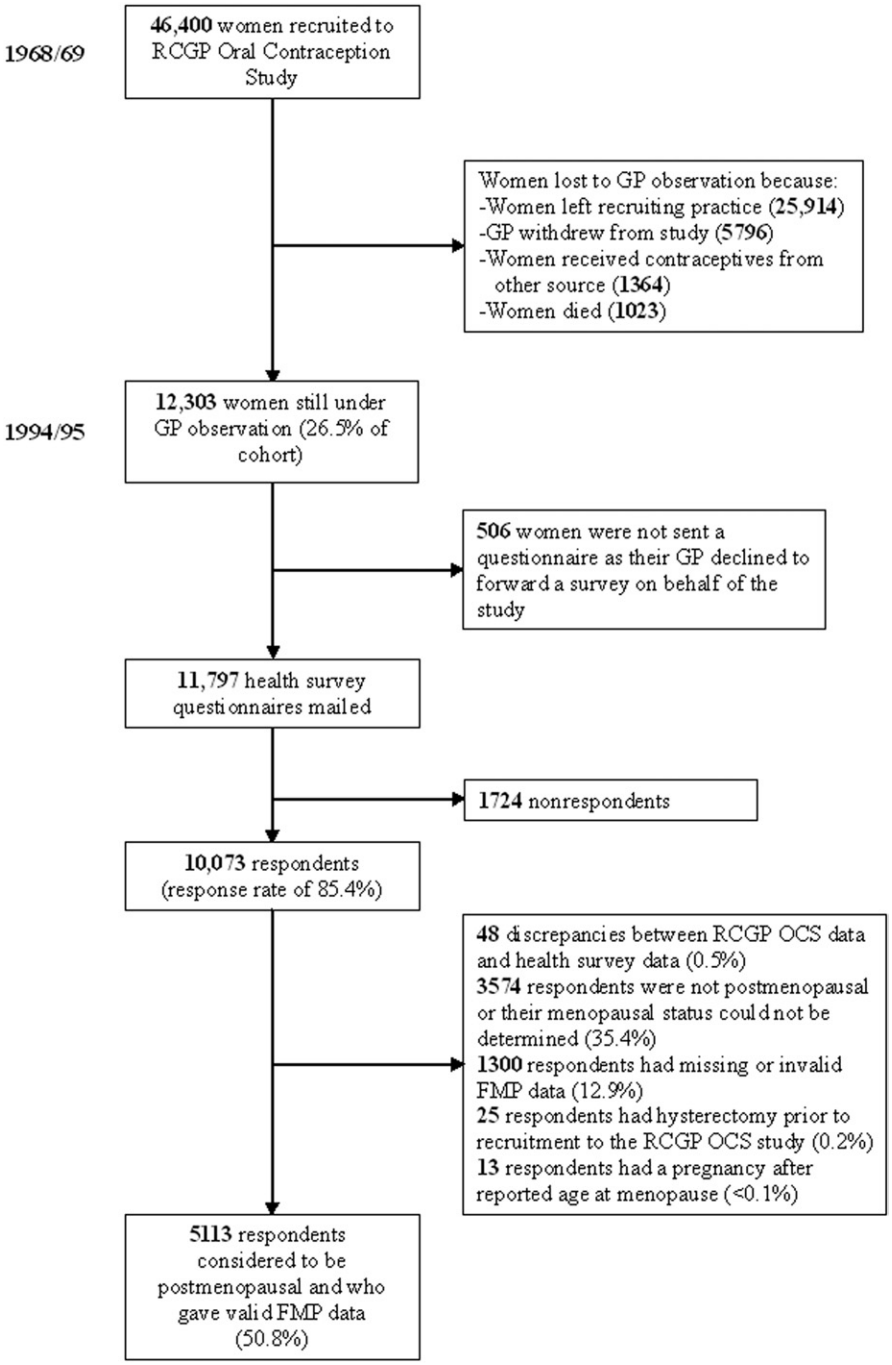
FIGURE 1
Flowchart of patients through cohort



FMP, final menstrual period; *GP*, general practitioner; RCGP OCS, Royal College of General Practitioners' Oral Contraception Study.
Pokoradi. Risk factors for age and type of menopause. Am J Obstet Gynecol 2011.

baseline included social class (as determined by the woman's husband's occupation), significant medical history, previous OC use, and parity. Following recruitment, information was received from the participating GPs every 6 months about: hormonal preparations prescribed, pregnancies, surgery, new episodes of illness, and, if applicable, date and cause of death. Information from the GPs was coded using the *International Classification of Diseases* (8th revision)[21] for morbidity and deaths, and the *Code of Surgical Operations and Procedures* (1969)[22] for any surgery. Women were lost from GP follow-up if they left the recruiting practice, they received OC from a different source (eg, a family planning clinic), they died, or their GP withdrew from the study.[20]

From November 1994 through July 1995, most of the 12,303 women who were still under GP observation were sent a health survey questionnaire by their GP on our behalf.[23] The health survey collected information about: parity, lifetime cigarette smoking, weekly alcohol consumption, current height and weight, weight at age 30 years, weekly hours of physical activity, whether the respondent had ever had a hysterectomy or been through menopause, and the month and year of her final menstrual period (FMP).

The study sample

The study sample consisted of all postmenopausal women who returned the health survey questionnaire and who reported valid information about the timing of their FMP (Figure 1). To check that the health survey was sent to the correct woman, health survey data were compared with RCGP OCS data and any women with discrepant information excluded (n = 48). Type of menopause (natural or surgical) and age at menopause was determined using the process detailed in Figure 2.

The RCGP OCS records were checked for a recording of hysterectomy and/or oophorectomy (Surgical Operations and Procedures R codes R671-672, R681, R690-694, R696) by October 1994. When a woman had no operations recorded, her responses to the health survey were examined. If a woman had reported having gone through menopause and had provided a date for the event, the midpoint of the corresponding year (June) was taken when calculating her age at menopause. We took the year midpoint because many women reporting their FMP failed to give the month as well as the year of the event. These women were allocated to the natural menopause group. We excluded women without a recording of an operation who had not finished their periods (n = 3574), those who did not provide the year of their FMP (n = 1210), those whose calculated