Chapter - 7
Summary

The present bio-social study on menopause among Punjabi Brahmin and Khatri women of Chandigarh has been conducted to explore the lifestyle characteristics (socio-economic, reproductive, dietary and physical activity) and anthropometric and physiological characteristics of these women; to find mean/median age at menopause; to evaluate the influence of various anthropometric, physiological and lifestyle characteristics on age at menopause; and to report the menopausal symptoms experienced by these women. The data for present study comprises a cross-sectional sample of 615 women (306 Brahmin and 309 Khatri) ranging in age between 40-60 years. Personal interviews were conducted to record various anthropometric and physiological measurements, to collect relevant information on socio-economic and lifestyle characteristics of the subjects and their menopausal status and symptoms experienced. All measurements were taken on the subjects, following standard techniques. The anthropometric measurements include, height, weight, circumferences (upper arm, waist, hip, calf), skinfolds (triceps, subscapular, suprailliac, calf); physiological measurements include, age at menarche, blood pressure and pulse rate; socio-economic and lifestyle characteristics of subjects include education, employment, occupation, family income, parity, number of pregnancies, problems faced during pregnancies, abortions and miscarriages, age at marriage, age at first child birth, dietary habits, physical activity and exercise. Body mass index (BMI) and waist-hip ratio (WHR) have been derived from anthropometric measurement.

The data has been subjected to univariate as well as multivariate statistical techniques to arrive at suitable results. Mean and median age at menopause has been computed using retrospective method, status quo method, and Kaplan-Meier cumulative survival analysis method. For factors influencing early/late age at menopause, ANOVA/t-test and Cox proportional hazards regression model were used to assess the association of age at natural...
menopause with independent variables of interest (anthropometric, physiological, and socio-economic and lifestyle characteristics), and to estimate relevant risk for early age at menopause using the hazard ratio.

The mean age at menopause among Punjabi Brahmin and Punjabi Khatri women following retrospective method is 47.94 years and 47.48 years, respectively. This mean age at menopause among Punjabi women of present study is somewhat higher than that of Turkey, Mexican women, Saharia women of Madhya Pradesh, Mahar women Maharashtra and Sansi and Arora women of Punjab, while, it is lower than that observed for Japanese, Australian, Chinese, White South African, Netherlands, Korean and Brahmin women of Himachal Pradesh. Median age calculated through status quo method is 47.80 years and 47.40 years in Brahmin and Khatri women, respectively. These median ages of both Brahmin and Khatri women are lower as compared to those of Lebanese, New Zealand, Spanish, Slovenia, Iranian women and higher than that recorded for Nomad Sikligars and Bazigar women. The median age calculated through Kaplan-Meier method is 48.93 years and 49.43 years in Brahmin and Khatri women, respectively. These median ages are somewhat lower than median age at menopause reported for women in United States, Puerto Rico, Poland, Finland and Mexico. According to Cramer and Xu (1996) an appropriate method for estimating the age at menopause is Kaplan-Meier survival analysis technique when cross-sectional data are used or where prospective data are available.

Various anthropometric, physiological, socio-economic and lifestyle characteristics are known to influence (early/late) age at menopause. Analysis of variance and test of significance (ANOVA/t-test) are used to test the difference in mean age at menopause between the groups. These tests showed statistically significant differences between the groups for diastolic blood pressure, pulse rate, education and total family income in Brahmin women, and waist circumference, age at menarche and employment status in Khatri women. The Cox proportional hazard regression model (univariate and multivariate) are used to assess the association of early/late age at natural
menopause with independent variables. In the present study, no anthropometric characteristic shows significant association with age at menopause in both Brahmin and Khatri women. In physiological characteristics, only Brahmin women show a significant association of higher diastolic blood pressure with later age at menopause. Some previous studies showing similar observations include Bengtsson and Lindquist (1979), Staessen et al., (1989) and Armellini et al., (1990).

Among socio-economic and lifestyle characteristics, education, total family income in Brahmin women, and use of contraceptives in Khatri women show a significant association with early/late age at menopause. Highly educated Brahmin women have later age at menopause. This is in agreement with studies reported on women from Poland, Finland and Egypt (Kaczmarek, 2007; Louto et al., 1994; Hidayet et al., 1999). However, other researchers (Beser et al., 1994; Sievert, 2003) observed an inverse relationship, that is, low education, late menopause. Total family income among Brahmin women is found to be significantly associated with later age at menopause. Similar observations were also made on American and Alexandrian women. Use of contraceptives is found to be significantly associated with earlier age at menopause in Khatri women. Stanford et al., (1987) and Gold et al., (2000) also reported similar observations for American women. Whereas, other studies reported use of contraceptives with later age at menopause (Reynolds and Obermyer, 2003; Okonofua et al., 1990; Van Noord et al., 1997). The findings regarding the association of age at menopause with various anthropometric, physiological, socio-economic and lifestyle characteristics may be due to multifactorial host, preferably genetic and environmental factors which are involved in a likely complex mechanism to determine the onset of menopause.

The anthropometric assessment show an increase in percentage body fat, upper arm circumference, waist circumference, sum of all circumferences and waist-hip ratio from premenopausal to postmenopausal women in both Brahmin and Khatri women. There are studies which reported significant increase in various anthropometric measurements from pre- to post-
menopausal women (Cho et al., 2008; Sonnenschein et al., 1993; Den Tonkelaar et al., 1989). Both Brahmin and Khatri women show an association between menopausal status and central adiposity for different cut-offs of waist circumference and waist-hip ratio. Postmenopausal women have significantly greater waist circumference and waist-hip ratio than pre- and peri-menopausal women, independent of age, education, employment, occupation, parity and BMI. The findings of present study confirm the changes in central adiposity as described in studies on Southern Brazilian, Swedish and Australian women. In Brahmin and Khatri women the prevalence of central obesity (BMI, waist circumference and waist-hip ratio) increases with increasing number of years after the onset of menopause among the postmenopausal women, which shows that a greater percentage of these women fall in obese and overweight category for BMI and high risk category for waist circumference and waist-hip ratio. A similar observation has also been made by Monisha and Singh (2007). Waist circumference and the waist-hip ratio offer an estimate of intra-abdominal fat, which are used as indicators for cardiovascular disease risk, diabetes, hypertension and other chronic disease risk (WHO, 1995; Krauss et al., 2000).

Mean values for systolic and diastolic blood pressure show an increase from premenopausal to postmenopausal categories in both Brahmin and Khatri women. The association of systolic and diastolic blood pressure with age, BMI and pulse rate in pre-, peri-, and post-menopausal women explain very small variation in both Brahmin and Khatri. In Brahmin women, BMI and pulse rate could explain association with systolic and diastolic blood pressure in postmenopausal women; while in Khatri women, only age is found to be associated with diastolic blood pressure in postmenopausal women. Two recent studies on Czech Republic and Italian women also reported that menopause itself does not cause increased blood pressure (Cifkova et al., 2008; Casiglia et al., 2008). The variation could be due to age, higher BMI and pulse rate as factors leading to increased blood pressure in postmenopausal women rather than ovarian failure per se.
The prevalence of menopausal symptoms during menopause (perimenopause) is reported by 72.3% Brahmin and 76.92% Khatri women, and after menopause (postmenopause) approximately 46% women in both caste groups suffered with one or more symptoms. Hot flashes followed by irritability and fatigue/laziness occur with greater frequency during as well as after menopause. The combined prevalence of hot flashes and night sweats in Brahmin and Khatri women is 63.83% and 54%, respectively. In other studies the combined prevalence of hot flashes and night sweats varies from 23% to 74% in Thai, Pakistani, North American, Dutch, Turkish, Jammu, Pune, Punjabi women of Amritsar. Heaviness/weight gain is reported to be the most frequently occurring problem which had an effect on health after menopause, followed by diminished acuity of vision in both Brahmin and Khatri women. Singh and Arora (2005) reported that physical health of Haryana women is adversely affected after menopause, and found that diminished acuity of vision was the most commonly reported problem after menopause. Both, Brahmin (55.38%) and Khatri (61.54%) women consulted doctors for menopausal symptoms and few of them also took medicines during menopause. After menopause the percentage of women consulting a doctor reduces to 25% in Brahmin and 26.87% in Khatri women. Use of hormone replacement therapy (HRT) among peri- and post- menopausal Punjabi women ranges from 7-12%.

A majority of postmenopausal women reacted positively and considered menopause as a welcome stage of life. The women of present study are conscious about their health, and are curious to gain more information and knowledge so that they prepare themselves well in advance. Menopausal health demands priority in Indian scenario due to increase in life expectancy and growing population of menopausal women. It is suggested that large efforts are required to educate and make these women aware of menopausal symptoms, reduction of discomfort and enable them to seek appropriate medical care, if necessary. Menopausal health has been one of the neglected areas in our country and need timely vital attention. The recent health policy adopted by India does not lay emphasis on the issues of older women.
especially during their menopausal period. The need of the hour is to conduct awareness campaigns to inform general public, health workers, etc, about menopause and associated health issues through various forms of mass media and personal contact programmes. In future, India should anticipate the provision of relevant health services, education and promotional activities to cope with the health needs of growing menopausal and postmenopausal women.