Despite the benefits of short-term weight reduction, sustained long-term weight loss is more difficult to achieve. There is a pressing need to develop a comprehensive medical and nutrition plan to reduce the prevalence of this newly identified disease state and its associated short-term as well as long-term health sequelae.

INVITED SESSION

Session 23 – The menopause in perspective

Tuesday 20 June 2006 **08:30–09:30**

O-087 Age at natural menopause and mortality

B. Jacobsen
University of Tromso, Institute of Community Medicine, Tromsø, Norway

Introduction: In 25 years, more than 1.2 billion women in the world will be at least 50 years old, i.e. they will experience the menopausal transition. As suggested in 1989 by Snowdon and coworkers, age at menopause may be considered a biological marker of health and aging, and women with an early natural menopause may run a higher risk of premature death. We will present data from a Norwegian study of age of natural menopause and all-cause as well as cause-specific mortality and contrast our findings with those from some other major studies.

Materials and methods: During 1956–1959, information about reproductive factors was collected in personal interviews of women aged 32–74 years who participated in a screening program for breast cancer in three Norwegian counties. A total of 22,151 women stated their age at menopause and 19,731 women had a natural menopause. The follow-up was from 1961 through 1997.

Results: A total of 18,533 women (94%) died during follow-up. Age at menopause was related to a significantly 1.6% lower all-cause mortality per 3 year increase in age at menopause ($p=0.003$). In women aged <70 years, a 3.7% reduction was found ($p=0.05$).

Overall, a relatively weak inverse relationship was found for ischemic heart disease, $p_{trend}=0.09$. The relationship was attenuated with increasing age and was strongest in women aged <70 years where women aged >55 years at menopause had 76% lower mortality than women aged <44 years at menopause ($p_{trend}=0.009$). No relationship was found for stroke mortality (1% increase in stroke mortality was found per 3 year increase in age at menopause ($p=0.4$)). This was consistent within groups of attained age and stroke type (ischemic and hemorrhagic strokes).

Indications for an inverse relationship between age at natural menopause and deaths attributed to hip fracture (n=391 deaths), particularly in women aged <80 years where women aged >53 years at menopause had 42% lower hip fracture mortality than women aged <44 years at menopause ($p_{trend}=0.15$).

As expected, we found a significant positive association between age at natural menopause and breast cancer mortality with a 12% increase in stroke mortality per 3 year increase in age at menopause ($p=0.005$) and women aged >55 years at menopause had 2.5 times higher mortality than women aged <40 years at menopause.

Conclusions: An early natural menopause is related to slightly higher all-cause mortality, typically in the range of 1–2% lower mortality per year delayed menopause. Although of minor importance for each woman, it still indicates a biologically interesting phenomenon. The impact of age at natural menopause on mortality differs according to cause of death. Whereas age at menopause is negatively related to coronary mortality, no relationship was found for stroke mortality. Furthermore, the beneficial effect of an early menopause with regard to coronary mortality, and to some extent also for all-cause mortality, was found primarily in women aged <70 years. This finding is supported by some, but not all, other studies.

In another large study, a low age at natural menopause has been found to be related to higher mortality due to genitourinary diseases, respiratory diseases and to external causes, possibly because of complications after osteoporotic fractures in old women as age at menopause is positively related to the bone mineral density. This is in accordance with our findings for hip fracture mortality. On the other hand, young age at menopause is related to a lower risk of breast cancer.

O-088 Menopause as an evolutionary adaptation

L.M.A. Shaw
Kent & Canterbury Hospital, Women's Health, Canterbury Kent, UK

Topic: Why does human female fertility decline more rapidly than male fertility? Why is this a peculiarly human trait? What are the impacts on 21st century life?

Introduction: From puberty, reproductive capacity in humans rapidly peaks. Following this, the rate of decline in men reflects the rate that other functions decline. However, in women, the rate of decline accelerates at a rate that exceeds other aging processes. We are familiar, of course with the endpoint in this process, the menopause.

The females of no other primate, and certainly no other apes, demonstrate the occurrence of the menopause phenomenon. Chimpanzee females are well known to be fertile to the end of their lives, the resultant loss of the last infant when the mother dies being referred to as 'somatic wastage'. This is considered to be an accepted price for the survival of the penultimate offspring.

Even in captivity, an ostensibly protected environment where primate life expectancy is greater, menopause is not seen in other apes as it is in human females. So the prolonged life of humans in the industrialized world is not the explanation.

Methods and Results: Review of the geological data draws attention to the global changes that occurred between 2 and 3 million years before the present time. Whilst it is known that, as a result of orbital cyclicity of the earth, the world was cooling over that period, there was coincidentally tectonic elevation of the Ethiopian highlands. So, there, in what is now the Rift Valley, the accepted cradle of humanity, the cooling effect was more pronounced. Fertile forests became savannah over a mere million years.

Review of the anthropological data reveals that, at the start of this period, the Australopithecines were surviving as omnivorous scavengers. The green and fertile environment provided relatively easy fruit and carrion. The survival skills of these hominids needed to change with the environment. There is an observed increase in hominid skull size over time that is more marked over this period. This is related to increase in longevity and an extended pre-adult life. A complex trade off of negative survival factors (longer vulnerability of childhood, obstetric difficulties resulting from larger cranium *inter alia*) in order to achieve positive ones (greater intelligence with gearing of effect by longer training period of childhood *inter alia*) appears to have won out as the successful evolutionary strategy.

To provide cohesion to this Hawkes et al. have observed surviving hunter-gatherers and demonstrated a relationship that adds a further dimension to the survival of the vulnerable progeny who may overburden their mother as a result of the prolonged dependency described above. The work clearly demonstrated the consistent support grandmothers make when their daughters have new infants to deflect their attentions from the previous child. This help is available provided the helper does not have their own infant to tend. There is benefit therefore, not particularly to a menopause but to a rapidly declining reproductive capacity to enable care of women's own second generation. The mechanisms for this are declining follicular recruitment and increasing chromosomal instability.

Conclusions: The adaptation, therefore, is not the menopause, but accelerated decline in fertility. This does of course result eventually in menopause but, until the enhanced longevity of industrialized life, few in the population reached menopause and, for those that did; it was only for a short time before the end of their life. Our improved longevity and other aspects of industrialized society have some incompatibilities with this evolutionary strategy. Our natural time to have children, and the peak of our fertility, is late teens and early twenties. Western society regards teenage pregnancy as a 'problem'. We delay our childbearing until stability in later life when fertility is less productive and require assistance from medical interventions that are often poorly funded by governments. Women now expect to spend more than a third of their life in the post-reproductive part of their life, an unnaturally prolonged hormone deficient state. Worry about the risk of replacement of the deficient hormones is still seen by some as more relevant than the risk of prolonged hormone deficiency.