Hysterectomy and urinary incontinence: a systematic review
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Authors' objectives
To find out whether urinary incontinence is a long-term sequelae of hysterectomy.

Searching
MEDLINE was searched from January 1966 to December 1997 using the following keywords: 'hysterectomy' (total, supracervical, supravaginal, and subtotal); 'genital surgery'; and 'urinary incontinence'. English and non-English language reports were included. Reference lists from identified studies were checked and respected specialists were consulted.

Study selection
Study designs of evaluations included in the review
Cross-sectional studies, prospective cohort studies, case control studies and randomised controlled trials (RCTs) that compared incontinence in women who underwent hysterectomy with women who did not were included. Studies which did not report data sufficient to calculate odds ratio or relative risk were excluded from the analysis.

Specific interventions included in the review
Total hysterectomy and supracervical (with and without surgical menopause) and various genital surgeries (ovaries, uterus, vagina and rectum) were compared to the following interventions or conditions: no hysterectomy; laparoscopic surgery; dilatation and curettage, endometrial ablation; awaiting hysterectomy; no genital surgery; and natural menopause.

Participants included in the review
Women who had undergone hysterectomy and women who had not were included. Age at assessment ranged from 23 to 101 years.

Outcomes assessed in the review
Urinary incontinence (including: any, stress, urge and mixed) was measured by self-report or urodynamic assessment.

How were decisions on the relevance of primary studies made?
The authors do not state how the papers were selected for the review, or how many of the reviewers performed the selection.

Assessment of study quality
The authors commented on aspects of validity.

Data extraction
Data were abstracted independently on standard forms by two researchers who were not blinded to journal, publication date, or named investigators. Disagreements were resolved by consensus with a third researcher. Data extracted appeared to include: first author and country; patient's age at assessment; participants; method of diagnosis of incontinence; and type of incontinence.

The most adjusted odds ratio (OR) and 95% CI was extracted, calculated from data presented or sought from the study investigators.

Methods of synthesis
How were the studies combined?
A random-effects model was used to calculate the summary OR and 95% CI. If fewer than five cases of incontinence were reported in either group, a small sample correction was used (addition of 0.5 to each cell). The RCT was excluded from the summary estimate.

How were differences between studies investigated?
Statistical heterogeneity was assessed (see Other Publications of Related Interest no.1). P < 0.10 was taken to be significant. Heterogeneity was investigated by examining the influence on results of age at time of assessment, adjustment for important confounders and type of incontinence.

Results of the review
Twelve studies, including eight cross-sectional studies (17,925 women), two prospective cohort studies (768 women), one case control study (140 women) and one RCT (126 women) were included.

Limitations of primary studies included: observational studies susceptible to confounding; inadequate adjustment for potential confounders (age, parity and weight); and short duration of follow up (2 years or less).

Urinary incontinence in women with hysterectomy compared to those without (11 observational studies): OR = 1.4 (95% CI: 1.2, 1.7). Heterogeneity was significant (P < 0.01).

Women aged 60 years of age or over (5 studies): OR = 1.6 (95% CI: 1.4, 1.8).

No evidence of heterogeneity (P = 0.22). Women < 60 years (6 studies): OR = 1.1 (95% CI: 1.0, 1.4). Heterogeneity was significant (P = 0.03). After exclusion of one study with only 5 women who had not undergone hysterectomy, heterogeneity was no longer significant (P = 0.29) and OR = 1.1 (95% CI: 0.9, 1.3). Inclusion of the RCT did not substantially alter the results.

Studies adjusted for age (3 studies, all in women aged >= 60 years): OR = 1.4 (95% CI: 1.2, 1.6). No evidence of heterogeneity (P = 0.34).

Type of incontinence: not possible to calculate summary OR by type of incontinence due to small number of studies and clinical and statistical heterogeneity. Total hysterectomy compared with supracervical hysterectomy (3 studies, including one cross sectional, one prospective cohort and one RCT):

Studies were small, had non-significant results and the estimated time since surgery was short. Mean summary OR = 1.3 (95% CI: 0.9, 1.8).

Authors’ conclusions
Since estimates suggest a 60% increase in the odds of developing incontinence, the authors recommend that women be counselled about the sequelae of hysterectomy and that incontinence should be discussed as a possible long term adverse effect.

CRD commentary
The aims and inclusion criteria were clearly stated. Attempts were made to locate unpublished literature and no language restrictions were applied.

Methods used to extract data were described. Results were clearly presented. Statistical heterogeneity was assessed and although validity was not formally assessed, comment was made on aspects of validity of the primary studies. Sub-group analyses were conducted to investigate potential causes of heterogeneity.

No details were given of methods used to select primary studies.

The evidence was limited by reliance on observational studies of short duration of follow-up, subjective measures.
predominantly used to assess outcome and lack of adjustment for potential confounding factors. These factors require that caution be applied when considering the authors' conclusions.

**Implications of the review for practice and research**

Practice: The authors state that when women are counselled about sequelae of hysterectomy, practitioners should discuss the possibility of an increased likelihood of incontinence in later life.

Research: The authors do not report any research implications of the review.

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This is a critical abstract of a systematic review that meets the criteria for inclusion on DARE. Each critical abstract contains a brief summary of the review methods, results and conclusions followed by a detailed critical assessment on the reliability of the review and the conclusions drawn.