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Psychological Aspects of Hysterectomy & Postoperative Care

Amitabha Majumdar and Sepeedeh Saleh
*East Lancashire Hospitals NHS Trust,
 United Kingdom*

1. Introduction

Hysterectomy is one of the commonest gynaecological procedures undertaken in the UK and in the USA. (Gupta & Manyonda, 2011) It is carried out both for benign indications (namely abnormal uterine bleeding and pelvic pain) and for malignancies of the female genital tract. In some cases there are multiple indications for hysterectomy, for example, menorrhagia and dysmenorrhoea (Williams & Clark, 2000) and chronic pelvic pain can accompany a variety of other gynaecological diagnoses. Bilateral salpingo-oophorectomy is often carried out concurrently and this may be followed by postoperative commencement of hormone replacement therapy (HRT).

Subgroups of patients undergoing hysterectomy have the procedure undertaken via the vaginal route, which may also be laparoscopically-assisted. These procedures are less invasive than abdominal hysterectomies and may therefore have better recovery profiles. (Nieboer et al., 2009) Hysterectomies have been extensively studied because of the large numbers of the operations performed annually.

As with any major surgical procedure the postoperative phase of a hysterectomy is complex and multimodal. Measures of postoperative recovery tend to focus on physical aspects, often overlooking the equally important psychological elements of recovery. (Gath et al., 1982) The impact of hysterectomy on sexual function is a major cause of preoperative anxiety which unfortunately is seldom articulated by patients or explored routinely by clinicians. Reports regarding the impact of hysterectomy on sexual function draw conflicting conclusions.

In exploring the psychological aspects of post-hysterectomy recovery we must first take into account preoperative factors. Levels of psychiatric morbidity in hysterectomy patients preoperatively have been found to be high in comparison to women in the general population. (Khastgir & Studd, 1998) This could be explained by a variety of factors including depression in response to the ongoing physical symptoms for which hysterectomy is planned and anxiety regarding the upcoming surgery. Other hypotheses include that of physical symptoms occurring as psychophysiological correlates to psychological disorders and the theory that a proportion of women are listed for major surgery (in this case hysterectomy) having repeatedly presented with physical complaints of nonorganic origin. (Stockman, as cited in O'Hara et al., 1995; Thornton et al., 1997)

Patients with pre-existing psychological disorders or those currently displaying psychopathological symptoms are also at increased risk of postoperative psychological disorders. These women with increased preoperative psychiatric morbidity are, almost by definition, at higher risk of further psychological disturbances in the event of protracted recovery or complications of surgery. More recent research has also identified increased risk of psychological morbidity in response to hysterectomy in women with a past history of sexual abuse and assault. (Swales & Sheikh, 1992; Wukasch, 1996)

It may be that certain pre-surgical risk factors antedate the problems and increase the likelihood of post-surgical psychological problems. The most common issues which have been highlighted in this capacity are chronic anxiety and depression, disorders of body image, problems in relationships with a partner and chronic pain.

Hysterectomy may be performed in response to a subjective assessment of physical symptoms rather than an objective assessment of gynaecological abnormality, for example in conditions such as dysfunctional uterine bleeding. Patients are likely to benefit from increased awareness of the global nature of their individual problems by all healthcare professionals in their care. Tools such as questionnaires which measure subjective aspects of the patients' symptoms may be helpful in these cases; highlighting potential psychological issues of concern and guiding clinicians to alter treatment options if necessary or even to seek further referral for behavioural therapies, counselling, etc. prior to surgery. Studies have shown that, although hysterectomy may significantly reduce negative mood status, clinical levels of anxiety are found in a majority of women undergoing the procedure. Preoperative mood status has been found to be inversely related to an intrapersonal dimension of 'dispositional resilience' and to 'family cohesiveness'. It is suggested that monitoring of preoperative mood, family cohesiveness and dispositional resilience may provide a useful adjunctive measure in attempting to identify women at risk of reporting an unsatisfactory surgical outcome. (Thornton et al., 1997)

There are three broad subsets of psychological symptoms referred to in the literature. These are: anxiety and depression attributed to the operation, sexual dysfunction (presenting as diminished libido, pain, dyspareunia or anxiety surrounding sexual activity) and reactions related to perceptions of femininity and low self-esteem. (Kinsey & McFarlane, as cited in Broome & Wallace, 1984)

Female sexual dysfunction is a multifactorial phenomenon comprising physiological, psychological and social components. The main physiological requirements for sexual function include an operational system of sex steroids, autonomic and somatic nerves and blood supply to the genital organs. (Nappi et al., 2005) Although data are sparse, it has been claimed there is pathophysiological involvement of abnormal sex steroid levels, damage to blood supply and nerve supply in women with problems of sexual desire, arousal or orgasm. (Mokate et al., 2006) The psychological aspects of sexual dysfunction are complex. The traditional 4-stage model first characterized by Masters and Johnson in 1966 (Masters & Johnson, 1966) was later modified by Kaplan (Kaplan, 1974). Basson, in 2001, proposed a new model called the sexual response cycle which was different from the traditional model and involved physical, emotional and cognitive feedback. (Basson, 2001) Interestingly, elements of this new model corresponded to the sexual difficulties arising before and after hysterectomy.

As alluded to earlier, women undergoing hysterectomy for pelvic organ prolapse and chronic pelvic pain constitute an interesting group in which preoperative expectations of the surgical procedure and outcomes have a marked impact on postoperative psychological wellbeing. This is more relevant in women undergoing hysterectomy for chronic pelvic pain. (Melzack, 1982) In these groups problems with anxiety, depression or reduced libido may already exist preoperatively, only to come to the fore if patients' expectations of the surgical procedure are not fulfilled.

Work has been done to compare differing types and routes of hysterectomy and to examine whether this has any impact on postoperative psychological status. In general, no significant differences have been identified between postoperative psychological morbidity relating to the various routes and types of hysterectomy. (Strauss et al., 1996)

Studies have also looked into more conservative approaches to the management of menorrhagia such as endometrial ablation, in terms of their comparative psychological impact. It has been concluded that it may be reasonable, in this subgroup of women, to offer conservative treatment after a psychomotor evaluation. (Alexander et al., 1996)

In many cases (for example, surgery to correct pelvic organ prolapse), the impact of surgery on the preoperative symptoms, particularly in terms of quality of life, may prove to have the most discernible effect on psychological status. In these cases it is usually subjective rather than objective outcome measures which are the most relevant to positive postoperative results. (Helström & Nilsson, 2005)

In this chapter, the authors reviewed the literature on the psychological and sexual impact of hysterectomy. The question of psychological and sexual morbidity following hysterectomy is multifaceted and a broad area is covered. Perhaps due to the popularity of work on hysterectomy, literature searches yielded a multitude of articles. It was, however, soon realised that, where themes such as relevance of route of surgery to psychological morbidity were commonly investigated in the recent literature, recent work on issues such as a history of sexual abuse was not so abundant. A distinct shift in the understanding of psychological aspects of hysterectomy was also noticed, from the older literature which used mostly retrospective and observational methods to arrive at conclusions to the newer studies which strived to prospectively study women's attitudes towards hysterectomy. It came as no surprise, therefore, that very different conclusions were reached by the two styles of research.

Ideally, double-blind randomised controlled trials would be performed to assess the psychological and sexual effects of hysterectomy. As women and surgeons often have strong opinions regarding surgical treatment of gynaecological problems, however, randomised trials are difficult to orchestrate and rarely performed. With regard to blinding, although this may be done for some aspects of surgical management, in many cases it is not possible; hence, most evidence on this topic is based on observational studies.

2. Hysterectomy and sexual functioning: The Maryland Women's Health Study

Before proceeding to a more detailed discussion we briefly consider, individually, the Maryland Women's Health Study as it holds a central place in our current discussion. (Rhodes et al., 1999) The study was a large, prospective two-year study which aimed to

investigate changes in sexual functioning in women between the ages of 35 and 49 undergoing hysterectomy for benign disease. The main outcome measures studied were frequency of sexual relations, dyspareunia, orgasm, vaginal dryness and sexual desire. A total of 1299 women were interviewed, 84.8% of whom completed the study and provided information about their sexual functioning. Data was collected prior to hysterectomy and at 6, 12, 18 and 24 months after hysterectomy.

The percentage of women engaging in sexual relations increased significantly from 70.5% before hysterectomy to 77.6% and 76.7% at 12 and 24 months after hysterectomy. The rate of frequent dyspareunia dropped significantly (from 18.6% before hysterectomy to 4.3% and 3.6% at 12 and 24 months after hysterectomy) as did the rates of not experiencing orgasm (from 10.4% before hysterectomy to 6.3% and 6.2% at 12 and 24 months after hysterectomy). The proportion of women who had not reported vaginal dryness in the past month improved significantly from 37.3% before hysterectomy to 46.8% and 46.7% at 12 and 24 months after hysterectomy. Pre-hysterectomy depression was found to be associated with dyspareunia, vaginal dryness, low libido, and not experiencing orgasm after hysterectomy.

In probably the largest case series reported on this topic, Rhodes et al. concluded that women may simply feel better after hysterectomy and that sexual functioning improves along with overall health status and quality of life. The women in this study were highly symptomatic before their hysterectomies and reported improvements in both sexual functioning and in other aspects of their health. It was suggested that freedom from vaginal bleeding and fear of pregnancy may be amongst the reasons for this. What the authors did point out, however, was that a majority of women studied had identifiable gynaecological pathologies and that the symptomatic improvements seen could be secondary to this. The same improvements in sexual functioning would not, therefore, be seen in women with no pelvic pathology.

Apart from the Maryland Women's Health Study various smaller analyses have been performed to explore the factors affecting the presence of postoperative sexual problems. Shifren and Avis found, interestingly, that suffering from depression before hysterectomy was associated with not experiencing orgasms after the surgery. (Shifren & Avis, 2007) Additionally, for each sexual problem encountered in the postoperative period, experiencing the problem preoperatively was found to be the single most important predictor for suffering from the same problem postoperatively.

3. Discussion

3.1 Route and type of surgery

Although hysterectomy has been performed for many years and is the most commonly performed operation both in the UK (Department of Health, 1999) and in the US (Lepine et al., 1997), an area of persistent conflict has been the conservation of cervix. There have been suggestions in the past that the cervix could be important in preserving sexual function and gynaecologists were pilloried for performing total hysterectomies and thereby destroying women's sexual function. (Masters & Johnson, 1966) Whilst earlier research may have quoted adverse psychological effects of hysterectomy, this has been refuted in recent research and it has also been suggested that either no benefit or even improvements in quality of life and psychological outcomes might be achieved by hysterectomy.

3.1.1 Total versus subtotal hysterectomy

Thakar et al., in a prospective, randomized, double-blind study on two hundred and seventy-nine women undergoing hysterectomy for benign disease randomly allocated the women to either total hysterectomy or subtotal hysterectomy. (Thakar et al., 2004) The women and the investigator were blinded to the type of operation for one year. Health status and quality of life was assessed using the SF-36 questionnaire (McHorney et al., 1994 & Jenkinson et al., 1995) which looked mainly at health perceptions, mental health, energy, physical function, role limitation, emotional factors, social functioning and pain. The GHQ-28 questionnaire (Goldberg, 1972) was used to assess psychological symptoms. This questionnaire is a valuable tool in detecting current psychiatric disorders and looks specifically at depression, anxiety, social dysfunction and somatic symptoms. The study was claimed to be the first trial to compare the impact of total versus subtotal hysterectomy on quality of life and psychological symptoms with a 12-month postoperative follow up period.

An improvement was found in quality of life after hysterectomy in six of the eight domains. There was no significant difference between the two groups in any outcome apart from that of emotions, which showed greater improvements from baseline at 12 months after subtotal hysterectomy. When this difference was examined further by looking at the change in the GHQ subscales, there was no significant difference at 12 months between the total and subtotal hysterectomy groups in the degree of change from baseline in anxiety, depression, somatic symptoms or social dysfunction. All women showed improvements in psychological symptoms following both operations.

It was found that, although quality of life improved, the scores for all domains were lower than normal at 6 and 12 months postoperatively, reported energy/vitality remained unchanged and pain scores were worse. The authors found this difficult to explain but suggested that full recovery from hysterectomy may take longer than is currently appreciated. Physical recovery and relief of symptoms could explain initial improvements in quality of life but it was felt that the delay in complete recovery of quality of life may be explained by the nature of the procedure, constituting both major surgery and removal of an organ central to concept of womanhood. The worsening postoperative pain scores could not be fully accounted for and did not agree with findings from other similar studies. The authors plan to further examine these findings by following up the same group of women with quality of life scores at 5 and 10 years.

Kuppermann et al. compared sexual functioning and health related quality of life outcomes between women undergoing abdominal hysterectomy and supracervical hysterectomy for benign conditions as part of the 'Total Or Supracervical Hysterectomy' (TOSH) study. (Kuppermann et al., 2005) One hundred and thirty five women scheduled to undergo abdominal hysterectomy were randomly assigned to either a total or supracervical procedure. The primary outcome considered was sexual functioning at two years, as assessed by the Sexual Problems Scale of the Medical Outcomes Study (MOS), looking at mainly four problems: lack of sexual interest, inability to relax and enjoy orgasm, difficulties in arousal, and orgasm. A scale value contributed to analysis only if the participant reported sexual activity. To measure specific aspects of sexual functioning in more detail, four new scales were developed using a combination of items from the MOS Sexual Problems Scale. The factors included pelvic problems interfering with sex, sexual desire, orgasm frequency and quality and satisfaction with sex. These were measured at six months and two years after hysterectomy.

Sexual problems improved dramatically in both randomised groups during the first six months and plateaued at one year postoperatively. Health related quality of life also improved in both groups. At two years both groups reported few problems. This study failed to demonstrate any difference between outcomes after total and supracervical hysterectomy. The authors concluded that the analysis confirms and extends findings from other similar studies in the field, implying that clinicians should be provided with more information to assist in appropriate decision-making.

Persson et al. looked at whether day-by-day postoperative recovery differed between women undergoing subtotal and total hysterectomy for benign disease and analysed various related factors. (Persson et al., 2010a) They measured general wellbeing on a visual analogue score (VAS), starting one week before surgery and continuing daily until day 35 postoperatively. Psychometric assessments of psychological and general wellbeing, depression and anxiety including the Psychological General Well-Being Schedule (PGWB-S), Women's Health Questionnaire (WHQ), State-Trait Anxiety Inventory (STAI) and Beck's Depression Inventory (BDI) were undertaken preoperatively and at five weeks and six months postoperatively.

The study found no difference in day-to-day recovery between the two operating methods. The level of psychological wellbeing preoperatively was found to be strongly associated with day-to-day general wellbeing.

Persson et al. then followed up the same group of women from the previous trial at five weeks, six months and 12 months using the same four tools: PGWB-S, WHQ, STAI and BDI. (Persson et al., 2010b) In addition, they also measured the serum concentration of sex hormones in the patients. The authors failed to find any significant differences between the two groups in any of the psychometric tests. Both surgical methods were associated with significantly higher degrees of psychological wellbeing at 6 and 12 months postoperatively compared with preoperative levels. No association was found between psychological wellbeing and serum sex hormone concentration.

3.1.2 Abdominal versus laparoscopic hysterectomy

Persson et al. compared the psychological wellbeing of women undergoing laparoscopic surgery with those undergoing total abdominal hysterectomy for benign disease in a prospective randomized multi-centre study. (Persson et al., 2006) Psychological functioning was measured one week preoperatively (baseline), then at five weeks and at six months postoperatively with psychometric tests. The PGWB-S and WHQ were used to assess general psychological wellbeing and the STAI and BDI were used to measure anxiety and depression levels.

No significant differences were observed between the scores of patients undergoing laparoscopic assisted hysterectomy and those of abdominal hysterectomy patients in any of the four psychometric tests. Both surgical methods were associated with a significantly higher degree of psychological wellbeing five weeks postoperatively than preoperatively and this improvement persisted at six months postoperatively in both groups.

Ellström et al. evaluated changes in psychological wellbeing and sexuality 1 year after laparoscopic and abdominal hysterectomy. (Ellström et al., 2003) Seventy four women

reportedly unsuitable for vaginal hysterectomy and undergoing hysterectomy for benign disease were randomly allocated to either abdominal or laparoscopic hysterectomy. Psychological wellbeing was evaluated using the PGWB-S and the McCoy scale was used to evaluate changes in sexuality. The effect of hysterectomy on sexuality tends to be less well defined than that of psychology with studies showing differing results. The authors in this study recognised the importance of sexuality as a key factor in quality of life measures. In using the McCoy scale to analyse sexuality, identifying sexual cognition rather than sexual behaviour, the authors aim to highlight the socioemotional aspects of sexuality which are at least as important as quantitative variables such as frequency of coitus in considering the whole concept of sexuality. The two main parameters were examined prior to surgery and one year after surgery and comparisons were made, both between individuals and also within and between the two patient groups.

The authors could not demonstrate any significant differences between the two groups with respect to psychological differences or sexuality after one year. Psychological wellbeing did improve after surgery in both groups, as reported elsewhere in the literature, but was unaffected by mode of surgical approach.

3.1.3 Vaginal versus abdominal hysterectomy

Gütl et al. investigated the impact of vaginal and abdominal hysterectomy on women's sexual behaviour, sexual dysfunction, body image and satisfaction with surgery in a prospective study involving 90 women. (Gütl et al., 2002) Data was collected at three points: one day before surgery, three months after surgery and two years after surgery. The questionnaires used were self-reported and included the Tübinger scale for sexual therapy (TSST), the self-developed sexual dysfunction scale (SDS), the relationship assessment scale (RAS German version) and the body image questionnaire (FBK).

The results showed significant differences in women's sexual behaviour and sexual dysfunction before and after hysterectomy which were independent of the surgical procedure performed. Women in both groups reported improvements in sexual desire, sexual activity and sexual intercourse three months and two years after surgery. Sexual dysfunction, dyspareunia, vaginismus, lack of orgasm and loss of sexual interest diminished significantly after surgery. Regression analysis revealed that postmenopausal status, severity of preoperative gynaecological complaints and frequency of sexual intercourse were the most important factors in improved sexual outcomes. Women in the abdominal hysterectomy group were dissatisfied with their body image because of the abdominal scars. They also tended to experience more pain and had longer recovery periods from surgery compared to women in the vaginal hysterectomy group. These results demonstrate that sexual behaviour alone is not a significant factor in choosing vaginal or abdominal surgery. Sexual behaviour is, however, an important element to consider when evaluating outcomes after any type of hysterectomy.

In conclusion, it seems that hysterectomy has traditionally been thought to be associated with adverse psychiatric sequelae but studies coming to such conclusions have often been found to be methodologically flawed, many being retrospective analyses lacking conceptual clarity. With the use of more modern tools, entirely different conclusions have been reached. Unless women embark on hysterectomy with preoperative depression, in which case they

are at increased risk of depression, psychiatric symptoms have been shown to be reduced following hysterectomy. This is consistent with findings of the Maryland Study (discussed above): the largest prospective study on the subject to date, which reported a substantial reduction in depression and anxiety levels after hysterectomy. (Rhodes et al., 1999)

3.2 Preoperative psychiatric morbidity

Psychiatric symptoms can arise as a result of physical illness but may also themselves influence both manifestation and outcome of the illness. The effects of hysterectomy provide a perfect example of this.

Gath et al. in their paper published in 1982 reported a prospective case series on one hundred and fifty six women undergoing hysterectomy for benign disease. (Gath et al., 1982) Psychiatric and social assessments were made at initial interview and four weeks before hysterectomy. Comparable follow-up interviews were then done at six months and again at 18 months postoperatively. The main standardised measure used was the Present State Examination or PSE. (Wing et al., 1974) Marriage and social adjustments were measured with the interview schedule devised by Brown and Rutter (1996) and elaborated by Quinton et al. (1976). Two self-explanatory questionnaires were used: the Eysenck Personality Inventory or EPI (Eysenck HJ & Eysenck SB, 1964) and the Profile Of Mood States or POMS (McNair & Lorr, 1964).

There were three main findings reported by the author. The first was that levels of psychiatric morbidity fell significantly after hysterectomy as evidenced by PSE scores with similar postoperative improvements seen in mental state (measured using the POMS). Virtually all improvements were noted in the first six months after surgery. The second finding was that hysterectomy itself rarely, if ever, led to psychiatric disorders. The third finding was that levels of psychiatric morbidity, both before and after hysterectomy, were much higher than in the general population of women, though lower than in psychiatric patients.

Gath et al. in their paper published in 1995, compared the findings of three studies carried out at intervals over the years 1975-1990. (Gath et al., 1995) The study was designed to answer two main questions. The first of these was whether levels of psychiatric morbidity had changed since their previous two studies of women undergoing hysterectomy for benign disease. Secondly, they aimed to examine the observed changes, if any, in levels of psychiatric morbidity were associated with demographic and social characteristics, duration and severity of menstrual symptoms, treatment with anti-menorrhagic medication, past psychiatric illnesses and women's understanding and expectations. The three studies considered looked at different issues but each examined psychiatric issues among women undergoing hysterectomy for menorrhagia of benign origin. In all three studies level of psychiatric morbidity were measured before the operation and six months after the operation by means of the PSE and the EPI.

Levels of psychiatric morbidity were found to have fallen significantly across the three studies with Study one reporting reductions from 58% to 26%, Study two also reporting reductions from 28% to 7% and with further reductions from 9% to 4% seen in Study three. This decline in psychiatric morbidity was independent of demographic and social characteristics, previous psychiatric history, family history of psychiatric illness, nature of menstrual complaints and the women's understanding and expectations of the operation.

The authors concluded by reporting that levels of psychiatric morbidity have continued to fall in recent years. The last study in the series showed a doubling in the frequency of prescription of antimenorrhagic drugs compared with the first two studies, although this could be due to increased availability of these drugs. However, this increase in prescribing does not seem to explain the reduced psychiatric morbidity from hysterectomy procedures. The authors did not offer any positive explanation for the reduction but attributed it to a change in referral practices by general practitioners and gynaecologists. It may have been assumed that clinicians are less inclined to opt for hysterectomy in patients with psychological problems.

3.3 Concomitant oophorectomy

We propose to outline a little of the physiology regarding endocrine changes and resulting symptomatology after oophorectomy in premenopausal women as an appreciation of these mechanisms is central to understanding the potential for psychological and sexual as well as physical effects following bilateral oophorectomy before commenting on findings in the literature.

In younger women during a normal menstrual cycle the ovaries produce oestradiol, testosterone and progesterone in a cyclical pattern under the control of Follicle Stimulating Hormone (FSH) and Luteinising Hormone (LH), both produced by the pituitary gland. Blood oestradiol levels remain well-preserved throughout a woman's reproductive life. They may increase slightly in the approach to the menopause but are, in general, fairly stable until at least the late perimenopause. This increase is presumed to be in response to elevated FSH levels. However, the menopause transition is characterized by marked, and often dramatic, variations in FSH and oestradiol levels, and because of this, measurements of these hormones are *not* considered to be reliable guides to a woman's exact menopausal status.

Menopause occurs due to a natural or surgical cessation of oestradiol and progesterone production by the ovaries, which are a key part of the endocrine system. These hormones are responsible for reproduction and also influence sexual behaviour. After menopause, oestrogen continues to be produced in other tissues, notably the ovaries but also in bone, blood vessels and even in the brain. The dramatic fall in circulating oestradiol levels at the time of menopause, however, impacts many tissues from brain to skin.

In contrast to the sudden fall in oestradiol during menopause, the levels of total and free testosterone, as well as dehydroepiandrosterone sulfate (DHEAS) and androstenedione appear to decline fairly steadily with age. No effect of natural menopause on circulating androgen levels has been observed thus specific tissue effects of natural menopause cannot be attributed to loss of androgenic hormone production. Women who have had the ovaries surgically removed, damaged by chemotherapy or radiotherapy or who have undergone ovarian suppression with gonadotropins, however, do have loss of ovarian androgen production as a result.

The decline of adrenal Dehydroepiandrosterone (DHEA) and DHEAS with age has been described by Labrie et al. and Ferrari et al. but the mechanism underlying this reduction is unclear. (Labrie et al., 1997; Ferrari et al., 2001) An alteration in adrenal zonation leaving the zona reticularis with lesser mass with advancing age has been described as a possible factor. (Parker et al., 1997)

The perimenopausal years in a woman's life involve a gradual change in ovarian function, leading to decreased fertility, a marked reduction in steroidogenesis, the menopause and the subsequent involuntary changes due to oestrogen deficiency. In gynaecological practice, both ovaries may be removed at the time of hysterectomy or at other points for various reasons such as cancer, endometriosis and pelvic inflammatory disease. Ovaries are sometimes removed on the presumption that they have ceased to perform and could become the seat of neoplastic changes. Women undergoing this operation experience almost immediate endocrinological effects and are at risk of the consequent symptoms.

If oophorectomy is performed before the menopause has occurred, the circulating levels of oestradiol will quickly fall to levels similar to those seen in postmenopausal women. Serum levels of FSH and LH start to rise and reach peak values six to eight weeks after surgery. These findings have been confirmed by studies looking at urinary excretion of gonadotrophins and oestrogens. The appearance of vasomotor symptoms is one of the first clinical indicators of reduced serum oestradiol levels and may occur within the first week of surgery. After the ovaries are removed the main source of oestradiol remaining is the adrenal cortex- principally through the secretion of androstenedione and the aromatization of this steroid in peripheral and growth-responsive tissue. A significant reduction is seen in levels of testosterone immediately after oophorectomy, but within five years of surgery or menopause the difference is minimal. (Shifren & Avis, 2007)

With this background, we now move on to the recent literature regarding oophorectomy and psychological wellbeing after hysterectomy.

By comparing the effects of hysterectomy alone with those of hysterectomy and bilateral salpingo-oophorectomy (BSO) it is possible to study the effects of oophorectomy on psychological wellbeing. Nathorst-Boos et al. published a small retrospective observational cohort study comparing oophorectomised women receiving oestrogen replacement therapy, oophorectomised women not receiving oestrogen replacement and women whose ovaries were conserved. (Nathorst-Boos et al., 1993) This was a Swedish study including all the women aged 47 to 55 years who had undergone total abdominal hysterectomy for benign disease in a single centre between 1984 and 1988. Approximately 100 women participated in the trial, doing so 3 years, on average, after surgery. On the basis of the Psychological General Well-Being Schedule (PGWB-S) women in the hysterectomy with BSO category reported significantly more anxiety and depression and less positive wellbeing than women whose ovaries had been preserved. As the investigators did not perform an assessment prior to surgery, they could not control for presurgical differences among the groups of women and this constituted the major limitation of the study.

A prospective observational study by Aziz et al. in 2005 again compared psychological wellbeing in women following hysterectomy alone versus hysterectomy with BSO. (Aziz et al., 2005a) This was done in a group of perimenopausal women aged 45 to 55 years, who were scheduled to undergo the surgery for benign disease at a Swedish hospital. All women in the group were sexually active and free from psychiatric disease preoperatively. Of the 362 women initially enrolled in the study, 106 underwent concurrent BSO and 89% of these went on to complete the one-year study.

Postoperatively, all oophorectomised women and those who had undergone hysterectomy only but were experiencing climacteric symptoms were recommended to commence

oestrogen replacement therapy. The McCoy Sexual Rating Scale and the PGWB-S were administered and hormone levels were measured both 2 months before and one year after surgery. The general wellbeing of the two groups did not differ, either before surgery or at one-year follow-up. Postoperatively, both groups displayed increased wellbeing in terms of mood, general health and total wellbeing scores. The hysterectomy-only group had increased vitality and the hysterectomy plus oophorectomy group showed increased positive wellbeing and decreased anxiety.

Farquhar et al. carried out a prospective study comparing women 46 years or younger who had conservation of at least one ovary with women who had hysterectomy and BSO. (Farquhar et al., 2006) Using the Center for Epidemiological Studies-Depression (CES-D) scale, they found decreased levels of depression in both groups after surgery compared with preoperative levels. The rate of depression amongst women who underwent BSO was found to be significantly higher than that for women in whom at least one ovary was conserved (67% compared with 43%). This difference persisted even after three years (50% compared with 27%).

These differences between the findings of Farquhar et al. and those of Aziz et al. earlier could have a few explanations. Firstly, the later study involved women of a younger age group and secondly, the presurgical assessments were completed two to three months prior to surgery in the first study but only one week before surgery in the study by Farquhar et al. Neither studies randomly assigned women to treatment, which makes comparisons difficult. Farquhar et al. also reported that women who underwent BSO were often nulliparous, more likely to have an abdominal hysterectomy, and more likely to have abdominal pain. This again highlights the limitations of observational studies in which patients choose their treatment and may help to explain the disparity in results.

Before moving on to analyse the effects of concomitant oophorectomy on sexuality it is interesting to note that traditional views of women's sexual response and desire have in recent years been questioned. Sexual desire, being primarily an emotion, is a psychological entity but also incorporates biological elements. It is expected that gynaecologists accept sexual difficulties as a legitimate women's health issue and are able to address them accordingly. This includes open discussion of potential effects of any planned surgery on the patient's sexual life.

The Maryland Women's Health Study examined women's sexual function after bilateral salpingo-oophorectomy (BSO) and compared this with sexual function in the women who had opted to keep their ovaries. (Rhodes et al., 1999) Removal of the ovaries generally results in a 50% reduction in circulating androgen levels. As testosterone plays a key role in sexuality and is an important hormone in the physiology of sexual desire, comparing libido and sexual response after hysterectomy with and without concurrent BSO is useful in assessing the part of testosterone in female sexual function. In considering the effects of hysterectomy and BSO on sexual function Rhodes et al. concluded that, after adjusting for age and for patients who had not been experiencing orgasms before surgery, only preoperative depression and BSO were associated with anorgasmia after hysterectomy.

Nathorst-Boos et al. found no significant difference in the frequency of intercourse or orgasm, dyspareunia, arousal, or partner satisfaction between women after hysterectomy with or without BSO. (Nathorst-Boos et al., 1993) There was, however, a difference in libido

between the groups, with women retaining their ovaries significantly more likely to report either the same or better libido. Conversely, women were significantly more likely to report a worsening in libido after BSO in comparison to women who retained their ovaries. This worsening was seen even in women who were using oestrogen replacement therapy after their surgery.

In an earlier retrospective observational study by the same authors, worsening was seen in the sexual lives of women who had undergone BSO. (Nathorst-Boos et al., 1992) The authors failed to find any correlations in this study between levels of total testosterone, androstenedione, or DHEAS and any of the psychological or sexual variables examined.

Aziz et al. also compared sexual function in women after hysterectomy with function after hysterectomy with BSO in another study done in 2005. (Aziz et al. 2005b) Due to the prospective nature of this trial, the investigators were able to assess baseline sexual function before hysterectomy as well as after the surgery. Interestingly, women who opted to retain their ovaries had significantly higher preoperative scores on most measures of sexual function and this advantage continued when assessed one year after hysterectomy. Measures considered included sexual arousal, satisfaction, enjoyment, and orgasmic frequency.

When differences between preoperative and postoperative scores were calculated and compared for the two groups, however, the hysterectomy only group scored significantly less than the group who had also undergone concurrent BSO. It is possible, given these findings, that the earlier reported poorer sexual function after hysterectomy with concurrent BSO compared with hysterectomy alone may be explained by a confounding selection bias, with women with poorer baseline sexual function being more likely to opt for BSO at the time of hysterectomy. No correlations were found between changes in androgen levels postoperatively and measures of psychological wellbeing or sexuality.

Bellerose conducted as part of his PhD thesis a study on five groups of women with ages between 35 and 55 years. (Bellerose & Binik, 1993) The groups included a nonsurgical control group, a hysterectomy only group, and three hysterectomy plus BSO groups: women untreated postoperatively, women on oestrogen replacement therapy postoperatively, and women on combined androgen-oestrogen replacement therapy postoperatively. The study comprised two separate sessions: an interview/questionnaire session and a sexual arousal session. The interview/questionnaire session assessed mood, body image and sexual functioning. In a second session completed by 45% of subjects a vaginal photoplethysmograph, (Sintchak & Geer, 1975) an instrument used to indirectly measure sexual arousal, measured vaginal blood flow in response to an erotic stimulus while subjects concurrently monitored subjective arousal. Overall, the groups of women who had undergone hysterectomy with BSO, both with no postoperative treatment and with postoperative oestrogen replacement had significantly lower self-reported desire and arousal than the remaining three groups. Body image was significantly poorer in the untreated hysterectomy plus BSO group. Furthermore, a third of the control group reported positive changes in body image and sexuality in the previous five years. This effect was attenuated in the hysterectomy only group, the hysterectomy and combined therapy group, and the hysterectomy and oestrogen replacement group. No significant differences were reported in mood, vaginal blood flow and subjective arousal to an erotic stimulus.

A majority of studies demonstrate improvements in sexual functioning after hysterectomy for benign disease. Several studies have suggested that concurrent BSO does not have any effect on sexual functioning but others have refuted these claims postulating that adverse effects of BSO on libido and orgasmic response are caused by the postoperative decline in circulating androgens levels. The reasons behind this apparent lack of consensus have been alluded to earlier and are perhaps rooted in the deficiency in randomised controlled trials in this field. Women should therefore be informed that although the majority of studies into oophorectomy have not demonstrated any adverse effects on sexuality, some women may suffer from the sudden and significant decline in ovarian hormones. Although many forms of hormone replacement therapy are available to treat hot flushes, sleep deprivation and vaginal dryness, only testosterone has been shown to be effective in the treatment of hypoactive sexual disorders.

Preoperative counselling is essential in enabling women to make well-informed decisions regarding postoperative hormone replacement bearing in mind the recommendations of the Women's Health Initiative Study. Women should also be informed that the majority of women undergoing hysterectomy for benign disease will experience improved psychological wellbeing and improvements in sexual function postoperatively. Women with preoperatively depression or sexual problems have an increased risk of worsening mood, libido and sexual response after the surgery. Additionally, it may be worth discussing the fact that psychologically healthy women without sexual problems can usually maintain a similar or perhaps even better quality of life post-hysterectomy than that which they enjoyed prior to the surgery.

3.4 Sexual abuse

Hendricks-Matthews reported a case in 1991 of a 33-year-old attorney scheduled for a vaginal hysterectomy who presented to hospital with panic attacks. (Hendricks-Matthews, 1991) She experienced feeling numb as she looked around at other women in a store. She also spoke of feeling very isolated and different from other women around her and kept pondering the upcoming loss of her womb. She later confessed to having the same feelings of being different and isolated from other women when she was raped at knifepoint at the age of 21.

During her counselling sessions she was embarrassed by her "crazy thoughts" as she realised her fears about her upcoming surgery, yet she felt unable to calm herself. Her fears and anxiety were compounded by the fact that she would be under a general anaesthetic during the procedure and would not have any control over what would be done to her body.

This woman had had no prior counselling regarding her sexual abuse. She had been relatively successful in trying to forget her past experiences until the reality of her upcoming hysterectomy made it almost impossible for her to repress the thoughts of the trauma.

Depression and sexual dysfunction are two of the most widely recognized consequences of sexual assault. (Briere & Runtz, 1988; Finkelhor, 1990; Kroll 1988; Lowery, 1987) Being sexually active does not necessarily mean that the survivor has resolved a sexually traumatic experience. (Mackey et al., 1992) In fact, Karasu has warned that such problems, being unrevealed, are also likely to be unresolved. (Karasu, 1990)

Medical literature had previously been divided on whether women experience psychological disturbance after hysterectomy. Whereas with the introduction of prospective studies this controversy seems to have subsided, there is no controversy regarding the fact that women with pre-existing psychological problems will have poorer outcomes post-hysterectomy. The violence associated with rape and sexual abuse is a cause of major health and social problems in the modern world and the incidence of these events is sadly rising. There is consequently a requirement for healthcare providers to identify women who may be at risk of such postoperative psychological sequelae.

Hendricks-Matthews, in reporting the above case, emphasises this fact, highlighting the increased needs of women with unresolved sexual abuse issues as surgery may re-evoke negative feelings which had previously been suppressed.

This issue was also discussed by Briere and Runtz who stated that it is not uncommon for survivors of abuse to dissociate themselves from the experience until a triggering event occurs, of which hysterectomy is a prime example. (Briere & Runtz, 1988) It is therefore understandable in such cases that patients have not only to cope with the stress of surgery but also with the burden of all the negative memories associated with the abusive experience.

Hendricks-Matthews also draws parallels between hysterectomy and sexual abuse in terms of violation of bodily boundaries, loss of control, disruption of sexual identity, society viewing a woman differently from how she was before and, in vaginal hysterectomy, the similarity of vaginal pain afterwards. It is suggested that women's previous defences of repression, minimisation, and denial may crumble during the crisis of surgery and bring buried effects flooding through, usually in the form of symptom formation, psychological distress, or both.

Ruth Wukasch, in 1996, conducted a cross-sectional study to examine the impact of a history of rape and/or incest on the post-hysterectomy experience stating that, where many events in women's lives influence their psychological response to medical interventions. (Wukasch, 1996) A special subgroup of women with negative sexual experiences was identified from a larger study looking at women's post-hysterectomy experiences. The decision to explore this subgroup was the result of the finding that a large number of women in the group had been subjected to negative sexual experiences.

In the retrospective cross-sectional study, participants were interviewed at 6, 12, 18, and 24 months after their elective hysterectomies, with a grace period of 4 weeks on either side of these time intervals. The time intervals were selected after a review of several studies examining various time periods in the measurement of sexual and emotional adjustment to a hysterectomy. (Gath et al., 1981; Polivy, 1974; Richards, 1978, Travis, 1988) Polivy suggested that it was during the period of 12-24 months after a hysterectomy that a woman might experience the most distress.

The post-hysterectomy questionnaire developed and used by the author was a three-part questionnaire which took the form of a semi-structured interview with some open-ended questions and prompts and some exploration of fixed categories. Part one determined which surgical procedures were undertaken and looked at recovery and the impact such surgery might have on her sexual functioning preoperatively and during hospitalization. Part two focused on the impact the hysterectomy had on the patient's sexuality and part three elicited demographic details.

The personal reflections on the 'My Hysterectomy Experience' scale, devised by the author specifically for this study, focused on four perceptions of experience: body image, effects of the hysterectomy, the decision to have a hysterectomy and feelings about physicians. The CES-D scale, also used in this study, measured the current levels of depression.

Another standardised, self-evaluation questionnaire used was the The Derogatis Sexual Functioning Inventory (DSFI) which looks at levels of sexual functioning and global sexual satisfaction as well as psychological symptoms and affects related to sexual functioning.(Derogatis, 1975) The main areas this tool assesses are 1) general sexual knowledge, 2) types of sexual behaviour experienced, 3) drive for and real and ideal frequency of various sexual behaviours, 4) sexual attitudes, 5) psychological symptoms, 6) affect, both positive and negative, 7) gender role, 8) sexual fantasies, 9) body image, 10) degree of satisfaction with one's current sexual relationship.

There were no significant differences in sexual functioning or satisfaction with the decision to have a hysterectomy between the abused and the non-abused women. Significantly higher levels of depression were seen in women with a history of abusive sexual experiences compared with non-abused women. Importantly, there was a significant relationship between the two time-interval groups and levels of depression: the abused women were more depressed in the first year after hysterectomy than were women who had not been sexually abused. However, in the second year there were no significant differences in depression level between the two groups.

The first finding, that abused women were more depressed than non-abused women and had more negative affective symptoms, supports findings by Hendricks-Matthews that sexual assault could precipitate post-hysterectomy psychological sequelae. In view of the current high incidence of sexual abuse in the female population, it is important to consider the additional burden faced by such women when undergoing hysterectomy.

Wukasch emphasises the need to ask patients specifically about a history of negative sexual experiences prior to planning for hysterectomy as this information, being sensitive, is unlikely to be volunteered. On uncovering a positive history of sexual abuse specific preoperative counselling regarding the woman's thoughts, fears and fantasies about the forthcoming surgery should be undertaken.

In conclusion, hysterectomy is one of the most commonly performed gynaecological operations worldwide and has unique emotional, medical, social, and sexual significance for many women. All health care professionals must understand the consequences for women (particularly women with the additional burden of negative sexual experience) and develop ways to provide valid information, education and affirmation to these women before and after a hysterectomy. Family physicians have an important role in the perioperative journey, eliciting any history of sexual abuse, offering counselling and support throughout and coordinating further multidisciplinary support as required.

3.5 Comparison between alternative forms of treatment for menorrhagia

One of the major limitations of research in the field of quality of life assessment and sexual dysfunction is the over-reliance on observational studies. Randomized controlled trials in this field are difficult to perform, but in spite of the challenges a few trials have been

conducted and reported comparing outcomes in women randomly assigned to either hysterectomy or medical treatment for menorrhagia.

One such reported study has been conducted by Kupperman et al., who randomly assigned 63 premenopausal women (aged between 30 and 50 years) with abnormal uterine bleeding for a median of four years to hysterectomy or expanded medical treatment with oestrogen and/or progesterone and/or a prostaglandin synthetase inhibitor. (Kupperman et al., 2004) The primary outcome was mental health, measured by the Mental Component Summary (MCS) of the RAND 36-Item Short-Form Health Survey (SF-36). Secondary outcomes included physical health, measured by the Physical Component Summary (PCS), symptom resolution and satisfaction, body image, and sexual functioning, as well as other aspects of mental health and general health perceptions. At six months, women in the hysterectomy group had greater improvement in MCS scores than women in the medicinal management group. They also had greater improvements in symptom resolution, symptom satisfaction, interference with sex, sexual desire, health distress, sleep problems, overall health, and satisfaction with health. By the end of the study, 53% of the women in the medicine group had requested and received hysterectomy and these women reported improvements in quality of life outcomes during the two years which were similar to those reported by women randomised to the hysterectomy group. Women who continued medical treatment also reported some improvements with the result that most differences between randomised groups at the end of the study were no longer statistically significant in the intention-to-treat analysis.

Hurskainen et al. randomly assigned two hundred and thirty six women complaining of menorrhagia to hysterectomy or treatment with a levonorgestrel intrauterine system releasing 20 micrograms of levonorgestrel on a daily basis and monitored all the women for five years. (Hurskainen et al., 2004) Health-related quality of life (HRQL), as measured by the 5-Dimensional EuroQol and other measures of psychosocial well-being (anxiety, depression, and sexual function) measured by the SF-36, were assessed in all the women. After five years of follow-up, both groups showed improved quality of life scores as well as decreases in anxiety and depression. There were no significant differences in these measures between the two groups, although 42% of women in the levonorgestrel intrauterine system group eventually underwent hysterectomy. Sub-analysis revealed that women in the levonorgestrel intrauterine system group had poorer baseline measurements in many of the considered factors.

Alexander et al., in a prospective randomised controlled trial, compared in psychiatric and psychological terms the outcome of endometrial ablation and hysterectomy for the treatment of dysfunctional uterine bleeding. (Alexander et al., 1996) Two hundred and four women with dysfunctional uterine bleeding who would otherwise have all undergone hysterectomy were randomised to either hysterectomy or endometrial ablation, which was carried out either by transcervical resection or by laser ablation of the endometrium. The main outcome measures considered were mental state, marital relationship, psychosocial and sexual adjustment in assessments conducted before the operation and one month, six months, and 12 months postoperatively. The four questionnaires that were used included the Eysenck personality questionnaire, the Hospital Anxiety and Depression Scale, the Psychosocial Adjustment to Illness Scale, and the Golombok Rust Inventory of Marital State. (Eysenck & Eysenck, 1964; Zigmond & Snaith, 1983; Derogatis, 1986; Rust et al., 1986)

Both treatments for dysfunctional uterine bleeding significantly reduced anxiety and depression present before the operation and there were no differences in mental health between the groups at 12 months. There were no links between hysterectomy and postoperative psychiatric illness. In terms of sexual interest, 46 out of a total of 185 women studied (25%) reported a loss of sexual interest with 50 out of 185 (27%) reporting increased sexual interest. There was no difference in postoperative level of sexual interest between the two procedures. Marital relationships were found to be unaffected by surgery. Personality and duration of dysfunctional uterine bleeding played no significant part in determining treatment outcome.

3.6 Hysterectomy in malignant disease

A large amount of research has been undertaken on the psychological and sexual aspects of hysterectomy for benign disease. This has, in most cases, found hysterectomy to have positive effects on psychological, sexual and quality of life indices. Discussion of hysterectomy is not complete without discussing hysterectomy for malignant disease. The existing literature on hysterectomy due to cervical or endometrial cancer tends to depict more negative postoperative outcomes than those seen thus far. In further analysing the various factors involved, however, we realise that these findings may not necessarily solely reflect the effects of hysterectomy per se.

Sexuality is central to quality of life and wellbeing, during the disease-free stage of the illness at least. Psychological function is clearly affected by gynaecological cancer and its treatment in concert with the physical sequelae. Threats to sexual identity and self-esteem, personal control over body functions, intimacy, relationship stability and the potential termination of reproductive capacity have all been implicated in negative effects on sexual function after cancer and its treatment. In many cases these effects could be more salient to women than the effect of the surgery itself. Additionally, changes in emotional wellbeing, for example the experiences of depression, anxiety, anger, and fatigue relating both to the fact of diagnosis as well as the physical illness symptoms can affect sexuality indirectly.

Research on appropriate interventions targeting these acquired sexual arousal complaints is sparse. There is little or no evidence for physical interventions aimed at addressing sexual issues and, in any case, such interventions would rarely address the significant psychological concerns emerging from cancer surgery. Postoperative counselling and support for cancer is extensively available but education about sexual physiology and about potential physical and psychological changes pertaining to sexuality in the disease is still limited, if available at all. Women are generally dissatisfied with the lack of attention given to such concerns. (Butler et al., 1998)

Capone et al. has reported that psychoeducation, combining education and information with elements of psychological therapy, significantly improves frequency of coital activity. (Capone et al., 1980) Robinson et al. also found that psychoeducation enhances compliance with sexual rehabilitation, reduce fear about intercourse, and improve sexual knowledge among early stage cancer patients.

Brotto et al. studied the efficacy of psychoeducational intervention to evoke sexual awareness, teach arousal-enhancing techniques, and facilitate capacity for change in various sexual functions. (Brotto et al., 2008) The primary endpoint of the study was sexual arousal

and secondary endpoints were orgasm, sexual desire, sexual distress, relationship satisfaction, depressive symptoms and quality of life. The authors also compared women with cervical cancer with those with endometrial cancer to assess possible differential effects.

A brief, three-session psychoeducational intervention targeting female sexual arousal disorder in women with early stage gynaecological cancer was first developed and pilot tested. Twenty-two women participated in the total of four sessions. The intervention consisted of three one-hour sessions combining elements of cognitive and behavioural therapy with education and mindfulness training. Women completed questionnaires and underwent physiological measurement of genital arousal pre- and post-intervention (sessions one and four) and participated in a semi-structured interview (session four) during which their feedback was elicited. Significant positive effects were seen in terms of sexual desire, arousal, orgasm, satisfaction, sexual distress, depression and overall wellbeing and trends towards improved physiological genital arousal and perceived genital arousal were also displayed. These findings suggest that a brief three-session intervention can significantly improve aspects of sexual response, mood, and quality of life in gynaecological cancer patients. It also carries implications for establishing the components of the program for women with female sexual arousal disorders.

We now move on to looking specifically at hysterectomy carried out for malignant disease. This analysis, as we discussed previously, reveals the negative psychological and sexual impact of such surgery in contrast to positive outcomes seen with hysterectomy for other indications. When compared with a control group of women undergoing surgery for benign disease, radical hysterectomy for cervical cancer has been seen to produce significantly more lubrication problems, decreases in postoperative sexual activity, impairment in all phases of the sexual response cycle and an increase in diagnosable sexual dysfunctions. (Grumann et al., 2001; Kylstra et al., 1999)

Both physical and physiological mechanisms are involved in these negative effects. In a comparative study followed up over one year looking at women undergoing radical hysterectomy versus a healthy control group the cancer patients experienced significant impairment in genital arousal and negative genital sensations despite no differences in frequency of intercourse. The genital problems reported in these studies included lubrication difficulties, reduced vaginal length and elasticity and more importantly and distressingly, absence of genital swelling in more than half of sexual encounters. Impaired vaginal blood flow in response to sexual stimuli following radical hysterectomy has been quantified using a vaginal photoplethysmograph (Maas et al., 2002): these changes have been linked to autonomic nerve damage. (Butler-Manuel et al., 2000, 2002)

The radical trachelectomy, a fertility preserving surgery, has increasingly been used as a safe alternative to radical hysterectomy with similar recurrence rates for early stage cervical cancer in women of childbearing age. Radical trachelectomy offers hope for future child bearing with promising obstetric outcomes. These hopes and concerns are obviously associated with significant psychological and quality of life issues, the impacts of which are not fully understood. Carter et al. prospectively assessed and described the emotional, sexual and quality of life concerns of women with early-stage cervical cancer undergoing surgery. (Carter et al., 2010) A group of 71 women, consented for either radical

trachelectomy or radical hysterectomy were enrolled for the study preoperatively in this two-year study. Participants completed a preoperative survey addressing sexual functioning, mood, distress, quality of life, and issues of fertility and treatment choice, which were explored by qualitative means. Follow-up questionnaires were completed at approximately 3, 6, 12, 18 and 24 months post-surgery.

The surveys used included the Functional Assessment of Cancer Therapy (FACT) scale, the Center for Epidemiological Studies Depression Scale (CES-D), the Impact of Event Scale (IES), the Female Sexual Function Index (FSFI) and background/medical information forms.

At preoperative assessment, women opting for radical hysterectomy reported greater concern about cancer recurrence than those undergoing radical trachelectomy. Of the women undergoing radical hysterectomy 48% reported having had adequate time to complete childbearing compared to 8.6% of those undergoing radical trachelectomy. Both groups preoperatively demonstrated scores suggestive of depression and distress in CES-D and IES scales respectively. Over time, however, CES-D and IES scores generally improved. Scores on the FSFI for the total sample were below the population mean, suggesting sexual dysfunction. These also continued to improve, however, both at 12 and then at 24 months. Overall, scores generally improved during the first year, reaching a plateau between year one and year two, which could reflect a new level of functioning in survivorship. The study concluded that measurements of mood, distress, sexual function and quality of life did not differ significantly with surgical type, and instead reflected the challenges faced by the young cervical cancer patients.

Grumann et al. noticed that despite extensive research on sexual dysfunction after gynaecological cancers, there is persisting uncertainty regarding its extent and nature. (Grumann et al., 2001) A trial was therefore carried out to determine whether radical hysterectomy for stage IB cervical cancer without adjuvant treatment leads to short and/or long-term sexual dysfunction. The authors prospectively studied 20 patients undergoing radical hysterectomy for stage IB cervical cancer, 18 women undergoing hysterectomy for benign disease, and 20 healthy women. Data was collected preoperatively and at four and eight months postoperatively using standardised questionnaires and specifically developed scales. Preoperatively, the cancer patients interestingly exhibited slightly better sexual functioning than women in the other two groups but this deteriorated slightly over time. Conversely, sexual functioning improved consistently over time in the women undergoing hysterectomy for benign disease.

Although the actual number of patients in this study was small, leading the authors to urge caution in interpreting the results, most studies addressing these issues have reported similar, significant disruptions in sexual function following surgery for cancer. (Schover et al., 1989; Wejmar Schultz et al., 1992; Anderson et al., 1989; Wejmar Schultz et al., 1991) Furthermore, adjuvant therapy for cancer following surgery is usually found to be associated with far greater sexual dysfunction. (Schover et al., 1989 and Wejmar Schultz et al., 1991)

In a similar study to the one described above, Serati et al. evaluated sexual functioning in a group of women undergoing radical hysterectomy for stage IB cervical cancer, again comparing them with a control group. (Serati et al., 2009) They also compared the same group of patients with a group undergoing laparoscopic assisted radical hysterectomy for

the same indication. This was done using a validated questionnaire (FSFI) to assess the possible differences between laparoscopic radical hysterectomy and abdominal hysterectomy in terms of their impact on sexuality. The FSFI measures six domains of female sexuality: desire, arousal, lubrication, orgasm, satisfaction and pain. The authors recruited thirty-eight consecutive sexually active women due to undergo radical hysterectomy for the treatment of early stage cervical cancer and divided them into two groups according to the surgical approach. These patients were all asked to complete the FSFI at their follow-up appointment six months after surgery. Comparisons were made between the women undergoing radical hysterectomy and those undergoing laparoscopic radical hysterectomy. Further comparisons were made between the women undergoing laparotomic radical hysterectomy and a group of thirty-five healthy women (as controls) who were seen in the gynaecology clinic for routine gynaecologic evaluation.

Somewhat predictably, the FSFI scores were significantly higher in the healthy controls than in the abdominal radical hysterectomy group. Again as expected, the total score and scores in all the individual domains of the FSFI were lower in the laparoscopic radical hysterectomy group compared with healthy controls. There were no significant differences between laparotomic and laparoscopic surgery despite the minimally invasive nature of laparoscopic surgery.

The authors of this study concluded that it is important to inform women due to undergo radical hysterectomy of the commonly inevitable negative effects on sexuality. These effects may be minimised by open discussion prior to surgery and by commencing rehabilitation as soon as is feasible postoperatively.

Jongpipan examined prospectively the effect of radical hysterectomy on postoperative sexual function in South-East Asian women with early stage cervical cancer. (Jongpipan & Charoenkwan, 2007) The authors feel that sexual dysfunction is the leading cause of symptom-induced distress after surgery for early-stage cervical cancer. Thirty patients were recruited and interviewed at preoperative admission and at three and six months after surgery. Seven aspects of sexual function were assessed using visual analogue scores. These features included overall satisfaction with sexual intercourse, sexual desire, vaginal lubrication, vaginal elasticity, orgasmic satisfaction, patient-perceived partner satisfaction and associated anxiety. The authors in this study could not demonstrate any significant short-term negative impacts of radical hysterectomy on sexual function. As this was an observational study, however, without a comparison group and taking into account the small sample size, it is difficult to relate these results to the general population.

3.7 Vaginal surgery for prolapse and incontinence

Helström and Nilsson, in a prospective comparative cohort study, examined the effects of vaginal surgery for urinary incontinence and genital prolapse on sexual function and quality of life. (Helström and Nilsson, 2005) A total of 118 women, of whom 41 were undergoing surgery for urinary incontinence and 77 for genital prolapse, completed a questionnaire looking at uterovaginal symptoms, quality of life and sexuality one week prior to surgery. One year later, 101 women, of whom 88 were sexually active, accepted to complete the same questionnaire by mail. The women reported improvement in quality of life on two different scales and no difference was found between scores in women undergoing surgery for

genital prolapse and those having surgery for urinary stress incontinence. The total score for sexual variables and the mean frequency of sexual intercourse had both reduced at this point. Amongst women with genital prolapse, 14% experienced more urinary incontinence and 13% experienced more dyspareunia after the operation.

Although pelvic floor disorders are known to impair sexual function, there was no improvement in sexuality after surgery for urinary incontinence or genital prolapse. On the contrary, it seemed from this study that sexual function and dyspareunia may both have deteriorated after vaginal surgery. The explanation for this could lie in the vulnerability of the vaginal nerves and vaginal wall blood supply to disturbance during surgery resulting in impaired sexual arousal and lubrication.

Depending on age it has been estimated that up to 40% of women have complaints of sexual problems, including decreased libido, vaginal dryness, pain with intercourse, decreased genital sensation and difficulty or inability to achieve orgasm. In a review by Tunuguntla et al (2006) the etiologies and incidence, evaluation and treatment of female sexual dysfunction following vaginal surgery for indications such as stress urinary incontinence and pelvic organ prolapse; anterior and or posterior colporrhaphy, perineoplasty and vaginal vault prolapse was studied. Literature on the mechanisms by which vaginal surgery affects female sexual function was discussed along with related pathophysiology to potential causes. The anatomy, neurovascular supply of the clitoris and introitus, and intrapelvic nerve supply were discussed in relation to vaginal surgery. Techniques to avoid neurovascular damage during pelvic floor surgery were corroborated by supporting literature and female sexual dysfunction following other procedures, such as vaginal hysterectomy, Martius flap interposition, and vesicovaginal and rectovaginal fistula repair were also discussed. Current literature did not support an association between vaginal length following vaginal surgery and sexual function. The proportion of women who were sexually active was not affected by vaginal surgery. Sling surgery for urinary incontinence did not appear to adversely affect overall sexual function, although individual parameters of sexual function scores may vary. Some patients experienced improved overall sexual function due to complete relief from coital incontinence. Symptomatic vaginal narrowing was rare even in women undergoing simultaneous posterior repair. Overall sexual satisfaction appeared to be independent of therapy for urinary incontinence or prolapse and defect specific posterior colporrhaphy with the avoidance of levator ani plication might improve sexual function. The authors concluded that possible etiological factors for sexual dysfunction following vaginal surgery deserve further investigations.

3.8 Hysterectomy for chronic pelvic pain

Chronic pelvic pain is a common symptom which affects about 15% of women in the United States. (Mathias et al., 1996) It remains poorly understood and there is no clear consensus on whether it should be classed as a diagnosis or a symptom. Zondervan et al. carried out a postal questionnaire study looking into chronic pelvic pain in women. (Zondervan et al., 2001) The population prevalence of the condition was found in this study to be about 24% with pain in one third of these cases apparently lasting for more than five years. The most troublesome aspects of the symptoms reportedly included pain severity, use of healthcare, effects on physical and mental health, sleep quality and pain-related absence from work. High levels of symptom-related anxiety were also identified in this group of women.

Despite the poor understanding of the condition by clinicians various treatment options, both medical (including various types of analgesia) and surgical (such as complete and partial resection of pelvic organs and neuroablative procedures) have been discussed. (Howard, FM. 2003) Of all the hysterectomies performed in the US 12% quote pelvic pain as the primary indication making hysterectomy one of the main treatment modalities for chronic pelvic pain even though 70% of aetiologies attributed to the development of chronic pelvic pain are not gynaecological in origin. (Lee et al., 1984; Wu et al., 2007; Lamvu et al., 2006; Zondervan et al., 1999; Zondervan et al., 2001) The role of hysterectomy in treating chronic pelvic pain therefore remains controversial.

A literature search on chronic pelvic pain and hysterectomy revealed a paucity of relevant evidence. Stovall et al. published long term outcomes from 99 women undergoing hysterectomy for idiopathic chronic pelvic pain. (Stovall et al., 1990) Most of these women had histories of failed medical or surgical treatments for chronic pelvic pain. Hysterectomies were undertaken in these subjects in the belief that the uterus was the origin of the chronic pelvic pain. It was found, however, that 22% of the women complained of continued chronic pelvic pain 12 to 64 months after hysterectomy. The authors were surprised at these findings, particularly as a proportion of the women complaining of continued pelvic pain post-hysterectomy were those in which histology results had confirmed uterine disease.

Hillis et al. confirmed these findings when a similar cohort of 308 women with chronic pelvic pain was studied undergoing hysterectomy. (Hillis et al., 1995) Of this sample 21% reported continued but decreased pain and another 5% reported unchanged or increased pain after hysterectomy. Interestingly, the authors found that women who were younger than 30 years of age, uninsured, without identifiable pathology at the time of surgery and with a history of pelvic inflammatory disease were at increased risk of non-resolving pain. Stovall et al. concluded that, particularly in these groups, hysterectomy might ameliorate the pain but was unable to cure it.

Both of the above studies were limited by the relatively small numbers of participants, absence of control groups and by the fact that they did not consider confounding factors such as histories of psychological illness and abuse in the patients studied. Moreover, the studies did not identify and evaluate quality of life markers, activity levels and sexual functions.

The relationships between hysterectomy, quality of life and pelvic pain were explored by Hartmann et al. in a study which aimed to evaluate differences in quality of life and sexual function after hysterectomy in 1249 women, a proportion of whom suffered from preoperative pain and depression. (Hartmann et al., 2004) Preoperative pain was assessed and defined in terms of its duration, character and intensity. The women were monitored for up to 24 months in outcome measures including physical function, social function, health perception, continued pain, sexual frequency, dyspareunia and satisfaction with surgery. Subjects were divided into three groups: women with preoperative pain, women with preoperative depression and women with both pain and depression. They were also compared against a healthy control group. All of the variables were studied at 6, 12 and 24 months for each study group.

The authors found that women with preoperative pain, depression or with both conditions improved substantially above baseline, with improvement in pain sustained throughout the

study period. However, when compared with the control group women with pre-existing pain and depression were three to five times more likely to suffer impairments in quality of life and to experience pelvic pain and dyspareunia 24 months after hysterectomy. This study had a few limitations in terms of methodology. Firstly, the patients' initial diagnoses of pelvic pain and depression were self-reported. In addition, the indications for undergoing hysterectomy were varied and psychiatric comorbidities such as anxiety and partner interactions were not considered.

The Maine Women's Health Study, a prospective cohort study of 418 women undergoing hysterectomy for non-malignant conditions, interviewed women at the time of surgery and at 3, 6, and 12 months postoperatively. (Carlson et al., 1994) The main outcome measures considered were symptom relief, changes in quality of life and the development of new symptoms during the year following surgery. Chronic pelvic pain was found to be the primary indication for hysterectomy in 18% of the women studied. It was noted that hysterectomy had positive effects on pelvic pain, psychological symptoms, and sexual dysfunction, although it was not specified whether these figures pertained specifically to women undergoing hysterectomy for chronic pain. If these results relate to all hysterectomies considered in the study, this must be borne in mind during interpretation in the knowledge that such outcomes are likely to vary according to indication for hysterectomy.

4. Conclusion

Hysterectomy is one of the commonest operations performed in the UK and in the US, carried out in most cases for benign disease. Most studies revealed significant improvements in general wellbeing, psychological measures and sexuality following hysterectomy which were unrelated to route and type of surgery. Concomitant oophorectomy also yielded similar benefits. The only exceptions to this rule were hysterectomies undertaken for malignant disease: cases which are often complicated by other major factors relating to the disease. Psychological and sexual outcomes of surgery were found to be even poorer in cases requiring adjuvant therapy for the cancer. When hysterectomy is carried out on a background of long-term morbidity including depression, anxiety and chronic pain the results in terms of postoperative psychological and sexual functioning may again be less favourable. In these cases preoperative assessment and counselling is a key to optimising postoperative psychological and sexual outcomes.

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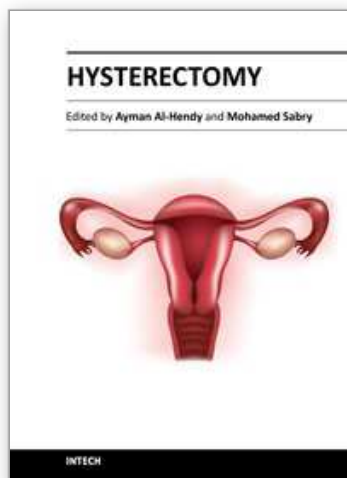
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This book is intended for the general and family practitioners, as well as for gynecologists, specialists in gynecological surgery, general surgeons, urologists and all other surgical specialists that perform procedures in or around the female pelvis, in addition to intensives and all other specialties and health care professionals who care for women before, during or after hysterectomy. The aim of this book is to review the recent achievements of the research community regarding the field of gynecologic surgery and hysterectomy as well as highlight future directions and where this field is heading. While no single volume can adequately cover the diversity of issues and facets in relation to such a common and important procedure such as hysterectomy, this book will attempt to address the pivotal topics especially in regards to safety, risk management as well as pre- and post-operative care.

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Unit 405, Office Block, Hotel Equatorial Shanghai
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中国上海市延安西路65号上海国际贵都大饭店办公楼405单元
Phone: +86-21-62489820
Fax: +86-21-62489821

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