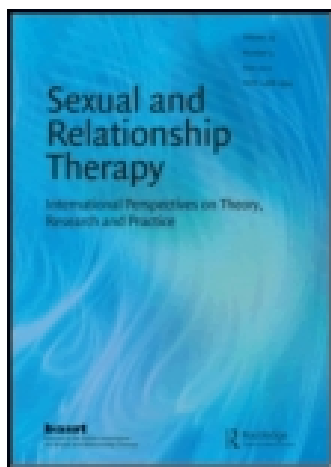


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### Sexual activity, health and well-being - the beneficial roles of coitus and masturbation

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## SCIENCE UPDATE

# Sexual activity, health and well-being – the beneficial roles of coitus and masturbation

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**ABSTRACT** *The beneficial and well-being effects of human sexual arousal induced by coitus or masturbation are reviewed. Greater sexual satisfaction and some health rewards are given by coitally obtained orgasms even though those from masturbation may be more physiologically intense. The functionality of the circulatory, neural and muscular systems of the male and female genitalia are maintained by arousal and orgasm (maintenance functions) both in the conscious state and when asleep. Prophylactic actions (preventative functions) occur in relation to prostate cancer, implantation and dysmenorrhoea. In the male, ejaculations keep sperm morphology and semen volume within normal ranges while leukocyte numbers are increased. In the female, with coital vaginal deposition of semen mood enhancement occurs, menstrual cycles are more often of the ovulatory (fertile) type and postmenopausal vaginal atrophy is counteracted.*

**KEYWORDS:** *sexual satisfaction; sexual satiety; health; well-being; coitus; masturbation; orgasm; prolactin; oxytocin; implantation; cardiovascular system; prostate; vagina; cervix; breast; penis; ejaculate; immune system; cancer; myocardial infarcts; dysmenorrhoea*

## Introduction

The relationship between an individual's health and well-being and their sexual activity, especially masturbation, has been the subject of numerous discourses in the western world. According to Laqueur (2003), the real creation of the new guilt against masturbation started after the publication of the anonymous and undated tract (circa 1712) "Onania" where it was described as a serious medico-ethical problem with dire results. This was followed by others whose opinions and prejudices of the author were often little more than morality tracts. European and American diatribes against masturbation and to some extent sexual activity (Tissot, 1764;

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Kellog, 1891) are but illustrative of the general tenor of such polemics. The displeasure was focussed mainly on males, young men in particular, for semen was thought to play a special role in the economy of the body, claims that one ounce (33 grams) of semen lost being the equivalent of the loss of 40 ounces (one and a third kilograms!) of blood, so that its wasteful dissipation by masturbation was held to create a disequilibrium leading to malady and disease. Masturbation by females, however, because of the possible loss of vaginal fluid, was also condemned as they could suffer from hysteria, jaundice, menstrual derangements, epileptic fits, enuresis, unchastity of speech while its practice would facilitate the pathway to sodomy. Non-procreative sexual activity was also regarded as harmful because by its overexcitement it caused damage to the nervous system. Prostitutes were criticised because their activity caused the over-stimulation of the male's sexual apparatus. One of the first serious counters to this anti-sexual agenda was begun in Britain by Havelock Ellis (1897) who argued against vilifying masturbation and initiated the case for its positive attributes as an important part of the development of human sexuality. Moreover, for Ellis sex was essential for both mental and physical well-being. He was an early and strong proponent of the concept that recreational sex was just as important to men and women as reproductive sex. The shackles, however, of the anti-sexual attitude remained in America for years; even as late as 1994 the then President of the United States (Clinton) under political pressure sacked his Surgeon-General (Dr Jocelyn Elders) because she mentioned that masturbation should be regarded as safe and healthy and included in the school sexual education curriculum.

The present review collects the scattered studies in the literature about the roles that coitus and masturbation have in benefiting the health and well-being of male and female participants. While many have evidence-based conclusions some subject areas have been less developed and the conclusions are opinion-based.

### **Sex and mortality rates**

One of the most difficult "facts" to parse out from data collected from surveys of selected populations asked about their sexual activities in relation to their health is causation, whether or not particular sexual activities increase or decrease (or have no effect!) on their mortality risk, especially myocardial infarcts. The many different features of life and lifestyles (e.g. diet, workload stress, levels of physical activity) create multimodal models that limit seriously the ability to control the data for known and possible confounding effects while unmeasured or unknown effects clearly cannot be factored in for corrections. Despite this, there have been a number of studies suggesting that there is an inverse relationship between orgasmic frequency and mortality (Persson, 1981; Abramov, 1976). Palmore (1982) undertook a longitudinal study with a group of men and women over 25 years. He found that for men the frequency of coitus was a significant predictor of longevity but not for women, the best predictor for their longevity was their reported past enjoyment of coitus. A Caerphilly cohort study of 918 men aged 45–59 years at time of recruitment with a 10-year follow-up (Smith *et al.*, 1997) examined all deaths and deaths from

coronary heart disease and the results were interpreted to indicate that the mortality risk in the group with the high orgasmic frequency was 50% lower than in the group with the lower orgasmic frequency and that there was evidence of a dose–response relation across all groups. As with all of these survey type studies criticism appeared later. Batty (1998) argued that the authors had failed to adjust for energy expended during sexual activity, which is associated with a decrease in mortality (Hakim *et al.*, 1998) (see section below on Sex as exercise).

A saying that is often quoted is that “nobody has ever died from not having sex”; that may be true but it does not take into account that its lack can generate frustrated, resentful, unfulfilled and embittered individuals. It has been difficult to ascertain the effects that claimed life-time celibacy and even relatively short periods of sexual abstinence have on emotional health due to difficulties in isolating them from all the other possible differences in lifestyle and behaviour that could influence physical and mental health. Haddon (1983) in a popular book on celibacy could find no scientific study to quote based on this theme. The noticeable paucity and lack of useable data on even short term (6 months) coital abstinence is remarkable (Nettleman *et al.*, 2006). A number of reports have indicated, however, that in both sexes higher death rates are seen in the unmarried from all causes than in the married (Berkson, 1962). Obviously factors other than simply sexual activity could help account for this difference, but it does show that partaking of sexual activity which most married people undertake does not necessarily enhance death rates! In the case of nuns, a supposedly sexually abstinent group well studied because they can be compared with sexually active women, patterns observed for breast and cervical cancer appear different. Meurer *et al.* (1990) concluded that nuns had a 20% greater risk of having breast cancer compared to US females, which is consistent with the increased risk associated with nulliparity. Nuns had a significant excess in mortality from breast cancer over the span 40 to 74 years with consistently higher rates than controls for every age group older than 39 years (Fraumeni, *et al.*, 1969). The risk of death from cancer of the cervix in nuns has been estimated to be little different from that of the general population (Griffiths, 1991), suggesting that not partaking of coital activity does not give a large protective bonus from cervical cancer.

### **Coitus versus masturbation**

The only qualification that coitus needs is whether it takes place heterosexually with or without a condom. Masturbation, however, is a more complex activity. The word not only applies both to auto- or self-masturbation (pleasuring oneself) but also to partner-activated masturbation which can be same sex or opposite sex. Remarkably few authors specifically qualify its usage in their studies so that the exact type of stimulation is unknown, which is unfortunate because this may have a significant impact on the psychological/physiological intensity and subsequent sexual satisfaction of the arousal. In recent years some studies on coitus and masturbation in males and females have attempted to characterise the similarities and differences of these activities, often ascribing to the former benefits not observed with the latter. In fact it

is not at all surprising that the two methods of creating sexual arousal may have different physiological and psychological effects, especially so in the female. This is because different genital structures are stimulated by clitoral masturbation as opposed to coitus. Clitoral stimulation is highly localised, the stimulus being focused usually on the glans and/or shaft of the organ; little or no stimulus escape to the labia or vagina occurs and the impulses are conveyed to the brain via the pudendal nerve. Coitus, on the other hand, not only can stimulate the labia, introitus, periurethral glans (Levin, 1991) and the vaginal wall but if the thrusting is deep and forceful, the erotic structures embedded in and above the anterior wall of the vagina, namely the urethra, the so-called G-spot and Halban's fascia. It has been suggested that this group of erotically activated tissues be named the "anterior-wall complex" as it is impossible for only one of these to be activated during penile thrusting or by strong digital pressure (Levin, 2003a). The activation of the multiple structures would clearly produce a greater train of neural impulses to the brain than that simply from the clitoris alone as the stimulated structures would convey the impulses by the pelvic, hypogastric and even possibly the vagal nerves. In fact, even vaginal penile thrusting during coitus may also stimulate the clitoris through stretching and relaxation of its tendons located around its base (Ingleman-Sundberg, 1997). Moreover, there appears to be a synergism between the two erotic sites when they are activated together. Hoch (1986), from his experimental studies, reported that if the anterior vaginal wall and the clitoris are stimulated at the same time women achieve orgasm very quickly and "the response is more intensive and sexually fulfilling than if obtained by the separate stimulation of either of the two areas". It has been suggested that stimulation of the periurethral glans during coitus by the in-and-out thrusts of the penis could be the stimulus and trigger for penile-induced vaginal orgasms in those women whose periurethral glans are well innervated (Levin, 1991).

A further aspect of coitus that would create differences compared to masturbation if condoms are not used is the deposition of the ejaculate into the vagina. Ejaculates contain many biopotent substances (hormones, prostaglandins, transforming growth factor beta – TGF $\beta$ ) that may affect the vaginal and cervical mucosa *per se* and/or be absorbed and once in the bloodstream affect circulatory/neural/hormonal balance and brain functions (see sections below on Benefits of exposing the female to semen). With the previous semen functions in mind, it has been claimed that frequency of intercourse but not other sexual activities is associated with better cardiovascular autonomic function (Brody, 2006; Brody & Preut, 2003) and with greater ability of women to identify their emotions (Brody, 2003). Leiblum *et al.* (1983) found that the vaginas of postmenopausal women who had coitus showed significantly less atrophy than those that did not and even those that had masturbated.

### **Sexual satiety and satisfaction: is prolactin release at orgasm involved in both men and women?**

Sexual arousal to orgasm usually produces a pleasant calming effect of sexual satisfaction. The mechanism that Krüger *et al.* (2002) initially proposed for the

induction of sexual satiety or refractoriness after orgasm was that the orgasmic specific release of prolactin switched off the arousal; they did not distinguish between men and women. Levin (2003a) pointed out that such a mechanism was unlikely in women because they are multi-orgasmic and can have repeated orgasms without satiation taking place. Although in a more recent review (see Levin, 2007) the authors did mention that the prolactin effect “may differ between genders” (i.e. may not apply to women); this basic criticism has been ignored in subsequent papers (Brody, 2006a; Brody & Krüger, 2006). In a study (Krüger *et al.*, 2003) where prolactin secretion was manipulated in males by drugs to give high and low levels, the effects did not show a simple and direct negative feedback of prolactin on sexual arousal for apart from the delay in ejaculation (latency) “hyperprolactinaemia did not lead to the significant reduction in sexual parameters that would be expected in a tight feedback loop. Furthermore, in the placebo condition, the sexual experience of the second sequence, where prolactin was already increased, was not different from the first”. The conclusion was that even in males, while prolactin was important in the post-orgasmic regulation of sexual behaviour, it was one signal within a network of psycho-neuroendocrine regulations. Indeed, Caldwell (2002) had previously suggested that oxytocin released at orgasm could also be a possible neuropeptide that reduces arousability by decoupling shuttling G-proteins from steroid hormone activation. With this admission by Krüger *et al.* (2003) that prolactin is not the key to creating the sexual refractory state, it is surprising to find Brody & Krüger (2006) now proposing that the post-orgasm prolactin response is an objective physiological index of sexual satiety in men and women. They reported that the magnitude of the prolactin released following coital orgasm is much greater than that released by masturbatory orgasms in both males and females. This, they claimed, showed that coitus was more satiety-inducing than masturbation and thus more physiologically satisfying. Unfortunately, the study was an opportunistic one that used and compared prolactin data from three previous groups of men and women obtained in other studies but, remarkably, in none of these studies were the participants asked any questions or to scale their actual “satisfaction” from the two sexual arousal methods! Moreover, the concept that post-orgasmic prolactin levels are an indicator of satiation again cannot be appropriate for women because of their multi-orgasmic ability. Ladas *et al.* (2003) discussed a completely different mechanism by which sexual satiation comes about in the female (pp. 148–149). This was proposed initially by Davidson (1980) and depends on the activation of intense uterine contractions at orgasm mediated through the hypogastric nerve; if they are activated, then sexual satiation occurs and the subject experiences complete satisfaction, but if they do not occur then further orgasms are possible. Prolactin has no action on orgasmic uterine contraction but oxytocin may be involved (see Caldwell, 2002 above).

Assessing the relationships between the intensity of the orgasm and the sexual satisfaction it bestows has not been without its problems. Masters and Johnson (1966) first claimed that the physiological intensity of arousal was actually highest from masturbation rather than from coitus but that the subjective satisfaction need not be

as satisfying (the claim appears to be based on the intensity and duration of uterine contractions). Not surprisingly, however, an increase in emotional intimacy during or after coital orgasms compared to solitary masturbatory orgasms was reported by Mah and Binik (2002) in their analysis of whether all orgasms felt the same. In a later paper, Mah and Binik (2005) found that orgasms that felt physically intense were likely to be experienced as highly pleasurable and satisfying. They commented that this conflicted with the Masters and Johnson finding reported above and confirmed by others (Butler, 1976, Clifford, 1978; Davidson & Darling, 1989) that subjects report that while masturbatory orgasms are felt to be more physically intense they are less psychologically satisfying than less intensive coital ones. They suggested that this conflict might be due to subject's bias in thinking that coital orgasms sound more socially desirable and acceptable than those obtained during masturbation when asked to distinguish between the two.

### **Ejaculation: sperm and semen quality**

There is evidence that if ejaculation is not experienced for a period as short as 5–18 days both the quality and quantity of the spermatozoa decrease (see Levin, 2005 for references). Masturbation and nocturnal emissions were suggested as mechanisms to ensure the maintenance of a fertile ejaculate independent of the proclivities of female acceptance for coitus (Levin, 1975) and also to have an ejaculate best suited to counter possible sperm competition from a rival suitor/lover. Man is not the only mammal to masturbate, it is common to most primates, dogs, cats, bulls, horses, shrews, rats, hamster, deer and even whales. A number of studies have associated coitus as producing a higher quality ejaculate (greater volume and increased concentrations of prostaglandins and polyamines) compared with those produced by masturbation while the duration of the pre-ejaculatory stimulation during masturbation has a significant effect on the quality of the ejaculate. The type and duration of sexual arousal can thus influence the quality of the ejaculate (see Levin, 2005 for references).

### **Prostate cancer and ejaculation**

The epidemiological studies on the incidence of prostate cancer have unfortunately yielded contradictions about the relation of sexual activity (ejaculations/orgasms) to the possible increased risk of the condition. There has been controversy about whether plentiful ejaculations can reduce the susceptibility to cancer of the prostate. A meta-analysis of the association between prostate cancer and aspects of sexual activity showed an increased risk was associated with an increasing frequency of sexual activity but the studies were heterogeneous as an increasing number of sexual partners were also associated with prostate cancer (Dennis & Dawson, 2002). Correa (2005) drew attention to three earlier studies where sexual activity was associated with a risk increase.

In a case-controlled study of men with prostate cancer aged less than 70 years old and age-matched controls, Giles *et al.* (2003) collected data on the number of

sexual partners and the frequency of ejaculation (from all types of arousal) during the third to fifth decades of their life. They did not find any relation of prostatic cancer to the number of sexual partners (suggesting that sexual disease transfer was not a cause) but they did find that a reduced amount of ejaculations in the early part of life was associated with an increased risk of prostate cancer. The conclusions of the study and the publicity surrounding it in the *New Scientist* (Fox, 2003), and worldwide were criticised in letters by Brody (2004) because the questions asked were not specific to masturbatory ejaculations and by Oliver (2004) because the conclusion about disease not being the cause was not justified by the data. Notwithstanding these criticisms, a previous review by Bosland (1988) concluded that men who developed prostate cancer had lower rates of penile vaginal coitus at age less than 50 years than age-matched controls and also had a greater frequency of masturbation. Another study examined the relationship between the number of ejaculations and prostate cancer in 29,342 U.S. men aged 46 to 81 years (Leitzman *et al.*, 2004). Most categories of ejaculation frequency were unrelated to the risk of prostate cancer but high ejaculation frequency was related to a decreased risk of total prostate cancer. The mechanism of the possible protection that ejaculations may have is unknown but one suggestion was that chronic contact of the glandular cells with their luminal secretions may be conducive to carcinogenesis.

One of the possible confounding effects on the incidence of prostate cancer is that of diet. Two studies have investigated the effects of dietary fat. Giovannucci *et al.* (1993) and the follow-up study by Michaud *et al.* (2001) surveyed a prospective cohort of 51,529 U.S. men aged 40 to 75 years on food frequency. From the first study they reported that total fat consumption especially that from red meat was directly related to risk of advanced prostate cancer. In the second follow-up study it was stated that intakes of red meat were not associated with risk of total or advanced prostate cancer but were involved in an elevated risk of metastatic prostate cancer, especially if coupled with high dairy food intakes. Processed meats, bacon and beef, pork or lamb as a main dish also contributed to this elevated risk. What effect these findings could have on the previous epidemiological studies that did not take the dietary habits of the subjects under study for the effects of sexual activities on the prostate is unknown.

### **Effects of orgasm on male immune system**

The effect of masturbation-induced arousal and orgasm in males on the immune system was studied by Haake *et al.* (2004). They found that the absolute number of leukocytes, especially natural killer cells (CD3<sup>-</sup>, CD16<sup>+</sup>, CD56<sup>+</sup> involved in attacking infected cells), increased but the T-cell (involved in cell-mediated immune responses) and B-cell (involved in humoral mediated responses) populations remained unaffected. Thus, unlike the claims of the anti-sex protagonists (Hodgkinson, 1988), sexual arousal and orgasm actually enhance some functions of the immune system rather than depressing it. As yet a similar study has not been undertaken in females.



### **Effects of orgasm on dysmenorrhoea**

Masters and Johnson (1966, pp. 125–126) reported that a number of their subjects ( $n = 43$ ) used self-masturbation with the onset of their menstruation to relieve minor to major degrees of dysmenorrhoea. The orgasm induced by the activity “increased the rate of (blood) flow, reduced pelvic cramping when present and frequently reduced their menstrual associated backaches”. On direct observation in the laboratory using a speculum it was found that at the terminal stages of orgasm menstrual fluid could be seen squirting out of the cervical canal under pressure. In a survey of some 1900 U.S. women, 9% reported that they had masturbated in the previous 3 months to obtain relief from painful menstruation (Ellison, 2000).

### **Sexual activity as exercise**

Sexual activity normally entails increases in heart rate, blood pressure and respiration and can involve voluntary (striated) muscular activity (Masters & Johnson, 1966), so it can be equated to exercise where all of these features are in operation (Butt, 1990). Because the male is usually the more active partner in coitus in terms of thrusting and movement, most of the measurements on energy expenditure and so on, have been conducted on males (Bohlen *et al.*, 1984). The subject is of great interest to medicine in that it is important to know the possible extra strain on the heart in relation to normal energy expenditure and those recovering after myocardial infarct. Stein (2000) comprehensively reviewed the various studies that have measured heart rates, blood pressure and oxygen consumption during coitus in various environments in both normal subjects and in post-coronary patients. Those undertaken in laboratories generally had higher values than those undertaken in the subject’s homes, but the conclusion was that the range of values created during coitus was not above those for mild general exercise. One set of estimations for myocardial oxygen cost was that it was the equivalent of climbing two flights of stairs (Hellerstein & Friedman, 1970) or that of a leisurely walk or strolling (Ainsworth *et al.*, 1993). Coitus then is approximately equivalent to a mild bout of exercise, maintaining the tone of the cardiovascular system which can be important in reducing mortality (see previous section on Sex and mortality rates).

### **Benefits of exposing the female to semen**

While there are rare exceptional cases of females who have an allergic reaction to the deposition of semen into their vaginas (Shah & Panjabi, 2004) the great majority of such depositions are beneficial, as detailed in the sections below.

#### *(a) Through direct contact*

The cervix responds to the spermatozoa in semen, but not to the seminal plasma, by a significant increase in the number of leucocytes (white cells). The exact role(s) of this “leukocytic reaction” remains to be established but it has been suggested that possible

functions may be sperm selection, the mopping up of bacteria by phagocytosis and possibly immunovigilance (see Levin, 2005b for references). Insemination exposes the female reproductive tract to seminal plasma and it is known that in animals this is beneficial for implantation (Robertson, 2005). Studies investigating the role of semen exposure in human females who were undergoing assisted human reproduction (IVF, intrauterine insemination) have given conflicting results, some showing effects and others not, but in all cases the semen was applied by artificial insemination. The only study that has used natural coitus during an IVF cycle found that exposure to semen around the time of embryo transfer increased the likelihood of embryo implantation and development (Tremellen *et al.*, 2000). Interestingly, infertile couples tend to practice abstinence during fertility treatment which is often encouraged by the attending physician; the results of the study suggest that coital activity should be encouraged and maintained. Coulam and Stern (1995) demonstrated the effect of seminal plasma on implantation rates in a clinical trial carried out with women experiencing unexplained infertility and/or recurrent spontaneous abortions. They inserted gelatine capsules vaginally containing seminal plasma or placebo (vaginal jelly). Women with the plasma administration had higher implantation rates (80%) compared to those on the placebo (67%), suggesting that as in animals seminal plasma administered vaginally facilitates implantation.

*(b) Through genital absorption*

Ney (1986) hypothesised that the absorption of prostaglandins from the semen ejaculated into a woman's vagina could be absorbed and affect her mood. Gallup *et al.* (2002) assessed the effects of condom use on the incidence of depression in sexually active college females. Females who were having sex without condoms were found to be less depressed while depressive symptoms and suicide attempts among females who used condoms were proportional to the consistency of condom usage. The purpose of the semen effect has been questioned by evolutionary psychologists asking "why should it have evolved?" One possible answer is that the mood enhancement from coital ejaculation was noticed by women, which made it attractive even if the men ejaculated without giving the female an orgasm.

Regular coitus appears to influence early ovulation and to make the menstrual cycles more often of the fertile (ovulatory) type (see Levin, 2005 for references). These actions will increase the chance of coital fertilisation. Whether it is due to the action of the ejaculate in the vagina and its absorption, or some other action triggered off by the coitus, is as yet unknown.

*(c) Through oral absorption*

While clearly not coital or masturbatory, oral penile stimulation to ejaculation is included in the survey of benefits for comprehensiveness. In an unusual study Koelman *et al.* (2000) correlated oral sex and the ingestion of semen with a diminished occurrence of pre-eclampsia, a serious pathological condition of pregnancy initiating with high blood pressure and protein in the urine.

## **Sexual arousal and analgesia**

### *(a) Relief from painful medical conditions*

Marchand (1961) observed two psychiatric patients who used masturbation to obtain relief from painful medical conditions. He was the first to suggest that masturbation could be used to reduce pain. Sexual arousal, especially if orgasmic, has been reported to relieve chronic and back pain and to increase the threshold of pain in women (Komisaruk & Whipple, 1995).

### *(b) During labour*

The induction of sexual arousal to orgasm has been used in a number of cultures by midwives to facilitate labour and to create pain relief without recourse to drugs (see Pranzarone, 1991 for references). Its employment in the hospital obstetrics of the Western world, however, would be anathema firstly as every effort is made to desexualise the experience of pregnancy and childbirth and second, the propriety of introducing such overt sexual practices into medicine. However, nipple stimulation to enhance labour contractions has been promoted and used in clinical practice. Pranzarone (1991) proposed a protocol for the inclusion of sexual arousal in childbearing to allow women to take personal control over the birthing process and create a more positive, enjoyable and emotionally rewarding parturition, but the chances of it being taken up are remote indeed.

## **Sexual arousal and genital/genital tract maintenance**

All organ systems in the body have a cardiovascular and neural supply and in many cases a musculature. To maintain the functionality of these systems they need to be put into use; the old adage “use it or lose it” applies. Physiological changes activated by the neural innervation occur in the peripheral circulation and in the musculature of both the female and male genital tracts during arousal and at orgasm (Masters & Johnson, 1966; Levin, 1998). There are also a number of reflexes that are activated during coitus that involve contractions of the pelvic striated muscles in both the male and female. These have been reviewed by Levin (2003b) and more recently in Levin (2005). Obviously coitus and masturbation activate these systems but they are also activated by sexual arousal during sleep. This occurs both for males (nocturnal erections, emissions or “wet dreams”) and for females who have periodic increases in vaginal and clitoral blood flow associated with REM (Rapid Eye Movement) sleep and orgasms (Levin, 2005). It is thought that the increased blood flow brought about by the nocturnal sexual arousal creates an intermittent oxygenation of the genitalia that helps in the maintenance of the morpho-dynamic integrity of the genital smooth muscle. A possible example of the “use it or lose it” scenario is the mention by Masters and Johnson (1966, p. 181) that the penis of secondarily impotent males attains a state of pathologic involution (compared to their established norms) after two to four years of unremitting impotence. They suggested this penile hyperinvolution might be due to a central

neurally controlled involution, but it is more likely that the chronic lack of blood flow leads to a reduction in the penile morpho-dynamic integrity, resulting in a decrease in organ size. The vaginal atrophy that occurs in postmenopausal women due to lack of ovarian oestrogen can be overcome if coital activity is maintained (Leiblum *et al.*, 1983).

### **The possible downsides of sexual activity**

While the focus of this article is to collect and review the studies where sexual activity, either by coitus or masturbation, has psychological and physiological benefits in health and well-being for its practitioners, it should be mentioned that there are also some obvious health risks. All life's activities carry a risk, in the case of sexual activity these can be kept to a minimum if safe sexual practices are employed. The health risks of unprotected or unsafe sex are the "common" sexually transferred diseases (AIDS, chlamydia, gonorrhoea, hepatitis, genital warts, syphilis) and for women the unwanted pregnancy.

### **Conclusion**

Human sexual activity has often been negatively promoted as causing disease, dysfunction and disruption. The literature is awash with articles on the pathologies of sex. However, in the last few years a number of studies have been published that reveal the effects of sexual arousal and orgasm induced either by coitus or masturbation on the health and well-being of both males and females in terms of their having maintenance functions and preventative (prophylactic) functions. There is evidence that coital orgasms give greater sexual satisfaction and more benefits than those from masturbation although the actual physical intensity of the orgasm may be greater in the latter. There are still many unknowns – how much influence has sexual activity in the better mortality statistics for married as opposed to single individuals, how important is the influence of diet on cancer of the reproductive tract especially the prostate, how does orgasm in males increase their white cell numbers and does it also occur in women, does exposure to pathogen-free normal ejaculates influence cervical cancer, is the stimulation of the periurethral glans crucial to obtain vaginally induced coital orgasms, does sexual abstinence strengthen or weaken relationships, and how does coitus influence the regularity and ovulatory menstrual cycles – these being just some of the questions waiting to be answered.

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