

## CHAPTER 1: INTRODUCTION

### 1.1 Human Sexuality

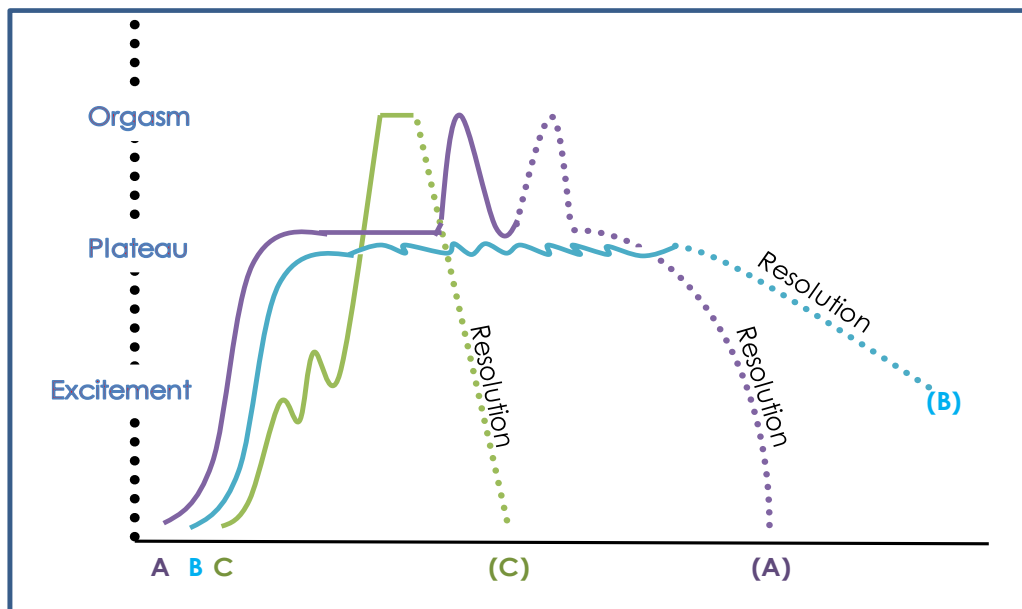
Human sexuality has long been taboo and essentially marginalized in the realm of modern medicine. This fact holds true across cultures, although some cultures are more open with regards to sexuality than others. Nevertheless, matters pertaining to sexual health are infrequently discussed in day to day medical consultations. Apart from the obvious taboo as well as the social, religious and cultural restrictions that come into play when sexual matters are discussed in clinical practice, the clinician has a further dilemma; for the most part of the 20<sup>th</sup> century as modern medical science developed, data pertaining to sexuality and sexual health were for the most part lacking.

The first effort to study human sexuality was conducted by Alfred Kinsey who in 1948 published his seminal work '*Sexual Behavior in the Human Male*'.(Kinsey, 1948) This was followed up another publication in 1953, '*Sexual Behavior in the Human Female*' which made comparisons between the male and female sexual repertoire.(Kinsey, 1953) The work done by Kinsey and colleagues involved over 10000 male and female respondents, but the sample was biased as it involved only white college educated people. Despite that, Kinsey's study was the first to give insights into the human sexual repertoire and was regarded as a landmark study.

## 1.2 Sexual Response Cycle

Following the work of Kinsey and colleagues, other researchers began to study human sexuality. In the late 1960's, Masters and Johnson described the sexual response cycle as consisting of four phases; excitement, plateau, orgasm and resolution (Masters WH, 1966).

It is depicted diagrammatically below.



This model reflects the different responses different woman may have or an individual woman may have on different occasions. For instance, Woman A has a smooth transition from excitement to plateau to orgasm to resolution and has multiple orgasms on this occasion. Woman B (or Woman A on a different occasion) has a smooth transaction up to plateau but doesn't experience an orgasm. This is not a problem if it is an occasional occurrence (e.g., it is Woman A, who sometimes experiences orgasm) but would be diagnosed as a sexual disorder if this occurs every time Woman B has a sexual experience. Woman C has a different pattern of transition from excitement through orgasm and resolution than either A or B – again possibly reflecting the same woman on another occasion or three different women.

**Figure 1: Female sexual response cycle proposed by Masters and Johnson** (Adapted from 'What you need to know; Female sexual response'. Association of Reproductive Health Professionals. [www.ahrp.org/factsheets](http://www.ahrp.org/factsheets)).

In the excitation phase, there is a heightened state of sexual excitement with increased blood flow to the erogenous zones in both men and women. In the male, there is erection of the penis, tightening of the scrotal sac and elevation of the testes and secretion of mucoid fluid from the Cowper's gland. These changes are accompanied by other physiological changes such as tachycardia, elevated blood pressure, increased respiration rate and myotonia. In the female, analogous changes in the genitalia are enlargement of the clitoris and labia minora, elongation of the vagina accompanied by increased secretion of mucus, nipple erection and flushing of the skin.

The changes of the excitement phase are maintained and further intensify in the plateau phase before culmination in orgasm. During the orgasmic phase, there is a peaking of sexual pleasure accompanied by rhythmic contraction of the perineum and associated musculature. In the male there is ejaculation, which is a result of contraction of the vas, seminal vesicles and prostate gland. In the female, there is rhythmic contraction of the lower third of the vagina, uterine contractions and loss of voluntary muscular control. In both sexes, during orgasm, there is further hyperventilation, tachycardia and elevation of blood pressure. A feeling of release of sexual tension and pleasure is experienced.

Resolution is the final phase of the sexual response cycle and it represents a return of the physiological parameters to the baseline accompanied by a relaxed and satisfied feeling. The return of the physiologic parameters such as blood pressure, heart and respiratory rate to baseline generally takes a few minutes.

Other models of sexual response have been described. Kaplan suggested that a desire phase was pertinent prior to excitation (Kaplan, 1974, Kaplan, 1975). Desire is the subjective

awareness of a longing for sexual activity. Sexual desire is a complex dimension that is influenced by an individual's personality, sexual fantasy, current relationship status or any number of medical or psychosocial stressors. Having considered the dimension of sexual desire, Kaplan proposed a triphasic model of sexual response; desire, arousal and orgasm(Kaplan, 1979). These new insights into the understanding of the human sexual response occurring at a period of major shifts in social attitudes regarding sexuality led to the development of modern sexual medicine and therapies. The more liberal views on sexuality in the western world encouraged people to speak openly about sexual matters and encouraged help seeking behavior.

The models of sexual response put forward by Masters & Johnson and Kaplan were significant advances in the understanding of sexual physiology and form the basis of most current classifications of sexual disorders. Nevertheless further contributions into the understanding of human sexuality were put forward by other researchers. In the 1990's, the circular model of sexual response was proposed by Whipple and Brash-McGreer. This model consisted of 4 stages; seductions, sensations, surrender and followed by reflection. In essence these stages are analogous to those proposed by Masters & Johnson and Kaplan; seduction=desire, sensations=excitement, surrender=orgasm, reflection=resolution. However the circular model emphasized the importance of reinforcement in the sexual act, particularly in the reflection phase, which will influence future sexual behavior in the woman. Hence a sexual experience that was deeply pleasurable and satisfying for the female will have a positive reinforcing effect. If the sexual experience was a negative one, the female may avoid future sexual activity.

Rosemary Basson provided a further model of the female sexual response, which is known as the non-linear model of sexual response(Basson, 2001).She pointed out some inherent flaws of the previous models, which in a nutshell was that the female sexual response was far more complicated than had been thus far described as being in three or four stages which occur in succession. Rather she postulated that the female sexual response begins when she is in a neutral state. The desire for sexual union is contingent on a host of factors such as emotional intimacy with her partner. This then encourages her to seek out sexual stimuli and lead to arousal which in turn escalates her desire and progress subsequently to full sexual union and orgasm. The emotional intimacy and physical sensations that she finds satisfying will positively reinforce her in future sexual activity(Basson, 2005).

It is pertinent at this juncture to discuss some of the criticisms of the previous models of female sexual response. Basson summarized in a review paper some of the shortcomings of the models put forward by Masters, Johnson and Kaplan(Basson, 2002). The previous models did not address the issue of intimacy or sexual stimuli. Needless to say, sexual motivation is a far more complicated than previously thought and influenced by a host of innate and contextual factors. The older models did not emphasize the importance of emotional intimacy which is inherently of vital importance to the woman; rather it emphasized physiological changes and responses. In terms of sexual stimuli, which are necessary for the sexual response to occur, the type and nature of the stimuli are far less important than the context in which it occurs. Another flaw that Basson pointed out was that the phases of the sexual response do not necessarily follow one after the other as described earlier. Indeed arousal may occur without desire, and a woman may feel satisfied

without orgasm. The linear models also emphasized the importance of sexual thoughts and fantasy as an important component of the sexual desire phase, which has been shown to be unnecessary as studies from community samples have found that women report satisfying sex lives despite them never or rarely thinking of fantasizing about sex (Cawood and Bancroft, 1996, Garde and Lunde, 1980). Further problems with the linear model of sexual response was the assumption that the male and female sexual response was implicitly similar, which we know now to be inaccurate. Basson's sexual response model is represented diagrammatically below (Basson, 2001).

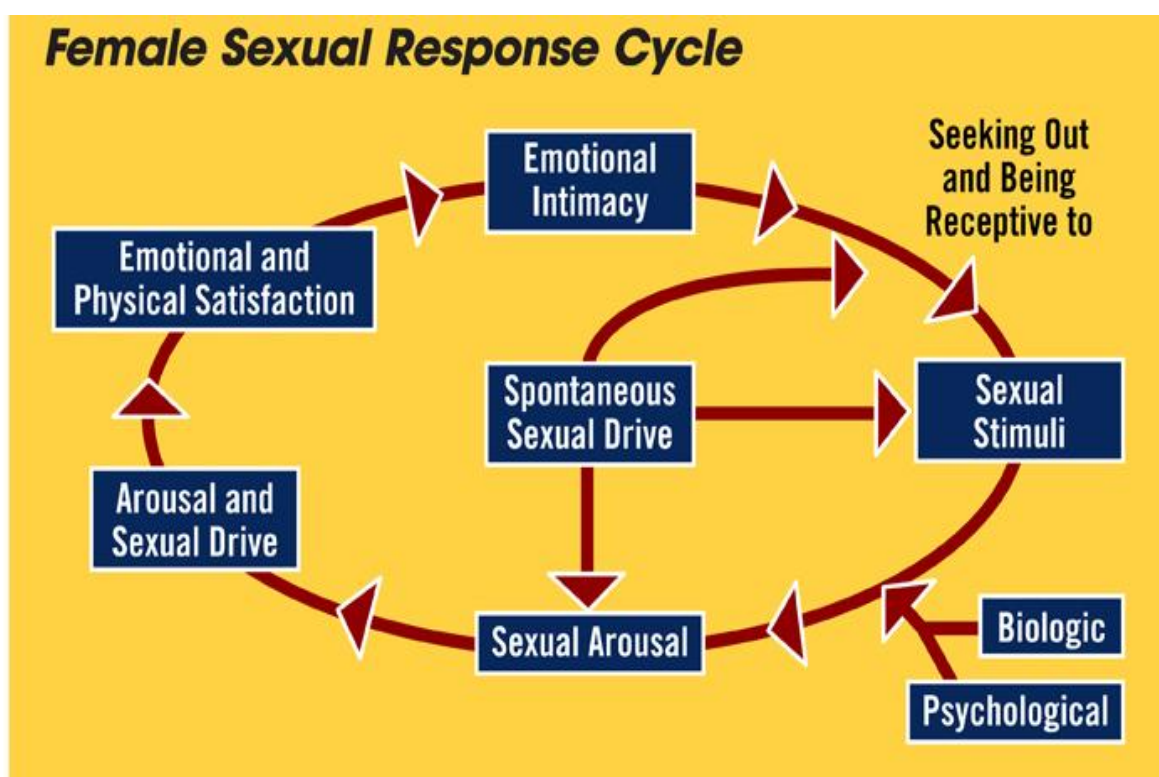


Figure 2: Female sexual response proposed by Basson (Adapted from Basson R. Human sex-response cycles. *J Sex Marital Ther.* 2001;27:33-43)

## CHAPTER 2: LITERATURE REVIEW

### 2.1 Female sexual dysfunction: An Overview

Female sexual dysfunction (FSD) has been well categorized in the DSM-IV-TR and is done so in keeping with the phases of the sexual response cycle. This however is a recent development. For the most part of the 20<sup>th</sup> century, the sexual problems related to women were very arbitrarily discussed and were treated by gynecologists, sexologist, psychiatrist as well as marital therapists(Angel, 2010). As interest grew in the field of psychoanalysis, there was a tendency to conceptualize sexual problems in the female to stem from a failure of normal female sexual development and a lot of interest was focused on frigidity.

The first edition of the Diagnostic and Statistical Manual (DSM) 1952 of the American Psychiatric Association (APA) was probably the first modern classification of sexual disorders, but it had its limitations(APA, 1952). In this primary edition of the DSM, sexual problems were classified under Personality Disorders, in a subcategory of Sexual Deviations and included such things as homosexuality, transvestism, pedophilia, fetishism, and sexual sadism. Clearly such a classification was inadequate and only skimmed the surface of the scope of sexual disorders. The inclusion of homosexuality as a disorder was also a reflection of the cultural sentiments at that period of time. The DSM II which was published in 1968 did not make significant changes to sexual disorders(APA, 1968).

The DSM III on the other hand represents the first significant classification that had clinical value. The work of Master's, Johnson and Kaplan clearly had an impact onto the way the sexual disorders were conceptualized. The DSM III had a chapter on Psychosexual

Disorders, in which there were separate subcategories for gender identity disorders, paraphilias and psychosexual dysfunctions (APA, 1980).

The last subcategory was based partly on the stages of the sexual response cycle and included the following conditions (for women):

- Inhibited sexual desire
- Inhibited sexual excitement
- Inhibited (female) orgasm
- Functional dyspareunia
- Functional vaginismus
- Atypical psychosexual dysfunction

The DSM III-R also represented major revisions to the classification system and changed the term “Psychosexual Dysfunctions” to “Sexual Dysfunctions” (APA, 1987).

Further refinement in the classification system resulted in the following conditions being delineated:

- Sexual desire disorder
- Sexual aversion
- Female sexual arousal disorder
- Inhibited female orgasm
- Dyspareunia
- Vaginismus
- Sexual dysfunction not otherwise specified



As it stands currently, there are two recognized classification systems for FSD, one by the Diagnostic's and Statistical Manual, 4<sup>th</sup> edition (Text Revision) published in 2000 by the American Psychiatric Association, and the other by the World Health Organization in the form of the International Statistical Classification of Diseases and Related Health Problems, 10<sup>th</sup> edition (ICD-10), which was published in 1992. Both these classification systems are based on the sexual response models that were pioneered by Masters, Johnson and Kaplan.

In the DSM-IV-TR, sexual dysfunctions are described as “disturbance in sexual desire and in the psychophysiological changes that characterize the sexual response cycle and cause marked distress and interpersonal difficulty”. The categories for sexual dysfunction specific to women that are classified in DSM-IV-TR are as follows(APA, 2000):

- 302.71 Hypoactive Sexual Desire Disorder

Persistently or recurrently deficient (or absent) sexual fantasies and desire for sexual activity. The judgment of deficiency or absence is made by the clinician, taking into account factors that affect sexual functioning, such as age and the context of the person's life

- 302.79 Sexual Aversion Disorder

Persistent or recurrent extreme aversion to, and avoidance of, all (or almost all) genital sexual contact with a sexual partner.

- 302.72 Female Sexual Arousal Disorder

Persistent or recurrent inability to attain, or to maintain until completion of the sexual activity, an adequate lubrication-swelling response of sexual excitement.

- 302.73 Female Orgasmic Disorder

Persistent or recurrent delay in, or absence of, orgasm following a normal sexual excitement phase.

- 302.76 Dyspareunia

Recurrent or persistent genital pain associated with sexual intercourse

- 306.51 Vaginismus

Recurrent or persistent involuntary spasm of the musculature of the outer third of the vagina that interferes with sexual intercourse.

- 625.8 Other Female Sexual Dysfunction Due to ... [Indicate the General Medical Condition)

There is evidence from the history, physical examination, or laboratory findings that the sexual dysfunction is fully explained by the direct physiological effects of a general medical condition.

Subtypes of the various sexual disorders listed above have been specified by the DSM-IV-TR and they indicate onset (lifelong or acquired), context (situational or generalized) or etiology (due to psychological causes or due to combined factors).

The ICD-10 classification system is broadly similar to the DSM-IV-TR but it is somewhat more flexible in that a diagnosis may be forthcoming in the absence of “marked distress” or “interpersonal difficulties”. Indeed the ICD-10 system for classification of sexual dysfunction is more clinically relevant and summed up by its somewhat broader definition: “sexual dysfunction cover the various ways in which an individual is unable to participate in a sexual relationship as he or she would wish”(World Health Organization, 1992). The ICD-10 also considers excessive sexual drive as a disorder of sexual function and this is another distinct difference from the DSM IV-TR classification.

The classifications of FSD in the ICD-10 are listed below:

- (F52.) Sexual dysfunctions, not caused by organic disorder or disease
  - (F52.0) Lack or loss of sexual desire
    - Loss of sexual desire is the principal problem and is not secondary to other sexual difficulties, such as erectile failure or dyspareunia. Lack of sexual desire does not preclude sexual enjoyment or arousal, but makes the initiation of sexual activity less likely.  
  
Includes: Frigidity  
  
Hypoactive sexual desire disorder
  - (F52.1) Sexual aversion and lack of sexual enjoyment
    - The prospect of sexual interaction with a partner is associated with strong negative feelings and produces sufficient fear or anxiety that sexual activity is avoided.
  - (F52.2) Failure of genital response
    - In women, the principal problem is vaginal dryness or failure of lubrication. The cause can be psychogenic or pathological or estrogen deficiency (e.g. postmenopausal)  
  
*Includes:* Female sexual arousal disorder  
  
Male erectile disorder  
  
Psychogenic impotence

- (F52.3) Orgasmic dysfunction
  - Orgasm either does not occur or is markedly delayed. This may be situational in which case etiology is likely to be psychogenic, or invariable, when physical or constitutional factors cannot be easily excluded except by a positive response to psychological treatment.  
*Includes:* Inhibited orgasm (male) (female)  
  
Psychogenic anorgasmia
  
- (F52.5) Nonorganic vaginismus
  - Spasm of the muscles that surround the vagina, causing occlusion of the vaginal opening. Penile entry is either impossible or painful. Vaginismus may be a secondary reaction to some local cause of pain, in which case this category should not be used.  
*Includes:* Psychogenic vaginismus
  
- (F52.6) Nonorganic dyspareunia
  - Dyspareunia occurs in both women and men. It can often be attributed to a local pathological condition and should then be appropriately categorized. In some cases, however, no obvious cause is apparent and emotional factors may be important. This category is to be used only if there is no other more primary sexual dysfunction (e.g. vaginismus or vaginal dryness).  
*Includes:* Psychogenic dyspareunia

- (F52.7) Excessive sexual drive
  - Both men and women may occasionally complain of excessive sexual drive as a problem in its own right, usually during late teenage or early adulthood. When the excessive sexual drive is secondary to an affective disorder (F30-F39) or when it occurs during the early stages of dementia (F00-F03), the underlying disorder should be coded.

*Includes:* Nymphomania

Satyriasis

- (F52.8) Other sexual dysfunction, not caused by organic disorder or disease
- (F52.9) Unspecified sexual dysfunction, not caused by organic disorder or disease

While these classifications are and have been useful clinically, recent works by Basson and colleagues have revealed that the female sexual response is far more complex than the linear models that the above classifications were based on. The American Foundation of Urological Disease had commissioned an international committee to revise the definitions for FSD in view of the current knowledge about female sexual response.

The proposals of the committee are summarized below: (Basson et al., 2004)

- Women's Sexual Interest/Desire Disorder

There are absent or diminished feelings of sexual interest or desire, absent sexual thought or fantasies and a lack of responsive desire. Motivations (here defined as reasons/incentives) for attempting to have sexual arousal are scarce or absent. The lack of interest is considered to be beyond the normative lessening with life cycle and relationship duration.

- Subjective Sexual Arousal Disorder

Absence of or markedly diminished feelings of sexual arousal (sexual excitement and sexual pleasure) from any type of sexual stimulation. Vaginal lubrication or other signs of physical response still occur.

- Combined Genital and Subjective Arousal Disorder

Absence of or markedly diminished feelings of sexual arousal (sexual excitement and sexual pleasure) from any type of sexual stimulation as well as complaints of absent or impaired genital sexual arousal (vulval swelling, lubrication).

- Genital Sexual Arousal Disorder

There are complaints of absent or impaired genital sexual arousal. Self report may include minimal vulval swelling or vaginal lubrication from any type of sexual

stimulation and reduced sexual sensations from caressing genitalia. Subjective sexual excitement still occurs from non-genital stimuli.

- Persistent Sexual Arousal Disorder

Spontaneous intrusive and unwanted genital arousal (e.g., tingling, throbbing, pulsating) in the absence of sexual interest and desire. Any awareness of subjective arousal is typically but not invariably unpleasant. The arousal is unrelieved by one or more orgasms and the feelings of arousal persist for hours or days

- Women's Orgasmic Disorder

Despite the self-report of high sexual arousal/excitement, there is either lack of orgasm, markedly diminished intensity of orgasmic sensations or marked delay of orgasm from any kind of stimulation

- Vaginismus

There are persistent or recurrent difficulties for the woman to allow vaginal entry of a penis, a finger, and/or any object, despite the woman's expressed wish to do so. There is often (phobic) avoidance and anticipation/fear/experience of pain, along with variable involuntary pelvic muscle contraction. Structural or other physical abnormalities must be ruled out/addressed



- Dyspareunia

Persistent or recurrent pain with attempted or complete vaginal entry and/or penile vaginal intercourse

Whether the above revised proposals of FSD are adopted and incorporated into future editions of the DSM and ICD remain to be seen, but it most certainly warrants serious consideration.

## 2.2 Pathophysiology of female sexual dysfunction

The mechanisms underlying female sexual dysfunctions are complex and multi-factorial. It is also dynamic, in that at different stages of a woman's life, the reasons underlying sexual problems will vary, taking into account the physiological changes related to aging as well as psychosocial circumstances. A convenient way of approaching the causes of FSD is to break down the causes into biological factors, psychosexual factors and contextual factors, examples of which are listed below (Graziottin et al., 2009):

- Biological causes are mainly due to deficiency of ovarian steroids, pelvic floor disorders, cardiovascular problems, and neurological disorders particularly those associated with pain. Metabolic and endocrine disorders such as diabetes and affective disorders such as depression are also frequently implicated. Surgery and radiotherapy to the pelvic region may also contribute significantly to FSD.

- Psychosexual factors are very diverse, consist of emotional, affective and psychological factors, and for the most part are long standing problems. Examples are childhood problems (physical and/or sexual abuse and neglect), bereavement, body image disorders, eating disorders and relationship problems.
- Contextual factors include current and past significant relationships, current interpersonal difficulties and the general health and sexual function of the partner.

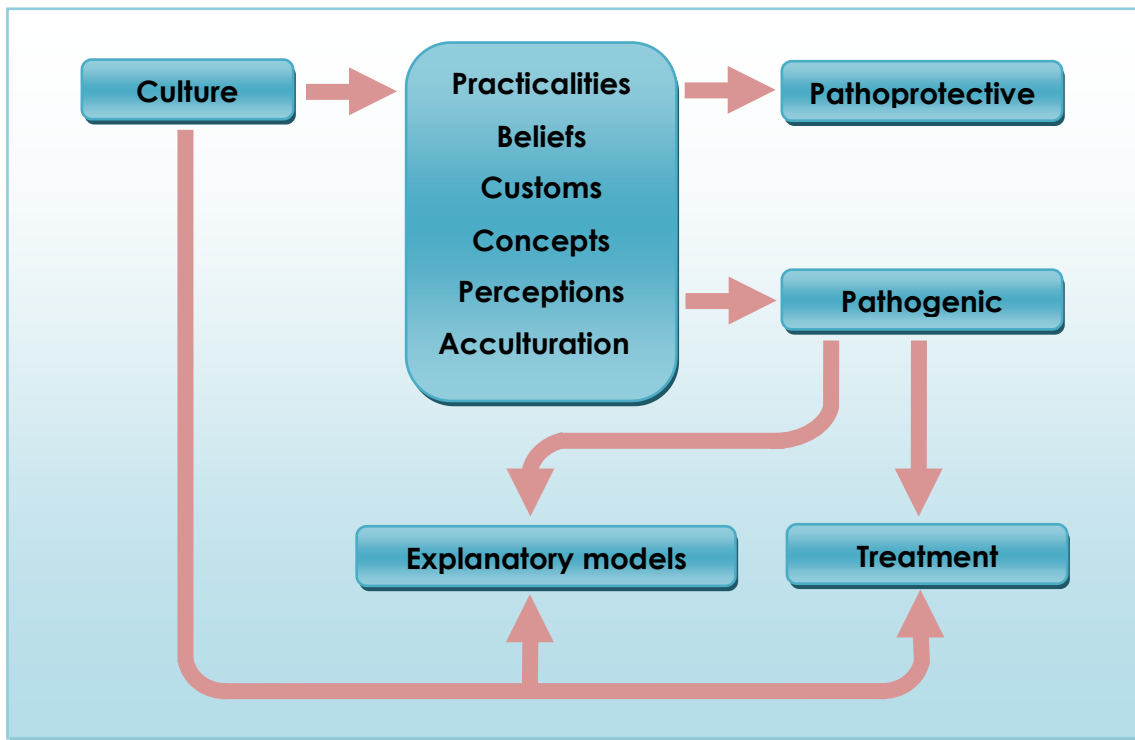
Some sexual disorders may have causes that are more specific. For example, diseases that restrict physical activity and mobility may reduce the sexual desire (Lewis et al., 2004) as will pathological body image perception and the effects of ageing (Laumann and Waite, 2008). Meanwhile pain or discomfort during sexual activity may be a real problem for those people with chronic pain problems such as arthritis and for those people with urinary incontinence (Lewis et al., 2004, Cohen et al., 2008).

The effects of biological causes are simple to understand and indeed many studies have examined sexual problems in relation to medical problems, surgical intervention and medications used to treat the relevant medical problems. The effects of psychosexual factors are admittedly more complex and certainly more difficult to study or quantify. Meanwhile the manner in which contextual factors impact upon sexual health is highly dependent upon an individual's personality traits and the manner in which one appraises and copes with stressors. Also in understanding female sexual dysfunction, it is imperative

also for an assessment of the medical comorbidities and sexual issues in the partner, as these may impact negatively on the sexual lives of the couple in general.

While the above causes seem straightforward enough, in reality rarely does the cause of FSD come down to a singular one. More frequently, FSD is a result of a variety of factors operating simultaneously and these may change with time and circumstances of the individual. The clinician needs to focus attention not only on physical problems but also on stressors that may be affecting multiple domains of life as well as current interpersonal relationships, and these issues may be more relevant in older women(Laumann and Waite, 2008).

Culture is also important, and has a profound and deep influence on sexual behaviors and practices. The variable prevalence of sexual problems amongst different cultures may be explained in part due to the differing views in sexuality and values, which may shape the manner in which individuals come forward to seek treatment or otherwise. While some cultures are liberal and discussions about sexual problems are more easily discussed, in more conservative societies, women are not encouraged to speak about sexual matters and many problems go unrecognized and untreated. It then comes to light that help seeking behavior for sexual problems is most certainly at least in part a function of the prevailing cultural attitudes towards sexuality and the role and status of women in general. Hence the influence of culture may be pathogenic, pathoprotective or pathoplastic and the relationship between culture and sexuality may be illustrated in the diagram below(Ahmed K, 2007).



**Figure 3: The role of culture in sexual dysfunction** (Adapted from AHMED K, B. D. 2007. The role of culture in sexual dysfunction *Review Article Psychiatry*, 6, 115-120)

### 2.3 Epidemiology of Female Sexual Dysfunctions.

Data pertaining to female sexual dysfunctions are relevant for the clinicians in a variety of settings, from primary care to specialized psychiatric or uro-gynecological centers. It provides a platform from which to plan services and provide opportunities for prevention and education for such disorders. Given that sexual disorders have a significant impact on quality of life, self esteem and interpersonal relationships, the need for epidemiological data is even more pressing. For the most part of the 20<sup>th</sup> century, such data was lacking, but as the awareness of sexual problems increased and classification systems were outlined, epidemiological studies for sexual problems began to surface. The increase in interest regarding sexual health has also been in part fuelled by advances in the understanding of the physiology of sexual response, in particular the neurovascular mechanisms underlying the sexual dysfunctions(Rajfer et al., 1992, Burnett, 1995, Park et

al., 1997). Complementing this is the huge market for pharmacological therapeutics, as exemplified by the drugs used in the treatment of erectile dysfunction, and new treatments are emerging for the treatment of other sexual dysfunctions such as that of desire and orgasm (Rosen and Ashton, 1993).

Due to the lack of standardization criteria for the classification of FSD, putting absolute numbers to FSD or its domains is difficult. To add to the complexity of this, too many confounding factors come into play, from the physiological effects of menopause and ageing, medical and psychological illnesses to the various psychosocial factors that change over time. The studies done on FSD have frequently been on specific groups of women (e.g. attending gynecological clinics), hence giving estimates to the rates in the general population have often been difficult. However there is a general consensus that FSD rates are higher in those women with multiple medical, psychological and psychosocial problems.

In perhaps one of the earliest review papers of sexual dysfunctions, Spector and Michael reviewed 23 studies that were done over a 50 year period to determine the incidence or prevalence rates of sexual dysfunction (Spector and Carey, 1990). They found rates of 5-10% for inhibited female orgasm, 4-9% for male erectile disorder, 4-10% for inhibited male orgasm and 36-38% for premature ejaculation. The samples were community based and data for the incidence or prevalence of female sexual arousal disorder, vaginismus or dyspareunia were not available, highlighting the scarcity of epidemiological research for the most part of the 20<sup>th</sup> century. The limitations in the earlier studies that were reviewed by Spector and Michael were significant. Sampling methods and well as the assessment

methods whether self or clinician rated were not standardized and would have contributed to some bias in the overall results. Nevertheless, these earlier studies served as a platform for other researches in the field to improve on subsequent work in the area.

Between the years 1990 to 1999, there were 52 empirical studies on the epidemiology of sexual dysfunction and it represented an increase in awareness and interest in the field. The studies were also methodologically superior to those done earlier and these studies were subject to a systematic review by Simons and Carey in 2001. They had attempted to adopt the DSM IV classification for the sexual disorders but only 16% of the studies reviewed used DSM criteria (Simons and Carey, 2001). For female orgasmic disorder, the community prevalence estimates was between 7-10 %, and this was similar to the rates found by Spector and Michael. For the other FSD such as female sexual arousal disorder, hypoactive sexual desire disorder, dyspareunia and vaginismus, the prevalence rates varied widely between studies due to methodological differences, making confident estimates difficult. Hence the lack of standardized classifications for sexual disorders continues to be a major obstacle towards the gathering of quality epidemiological data.

In recent years, there has been more epidemiological data coming forth. In a large household survey done in the United States, investigators found the point prevalence of any sexual problem to be 43.1% (Shifren et al., 2008). Meanwhile the overall distress as a result from sexual problems had a point prevalence of 22.5%, as measured by the Female Sexual Distress Scale. This study also found that sexual problems and distress were more common among older women and were associated with poor perception of personal health

status, lower education level, depression, anxiety, thyroid conditions and urinary incontinence. Another cross sectional population based study evaluating sexual dysfunction in middle aged women found prevalence rates of 35.9%(Valadares et al., 2008). Additionally, the investigators found that sexual dysfunction was associated with older age and hot flashes. Conversely, having a sexual partner and having a good perception of one's health were associated with less sexual dysfunction.

Both these studies had methodological limitations in that there was a possibility of response bias and the questionnaires were self rated. These studies also utilized different scales to measure sexual dysfunction and its associated problems. Nevertheless these studies do provide a glimpse of the rates of FSD in the general population, and the study by Shifren in particular had a very large sample size.

Another epidemiological study carried out in Denmark with a large sample of nationally representative individuals who were sexually active found rates of sexual dysfunction in women to be 11% overall and with 69% reporting having some sexual difficulty (Christensen et al., 2011). The rates of sexual dysfunction in specific domains were 7% for lubrication insufficiency, 6% of anorgasmia, 3% for dyspareunia and 0.4% for vaginismus. This study also highlighted that sexual problems were more prevalent in women aged below 30 years and above 60 years, and that economic hardship was positively associated with sexual dysfunction.

An epidemiological survey conducted in the United States by Laumann and colleagues found overall rates of sexual dysfunction in women to be 43% as opposed to 31% in men (Laumann et al., 1999). This study had a demographically representative sample of American adults, with more than 3000 male and female respondents who were interviewed for approximately 90 minutes. The study also found that women had a higher risk of developing sexual problems if they were not married (single, divorced, separated or widowed), had poor physical or emotional health or had early traumatic sexual experiences. Additionally women with higher education levels tend to have more sexual problems such as problems with desire, orgasm, pain and sexual anxiety. An interesting finding was a decrease in sexual problems in women with increasing age with the exception of problems with lubrication, which understandably was more prevalent in older women. There were also differences in sexual problems with regards to race and ethnicity. Another study of FSD done amongst women of lower-income status in urban settings mirrored the above findings. The researchers found the prevalence rate of FSD to be 37.3%, and women with FSD were more likely to be of an older age, unemployed, suffering from depression or urinary incontinence and to be taking a variety of medications (Worly et al., 2010). This study was done in a gynecology clinic, hence limiting its generalizability.

Laumann and colleagues conducted another epidemiological study in an older cohort of demographically representative of American adults. In this study, they found that there was little if any increase in sexual problems in women with increasing age. The risk of sexual problems was also increased by having a higher education level, having poorer physical health (such as a history of sexually transmitted disease or lower urinary tract syndrome),



poor mental health (depression and anxiety) and problems in relationships (past or present)(Laumann and Waite, 2008).

The literature supporting the role of physical or medical problems in genesis of sexual problems is vast. As described in the section on pathogenesis of sexual dysfunction, the biological factors that affect sexual function are numerous and certainly impact upon sexual function by a variety of mechanism. One particularly interesting factor that warrants further discussion is the effects of fatigue or exhaustion. Fatigue is a core symptom of many medical conditions in addition to one that may stem from psychological disorders or a direct result of occupational stress. Studies have shown that fatigue does impair sexual function in a host of medical conditions such as rheumatoid arthritis or cardiovascular diseases (Schumann et al., 2010, Josefsson and Gard, 2010). Certain individuals may also suffer from fatigue by virtue of their occupational roles although no studies were done specifically to examine its effects on sexual health. Stress on the other hand, which is also closely related to fatigue does confer added risk for sexual dysfunction and is discussed later, particularly in relation to healthcare workers.

The effects of relationship problems merit a further discussion. There appears to be without doubt that good sexual relations are an important factor in marital satisfaction(M Young, 2000) and that a poor quality of marital relationship is associated with sexual problems in both partners (Rust et al., 1988, M Khazaeia, 2011). The study by Rust found that the effects of marital problems impacted upon men more prominently with the resulting problems of impotence and premature ejaculation. Women meanwhile tended to suffer from anorgasmia and vaginismus when troubled by marital problems. A poor marital relationship may also contribute to low sexual desire among women(M Khazaeia, 2011).

This observation highlights the importance of exploring the marital relationship in addition to assessment of the couple together during a consultation.

In considering the increase in sexual problems amongst older women, it would seem pertinent to weigh on the effects on menopause on sexual function. The effects of declining levels of estrogen are obvious, and have been known to contribute significantly to sexual problems by causing problems of vaginal dryness and atrophy, as well as sleep disturbances, mood instability and cognitive problems(Graziottin and Leiblum, 2005). The fact that at least some of these problems can be addressed by hormone replacement therapy lends more credence to the role of hormonal changes and its effects on sexual health as a woman grows older. Despite that, the direct effect of menopause on female sexual dysfunction is not straightforward, as there are a host of other factors that are relevant at the menopausal stage such as role transitions, medical conditions and the effects of drugs used in their treatment, the length and quality of their relationships, and factors in their partners. The effects of culture are also important, as it determines how a woman responds and perceives this stage in life(Lock, 1998).

The rates of sexual dysfunction amongst people with psychological problems such as depression and anxiety have been studied extensively. Loss of libido for example has been established as a common symptom in depressive disorders, forming part of the vegetative symptoms (Angst, 1998, Lief, 1986) .The area of uncertainty that remains is whether the sexual dysfunction causes the depression/anxiety or vice-versa. What is certain is that the relationship between sexuality and psychological disorders is complex, closely related and multi-factorial, and most certainly involving major aberrations in neuroendocrine systems.

Patients who present with sexual difficulties will often have depressive symptoms as well, often severe enough to warrant treatment (Michael and O'Keane, 2000, Donahey and Carroll, 1993). Another factor that complicates and hinders treatment decisions is that the main drugs used to treat depression and anxiety, the selective serotonin re-uptake inhibitors, are notorious in their ability to cause sexual side effects such as anorgasmia (Balon, 2006). ). Estimates of sexual dysfunction associated with SSRI use have immensely varied. A study in Europe found the prevalence to be 39% in the United Kingdom and 27% in France (Williams et al., 2006). Other studies have shown rates as high as 70% for treatment emergent sexual dysfunction hence making reliable estimates difficult (Ferguson, 2001, Clayton et al., 2002, Rosen et al., 1999). Nevertheless an estimated rate of sexual dysfunction associated with SSRI use of between 30 to 50% appears reasonable (Balon, 2006).

Finally a look at the epidemiology of FSD in Malaysia is warranted. Prior to the validation of the MVFSFSI by Hatta, studies on FSD were virtually non-existent (Sidi et al., 2007b). However there has been a steady increase in local studies assessing FSD and its specific domains in the last few years. In a study done in a primary care setting, Hatta and colleagues found the prevalence of overall FSD to be 29.6% (Sidi et al., 2007e). Within specific domains, the rates for difficulties of arousal, lubrication, orgasm, sexual pain and dissatisfaction were 60.9%, 50.4%, 59.1%, 67.8% and 52.2 % respectively. Risk factors for FSD were older age, having a better academic status, being married longer and with more children and having an older husband. There were also ethnic differences, with the rates of FSD being higher amongst the Malays. These findings mirrored those done in the United

States and Europe. Another study assessing FSD in the primary care setting was more recently done by Ishak and colleagues (Ishak et al., 2010). They found the rate of overall FSD to be 25.8%, mimicking the earlier findings by Hatta. Within specific domains, they found rates of sexual desire disorder and sexual arousal disorder to be 39.3% and 25.8% respectively. Meanwhile within the domains of lubrication, orgasm, satisfaction and pain the rate of sexual dysfunction was 21.5%, 16.6%, 21.5 and 16.6% respectively. This survey also found that FSD was significantly associated with age, her partners' age and duration of marriage, menopause, medical problems and the frequency of sexual intercourse.

There have also been studies to look for FSD rates within specific population of patients. In a local study among female diabetics, the investigators found the rate of overall FSD to be 18.2%, and within the specific domains of desire, arousal, lubrication, orgasm, satisfaction and pain the rates were 40.9%, 22.7%, 18.2%, 4.5%, 36.4% and 22.7% respectively (Kamaralzaman S, 2010). The FSD rate was somewhat lower than expected in this study but as the number of participants was only 22, the low power of the study was its major limitation. Another Malaysian study assessing FSD among diabetics showed FSD rates to be 23.8% in diabetics compared with 11.2% in healthy controls (Azura Dina M, 2010). The diabetic women also had significantly higher rates of sexual arousal disorder compared to the healthy control group and the risk factors for FSD within the diabetic cohort were reduced frequency of sexual intercourse and having a partner with diabetes.

No data is available locally about the prevalence of FSD in populations of healthy women. There is a possibility that these women are not coming forward to seek treatment as they

may be embarrassed or do not regard their problem as something that warrants a medical consultation. Awareness is also probably lacking, and indeed medical services generally do not highlight sexual health or make it a priority area. There is a possibility that many people seek the help of traditional healers or remedies to address sexual problems.

Also not studied thus far within the Malaysian context is the prevalence of FSD amongst populations of women working in highly stressful environments such as in the medical profession, which is well established to be one of the most stressful and demanding, with studies showing the rates of above threshold levels of stress to be in the region of 28%, compared to 18% in the general population(Firth-Cozens, 2003). One local study did examine the prevalence of stress among dental healthcare workers but it did not examine sexual problems(B.N. Rusli, 2006). Common sources of stress amongst medical practitioners are those related directly with the job such as sleep deprivation and administrative duties, those related to the organization such as career uncertainties and lack of staff, relationship difficulties such as bullying and staff conflicts as well as disruptions in work-life balance(Wong, 2008). Rates of common psychological disorders are higher amongst healthcare workers. Among doctors, the rates of alcoholism and drug addiction, functional neurotic depression and affective psychosis are higher than for the general population, and the suicide rates are two to three times higher(Gestal, 1987). The review by Gestal also highlighted that marital discord and sexual dissatisfaction were common among doctors.

Other health workers are also not immune from the damaging effects of stressful working conditions. One study showed that up to 82% of nurses met the criteria for burn-out syndrome (Mealer et al., 2009), with the main sources of stress being work overload, and other role based factors such as lack of power, role ambiguity and role conflict(Moustaka E, 2010). This extensive review also identified that stress may be increased when there are unclear promotion prospects as well as threats of redundancy or poor career development. In a study of stress among nurses in Ireland, investigators found that by using the General Health Questionnaire-28, up to 27% of the respondents were identified as ‘cases’, meaning to be considered those with mild psychiatric morbidity(McGrath et al., 2003). The impact of stress on job satisfaction has also been extensively studied (Lu et al., 2007).

Within the Malaysian context, studies examining stress among healthcare workers are few. In one study done among doctors and nurses in nine hospitals in Kedah, the researchers found that the main stressors were of the organizational type, such as excessive workload, role conflict and the inherent limitations within their organization(Mohamed MN, 1999). The study did not explore the effects of stress on the sexual health of the respondents. Another study done among nurses working in the intensive care unit of a major teaching hospital in Malaysia found that 100% of the nurses experienced stress and related symptoms in the past 12 months, out of which 5.7% experienced loss of libido(Raja Lexshimi RG, 2007). This certainly gives an indication of potential sexual problems among the population sampled, which may have been delineated with the use of the proper research instruments. The prevalence of stress (100%) in the study among nurses working in intensive care units cannot be generalized as the population sampled is not one that is

representative of nursing staff. A more modest prevalence of perceived stress among nurses of approximately 25% appears more plausible (Robat, 2008, Sharifah Zainiyah SY, 2011).

Perplexingly, what has not been studied extensively are the effects of stress on the personal lives of healthcare workers. The effects of stress on the sexual health among doctors, nurses and other health workers have also not been given due attention, with the paucity of studies surprising to say the least. Sexual dysfunction among healthcare workers appears to have been completely neglected despite strong evidence of stressful working conditions and high psychiatric morbidity within this population.

The increasing availability of data on the prevalence of FSD in Malaysia is encouraging and will hopefully lead physicians to include relevant questions in their consultation as women are unlikely to bring up this sensitive topic voluntarily. However epidemiological data is needed from studies with better methodology and to address specific subgroups of women as the incidence of FSD is likely to vary depending on a host of biopsychosocial factors. There also appears to be a pressing need to evaluate the overall wellbeing of healthcare workers in Malaysia, with a comprehensive assessment of occupational stress and psychiatric co-morbidity, of which sexual dysfunction may be one such consideration.

## CHAPTER 3: OBJECTIVES

### 3.1 GENERAL OBJECTIVES

To systematically screen for the presence of FSD in a healthy demographically representative population of women and to determine potential the risk factors of FSD.

### 3.2 SPECIFIC OBJECTIVES

Primary objectives: Prevalence

1. To determine the prevalence of overall FSD in the sample.
2. To determine the prevalence of FSD within specific domains (desire, arousal, lubrication, orgasm, dissatisfaction and pain).

Secondary objectives: Probable risk factors

1. To determine if there is a correlation between the presence of probable psychiatric disorder as measured by the GHQ-30 Malay Version with FSD.
2. To determine if there is a correlation between any demographic variables of the respondent or spouse with overall FSD and within its specific domains.



## CHAPTER 4: METHODOLOGY

### 4.1 STUDY DESIGN

This study was based on a cross sectional study, and is a descriptive analysis of sexual dysfunction among healthy female health care workers in three hospitals namely Hospital Bahagia Ulu Kinta(HBUK), Hospital Mesra Bukit Padang(HMBP) and University Malaya Medical Center(UMMC).

### 4.2 STUDY POPULATION

The population was married female healthcare workers and their spouses in the above mentioned hospitals. Healthcare workers were defined as people who were involved in patient care as well as allied health professionals.

### 4.3 INCLUSION CRITERIA

The inclusion criteria for this study are as follows:

- Female healthcare workers in government hospitals
- Married and have a sexually active partner
- Aged between 18-60 years
- Consent for participation in the study

#### 4.4 EXCLUSION CRITERIA

The exclusion criteria for this study are as follows:

- Chronic and severe medical illness
- Pregnancy
- Postpartum period of up to 2 months
- Refusal to participate in the study

Severe and chronic medical illness that were explicitly highlighted in the consent sheet were chronic renal disease, serious cardiovascular and respiratory diseases, cerebrovascular disease, Parkinson's disease, Systemic Lupus Erythematosus or other autoimmune diseases, poorly controlled diabetes mellitus or other serious endocrine diseases and cancer. The clinician that screened each respondent had the discretion to determine if the respondent was suffering from a chronic or severe illness.

#### 4.5 DURATION OF STUDY

The study was carried out in the above mentioned centers between April 2010 and August 2011.

#### 4.6 APPROVAL

For the purpose of conducting the study in the Ministry of Health (MOH) hospitals, approval was obtained from the Medical Research Ethics Committee (MREC) of MOH.

Approval was also obtained from the ethics committee of UMMC.

Written consent from the primary respondents and their spouses was also obtained.

#### 4.7 SAMPLE SIZE CALCULATION

$$n = \frac{Z^2 P(1-P)}{d^2}$$

n – sample size  
Z – 1.96 (confidence interval 95%)  
P – Proportion (30%)  
d - Precision (0.05)

$$= 322.7$$

The final number of respondents recruited was 201. There were 22 questionnaires that were rejected as the questionnaires were incomplete or wrongly answered. A total of 43 respondents who were randomized refused consent. Due to time constraints and logistical problems, reaching 322 samples was not possible. Apart from the problems of single handedly collecting the data, due to problems of mobility of the respondents (transfers, study or no pay leave etc), and having respondents working shifts, meeting up personally with each individual respondent was very time consuming and hence it was not possible to reach the targeted number of samples.

#### 4.8 SAMPLING METHOD

For this study, the stratified random sampling method was used at each center. From each centre, a list of all female healthcare workers was obtained from the administration office following which the proportion of each subcategory of health workers as shown below was obtained.

- Medical officers
- Allied health officers
- Nurses
- Hospital attendants

The proportion of each sub category was calculated and the according percentage represented in the study. Thus, the list of names for each sub category was numbered and random numbers from each sub category was generated by Microsoft Excel. In the event that the selected person did not fit in the inclusion criteria or did not consent to participate, the next person on the list was approached and the same selection process was carried out until a suitable candidate was obtained.

#### 4.9 RESEARCH TOOLS/INSTRUMENTS

##### 1. Socio-demographics and marital profile form

This was provided for the primary respondent and for her spouse. It included details such as age, ethnicity, educational level, occupation, years of marriage and specifically for the male, smoking status and medical history. Additional questions in the demographics form for the women were the number of children, the presence of domestic helper, whether or not the spouse helped in household chores, was the marriage arranged or otherwise, the presence of live in in-laws and the frequency of sexual intercourse.

##### 2. General Health Questionnaire-30 (Malay Version)

This questionnaire was developed by Goldberg in 1978(Goldberg, 1978, Goldberg D, 1988) and it is widely used around the world as a screening tool for depression and anxiety, having been validated for use in various languages and cultures(Schmitz et al., 1999, Jacob et al., 1997, Donath, 2001, Montazeri et al., 2003). ). It has been validated for use in Malaysia in English by Maniam in 1996(Maniam, 1996) and subsequently a Malay version of the GHQ-30 was also validated(AR Abdul Hamid 2006). More recently a local study examined the use of the GHQ-30 Malay version for use in detecting distress in medical students. In this study, at cut off score of 5/6, the sensitivity and specificity was 0.87 and 0.81 respectively, with the area under the ROC curve being 0.84 (Yusoff, 2010). In this study, a cut-off point of 6 was used.

### 3. Female Sexual Function Index (FSFI)

This instrument was developed by Dr Raymond Rosen and it is a 19-item, multidimensional self report measure of female sexual function (Rosen et al., 2000). The scale evaluates six domains of female sexual function: desire, arousal, lubrication, orgasm, satisfaction and pain. For the purpose of this study, the Malay Version of FSFI (MVFSFI) was used and this instrument has been previously translated and validated for the local population (Sidi et al., 2007b).

The MVFSFI is a reliable instrument with its Pearson's product-moment correlation coefficient,  $r$ , in a range from 0.767 to 0.973, and an internal consistency as measured by Cronbach's  $\alpha$  in a range from 0.87 to 0.97.

A total cut-off score of  $\leq 55$  was used to distinguish between women with FSD and those without. This cut-off score had a sensitivity of 99% and a specificity of 97%. For each domain, cut-off scores were also specified and listed below:

- Sexual desire disorder  $\leq 5$  (sensitivity 95% and specificity 89%)
- Sexual arousal disorder  $\leq 9$  (sensitivity 77% and specificity 95%)
- Disorder of lubrication  $\leq 10$  (sensitivity 79% and specificity 87%)
- Orgasmic disorder  $\leq 4$  (sensitivity 83% and specificity 85%)
- Sexual dissatisfaction  $\leq 11$  (sensitivity 86% and specificity 95%)
- Sexual pain disorder  $\leq 7$  (sensitivity 86% and specificity 95%)

The 19 items in the MVFSFI and the domains that the items tested as well as the full score in each domain are listed below:

- Desire : Item 1,2 Total score :10
- Arousal : Item 3,4,5,6 Total score :20
- Lubrication : Item 7,8,9,10 Total score :20
- Orgasm : Item 11,12 Total score :10
- Satisfaction : Item 13,14,15,16 Total score :20
- Pain : Item 17,18,19 Total score :15

#### 4. International Index of Erectile Function-5 (IIEF-5)-Malay version

The IIEF is a self report multidimensional questionnaire that assesses male sexual function and it was first developed by Rosen in 1997(Rosen et al., 1997). It is a 15-item scale and it covers 5 dimensions of male sexual function:

- Erectile function (6 items)
- Orgasmic function (2 items)
- Sexual desire (2 items)
- Intercourse satisfaction (3 items)
- Overall satisfaction (2 items)

The IIEF is widely used and has been translated and validated into many languages.

The 15 item Malay version was validated by Quek and colleagues and was found to

have a high degree of internal consistency for each of the 15 items as well as for the five dimensions (Cronbach's  $\alpha$  0.56 and 0.74 respectively)(Quek et al., 2002). The Interclass coefficient (ICC) was 0.59. An abridged Malay version of only 5 items (IIEF-5) was later validated by Lim and colleagues and was used in this study(Lim et al., 2003).

The Malay version of IIEF-5 consists of 4 questions from the erectile function domain and one question from the intercourse satisfaction domain. It is a subset of the IIEF-15 and contains items 2,4,5,7, and 15. The IIEF-5 is suitable for use in clinical settings and for research purposes. At its optimal cut-off point, its sensitivity and specificity was 85% and 75% respectively. Based on the optimal cut-off scores, the degree of erectile dysfunction(ED) was classified as follows:

- 22-25: No erectile dysfunction
- 17-21: Mild erectile dysfunction
- 12-16: Mild to moderate erectile dysfunction
- 8-11: Moderate erectile dysfunction
- 5-7: Severe erectile dysfunction



#### 4.10 DATA COLLECTION

The study was conducted in the three centers and the questionnaires were handed over personally to each respondent who was selected from the sampling frame. The questionnaires, together with the instructions and consent sheet were handed to each female respondent during which their eligibility for participation was assessed. The questionnaires for both male and female respondents were not numbered and did not require the respondents to provide their name or MyKad number. This was done to ensure anonymity and confidentiality. If they were eligible and they consented, then they were advised to fill in the questionnaires for the female respondent privately and to ask their respective spouses to fill in the questionnaire for male respondents. Completed questionnaires were to be sealed and returned to the investigator in the envelopes that were provided. The respondents were explicitly reminded both verbally and by way of written instructions to seal and return the consent sheet separately from the questionnaires to ensure full confidentiality. 36 male respondents refused consent to participate in the study.

#### 4.11 STATISTICAL ANALYSIS

Statistical analysis was performed with SPSS 16.0 for Windows. Data were checked and explored as was the distribution and frequencies examined.

## CHAPTER 5: RESULTS

### 5.1 OVERVIEW OF STUDY PARTICIPANTS

A total of 201 subjects (principal female respondent and her partner) were recruited from 3 centers between April 2010 and August 2011. A total of 38 male partners did not consent to the study.

Table 5.1: Distribution of respondents by center.

CENTER	N	(%)
UMMC	41	20.4
HBUK	117	58.2
HMBP	43	21.4
Total	201	100.0

### 5.1.1 Socio-demographic data

Table 5.2: Demographic characteristics of female respondents (N=201)

The mean age (years) was 40.0 with a standard deviation (SD) of  $\pm 9.35$ . The median age was also 40.0 and the range 37.0. With regards to ethnicity, 'others' which constitutes 14.9% of the sample were mainly Kadazan and Dusun.

Characteristic		N	%
Age	20-29	37	18.4
	30-39	62	30.8
	40-49	58	28.9
	50-59	43	21.4
	$\geq 60$	1	0.5
Ethnicity	Malay	131	65.2
	Chinese	16	8.0
	Indian	24	11.9
	Others	30	14.9
Education level	Primary	5	2.5
	Secondary	87	43.2
	Diploma	85	42.3
	Degree	12	6.0
	Postgraduate	12	6.0
Occupation	Medical officers	20	10.0
	Allied health	19	9.5
	Nurses	96	47.7
	Attendants	66	32.8
Years of marriage	0-5	46	22.9
	6-10	36	17.9
	11-15	25	12.4
	16-20	30	14.9
	>20	64	31.8
No of children	none	17	8.5
	1	30	14.9
	2	40	19.9
	3	62	30.8
	4	31	15.4
	$\geq 5$	21	10.4
Presence of maid	No	168	83.6
	Yes-part time	8	4.0
	Yes-full time	25	12.4

Table 5.2, continued.

Characteristic			
Type of marriage	Arranged	29	14.4
	Not arranged	172	85.6
Does the husband help around the house?	Always helps	121	60.0
	Only helps if asked	74	36.8
	Never helps	6	3.0
Do the in-laws live in the same house?	Yes	23	11.4
	No	178	88.6
Frequency of SI	>3 times per week	22	10.9
	2-3 times per week	80	39.8
	2-3 times per month	88	43.8
	< once a month	11	5.5

Table 5.3: Socio-demographic characteristics of the male respondents (N=163)

The mean age (years) for male respondents was 43.2 with a SD of  $\pm 10.13$ . The median age was 44.0 and the range 42.0.

Characteristic		N	%
Age	20-29	23	14.1
	30-39	43	26.4
	40-49	45	27.6
	50-59	45	27.6
	$\geq 60$	7	4.3
Ethnicity	Malay	103	63.2
	Chinese	13	8.0
	Indian	22	13.5
	Others	25	15.3
Education level	Primary	4	2.5
	Secondary	100	61.3
	Diploma	31	19.0
	Degree	20	12.3
	Postgraduate	8	4.9

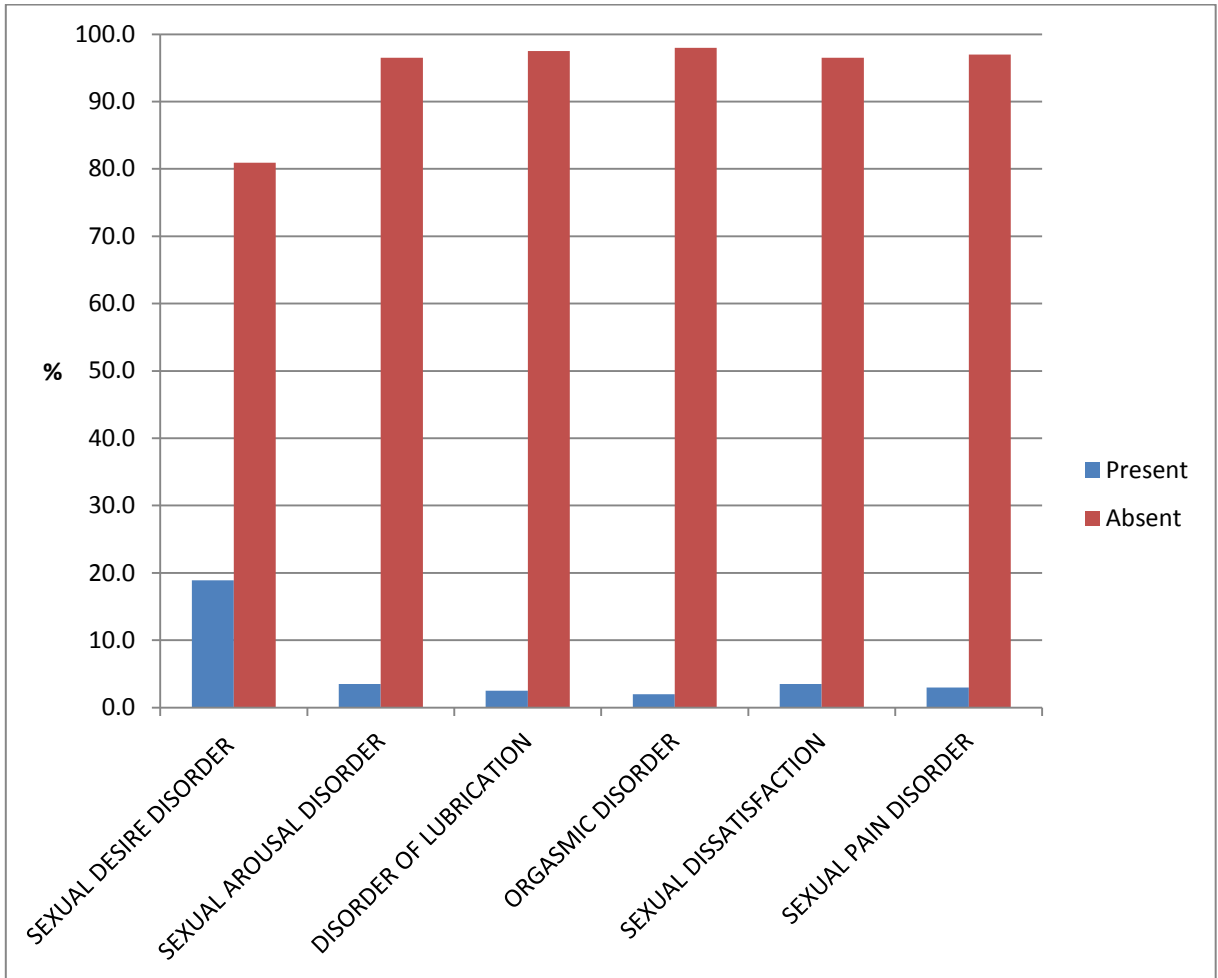
Table 5.3, continued.

Characteristic		N	%
Occupation	Medical officers	4	2.5
	Allied health	5	3.1
	Senior officials/manager	14	8.6
	Professionals	7	4.3
	Technical / associates	46	28.2
	Clerical	25	15.3
	Attendants	10	6.1
	Self-employed	12	7.4
	Elementary	27	16.6
	Retired	13	8.0
Smoker	Yes	55	33.7
	No	108	66.3
Medical history	None	119	73.0
	Hypertension	13	8.0
	Diabetes	23	14.1
	Backache	5	3.1
	Others	3	1.8

## 5.2 Frequency distribution of FSD

Table 5.4: Summary of FSD by specific domains

	Present		Absent	
	n	%	n	%
Overall FSD	11	5.5	190	94.5
Sexual Dysfunction Domain				
Sexual desire disorder	38	18.9	163	81.1
Sexual arousal disorder	7	3.5	194	96.5
Disorder of lubrication	5	2.5	196	97.5
Orgasmic disorder	4	2.0	197	98.0
Sexual dissatisfaction	7	3.5	194	96.5
Sexual pain disorder	6	3.0	195	97.0



**Figure 4: Prevalence of FSD**

The MVFSFI score assumed a normal distribution with a mean of 74.4 and a S.D. of  $\pm 0.727$ . The median was 76.0.

### 5.3 Frequency distribution of GHQ-30 (Malay version) score

Table 5.5: Overall GHQ-30 status

GHQ status	Frequency	(%)
No depression/anxiety	173	86.1
Indicative of depression/anxiety	28	13.9
Total	201	100.0

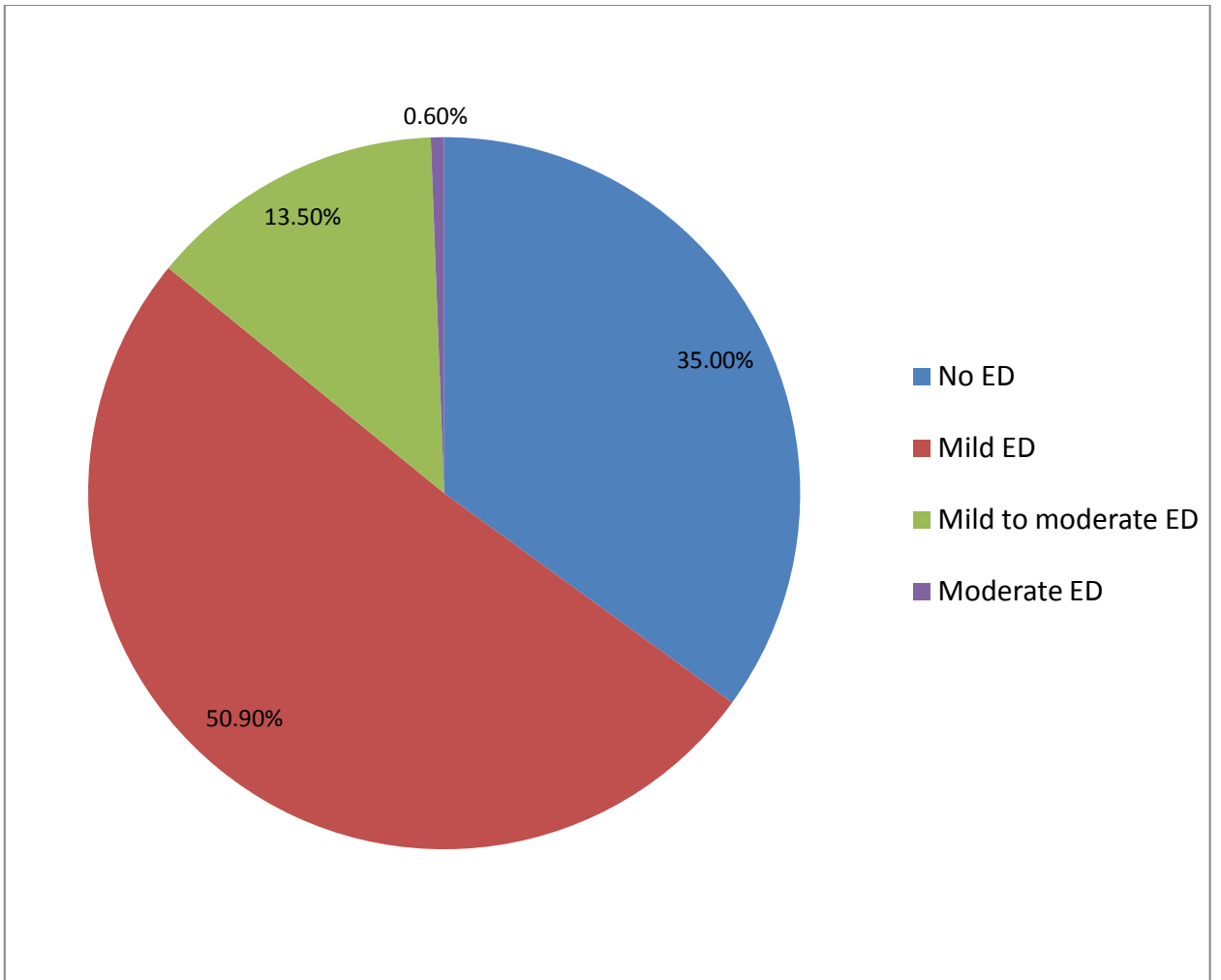
The mean GHQ-30 score was 2.2 with a S.D. of  $\pm 3.64$ .

### 5.4 Frequency distribution of IIEF-5 (Malay version) scores

Table 5.6: Overall ED status

ED Status	Frequency	%
No ED	57	35.0
Mild ED	83	50.9
Mild to moderate ED	22	13.5
Moderate ED	1	0.6

The IIEF-5 scores assumed a normal distribution with a mean of 19.9 and a S.D. of  $\pm 0.245$ .  
The median was 20.0.



**Figure 5: Prevalence of ED**



## 5.5 Association of FSD and its specific domains with selected variables

Table 5.7: Association of Overall FSD with selected variables

VARIABLES n=201	Overall FSD				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							3.779	0.065*
≥ 50 years	151	92.6	6	3.8	157	100		
< 50 years	39	88.6	5	11.4	44	100		
Education level							0.431	0.624*
Tertiary	22	91.7	2	8.3	24	100		
Others	168	94.9	9	5.1	177	100		
Occupation							0.010	1.000*
Medical officers	19	95.0	1	5.0	20	100		
Others	171	94.5	10	5.5	181	100		
Frequency of SI							<b>4.937</b>	<b>0.026</b>
≥ 2x/week	100	98.0	2	2.0	102	100		
< once a week	90	90.9	9	9.1	99	100		
No of children							3.552	0.071*
≤1 or < 2	47	100.0	0	0.0	47	100		
≥ 2	143	92.9	11	7.1	154	100		
In laws staying							0.064	1.000*
Yes	22	95.7	1	4.3	23	100		
No	168	94.4	10	5.6	178	100		
Arranged marriage							0.133	0.662*
Yes	27	93.1	2	6.9	29	100		
No	163	94.8	9	5.2	172	100		
Presence of maid							2.286	0.217*
Yes	33	100.0	0	0.0	33	100		
No	157	93.5	11	6.5	168	100		
Years married							<b>5.421</b>	<b>0.039*</b>
< 20	133	97.1	4	2.9	137	100		
≥ 20	57	89.1	7	10.9	64	100		
Sexual response							1.979	0.234*
Basson	36	90.0	4	10.0	40	100		
Others	154	95.7	7	4.3	161	100		

Table 5.7, continued.

VARIABLES N=163	Overall FSD				TOTAL		$\chi^2$	P	
	Normal	%	Dysfunction	%	n	%			
GHQ-indicative of anxiety or depression	Yes						0.175	0.653*	
	No	26	92.9	2	7.1%	28			100
		164	94.8	9	5.2%	173	100		
Husband's age	< 50	108	97.3	3	2.7	111	100	3.626	0.112*
	$\geq$ 50	47	90.4	5	9.6	52	100		
Husband has medical illness	Yes	40	90.9	4	9.1	44	100	2.259	0.213*
	No	115	96.6	4	3.4	119	100		
Husband smokes	Yes	51	92.7	4	7.3	55	100	0.995	0.445*
	No	104	96.3	4	3.7	108	100		
Husband's ED status	None to mild	138	98.6	2	1.4	140	100	<b>25.737</b>	<b>&lt;0.001*</b>
	Mild to moderate	17	73.9	6	26.2	23	100		

\*Fishers Exact Test

Table 5.8: Association of Sexual Desire Disorder with selected variables

VARIABLES n=201	Sexual Desire Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							2.572	0.109
≥ 50 years	131	83.4	26	16.6%	157	100		
< 50 years	32	72.7	12	27.3%	44	100		
Education level							<b>6.146</b>	<b>0.023*</b>
Tertiary	15	62.5	9	37.5	24	100		
Others	148	83.6	29	16.4	177	100		
Occupation							3.753	0.069*
Medical officers	13	65.0	7	35.0	20	100		
Others	150	82.9	31	17.1	181	100		
Frequency of SI							<b>30.327</b>	<b>&lt;0.001</b>
≥ 2x/week	98	96.1	4	3.9	102	100		
< once a week	65	65.7	34	34.3	99	100		
No of children							<b>4.323</b>	<b>0.038</b>
≤1 or < 2	47	100.0	0	0.0	47	100		
≥ 2	143	92.9	11	7.1	154	100		
Arranged marriage							0.061	0.805
Yes	24	82.8	5	17.2	29	100		
No	139	80.8	33	19.2	172	100		
Presence of maid							1.803	0.179
Yes	24	72.7	9	27.3	33	100		
No	139	82.7	29	17.3	168	100		
Years married							<b>7.120</b>	<b>0.008</b>
< 20	118	86.1	19	13.9	137	100		
≥ 20	45	70.3	19	29.7	64	100		
Sexual response							0.421	0.517
Basson	31	77.5	9	22.5	40	100		
Others	132	82.0	29	18.0	161	100		
GHQ-indicative of anxiety or depression							3.718	0.054
Yes	19	67.9	9	32.1	28	100		
No	144	83.2	29	16.8	173	100		

Table 5.8, continued.

VARIABLES N=163	Sexual Desire Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Husband's age							3.689	0.055
< 50	95	85.6	16	14.4	111	100		
≥ 50	38	73.1	14	26.1	52	100		
Husband has medical illness?							3.156	0.076
Yes	32	72.7	12	27.3	44	100		
No	101	84.9	18	15.1	119	100		
Husband smokes							0.230	0.631
Yes	46	83.6	9	16.4	55	100		
No	87	80.6	21	19.4	108	100		
Husband's ED status							<b>4.783</b>	<b>0.041*</b>
None to mild	118	84.3	22	15.7	140	100		
Mild to moderate	15	65.2	8	34.8	23	100		

\*Fishers Exact Test

Table 5.9: Association of Sexual Arousal Disorder with selected variables

VARIABLES n=201	Sexual Arousal Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							1.865	0.179*
≥ 50 years	153	97.5	4	2.5	157	100		
< 50 years	41	93.2	3	6.8	44	100		
Education level							0.038	0.595*
Tertiary	23	95.8	1	4.2	24	100		
Others	171	96.6	6	3.4	177	100		
Occupation							0.152	0.525*
Medical officers	19	95.0	6	5.0	20	100		
Others	175	96.7	1	3.3	181	100		
Frequency of SI							<b>7.474</b>	<b>0.006*</b>
≥ 2x/week	102	100.0	0	0.0	102	100		
< once a week	92	92.9	7	7.1	99	100		
No of children							2.213	0.203*
≤1 or < 2	47	100.0	0	0.0	47	100		
≥ 2	147	95.5	7	4.5	154	100		
Arranged marriage							1.175	0.266*
Yes	27	93.1	2	6.9	29	100		
No	167	97.1	5	2.9	172	100		
Presence of maid							0.781	0.323*
Yes	31	93.9	2	6.1	33	100		
No	163	97.0	5	3.0	168	100		
Years married							0.406	0.683*
< 20	133	97.1	4	2.9	137	100		
≥ 20	61	95.3	3	4.7	64	100		
Sexual response							<b>6.311</b>	<b>0.030*</b>
Basson	36	90.0	4	10.0	40	100		
Others	158	98.1	3	1.9	161	100		
In laws staying							0.058	0.579*
Yes	22	95.7	1	4.3	23	100		
No	172	96.6	6	3.4	178	100		
GHQ-indicative of anxiety or depression							1.297	0.252*
Yes	26	92.9	2	7.1	28	100		
No	168	97.1	5	2.9	173	100		

Table 5.9, continued.

VARIABLES n=163	Sexual Arousal Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Husband's age							0.156	0.654*
< 50	108	97.3	3	2.7	111	100		
≥ 50	50	96.2	2	3.8	52	100		
Husband has medical illness							1.907	0.325*
Yes	44	100.0	0	0.0	44	100		
No	114	95.8	5	4.2	119	100		
Husband smokes							0.436	0.664*
Yes	54	98.2	1	1.8	55	100		
No	104	96.3	4	3.7	108	100		
Husband's ED status							<b>18.478</b>	<b>0.001*</b>
None to mild	139	99.3	1	0.7	140	100		
Mild to moderate	19	82.6	4	17.4	23	100		

\*Fishers Exact Test

Table 5.10: Association of Lubrication Disorder with selected variables

VARIABLES n=201	Lubrication Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							0.011	1.000*
≥ 50 years	153	97.5	4	2.5	157	100		
< 50 years	43	97.7	1	2.3	44	100		
Education level							0.317	0.474*
Tertiary	23	95.8	1	4.2	24	100		
Others	173	97.7	4	2.3	177	100		
Occupation							0.578	0.411*
Medical officers	19	95.0	1	5.0	20	100		
Others	177	97.8	4	2.2	181	100		
Frequency of SI							1.939	0.207*
≥ 2x/week	101	99.0	1	1.0	102	100		
< once a week	95	96.0	4	4.0	99	100		
No of children							1.565	0.593*
≤1 or < 2	47	100.0	0	0.0	47	100		
≥ 2	149	96.8	5	3.2	154	100		
In laws staying							0.663	1.000*
Yes	23	100.0	0	0.0	23	100		
No	173	97.2	5	2.8	178	100		
Arranged marriage							0.129	0.545*
Yes	28	96.6	1	3.4	29	100		
No	168	97.7	4	2.3	172	100		
Presence of maid							1.007	0.594*
Yes	33	100.0	0	0.0	33	100		
No	163	97.0	5	3.0	168	100		
Years married							0.157	0.654*
< 20	134	97.8	3	2.2	137	100		
≥ 20	62	96.9	2	3.1	64	100		
Sexual response							1.300	0.260*
Basson	38	95.0	2	5.0	40	10		
Others	158	98.1	3	1.9	161	100		
GHQ-indicative of anxiety or depression							0.153	0.532*
Yes	27	96.4	1	3.6	28	100		
No	169	97.7	4	2.3	173	100		

Table 5.10, continued.

VARIABLES n=163	Lubrication Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Husband's age							0.156	0.654*
< 50	108	97.3	3	2.7	111	100		
$\geq$ 50	50	96.2	2	3.8	52	100		
Husband has medical illness							0.443	0.612*
Yes	42	95.5	2	4.5	44	100		
No	116	97.5	3	2.5	119	100		
Husband smokes							0.090	1.000*
Yes	53	96.4	2	3.6	55	100		
No	105	97.2	3	2.8	108	100		
Husband ED status							<b>18.478</b>	<b>0.001*</b>
None to mild	139	99.3	1	0.7	140	100		
Mild to moderate	19	82.6	4	17.4	23	100		

\*Fishers Exact Test



Table 5.11: Association of Orgasmic Disorder with selected variables

VARIABLES n=201	Orgasmic Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							1.144	0.578*
≥ 50 years	153	97.5	4	2.5	157	100		
< 50 years	44	100.0	0	0.0	44	100		
Education level							0.662	0.401*
Tertiary	23	95.8	1	4.2	24	100		
Others	174	98.3	3	1.7	177	100		
Occupation							1.032	0.345*
Medical officers	19	95.0	1	5.0	20	100		
Others	178	98.3	3	1.7	181	100		
Frequency of SI							1.082	0.364*
≥ 2x/week	101	99.0	1	1.0	102	100		
< once a week	96	97.0	3	3.0	99	100		
No of children							1.246	0.341*
≤1 or < 2	47	100.0	0	0.0	47	100		
≥ 2	150	97.4	4	2.6	154	100		
In laws staying							0.527	1.000*
Yes	23	100.0	0	0.0	23	100		
No	174	97.8	4	2.2	178	100		
Arranged marriage							0.369	0.467*
Yes	28	96.6	1	3.4	29	100		
No	169	98.3	3	1.7	172	100		
Presence of maid							0.802	1.000*
Yes	33	100.0	0	0.0	33	100		
No	164	97.6	4	2.4	168	100		
Years married							0.088	1.000*
< 20	134	97.8	3	2.2	137	100		
≥ 20	63	98.4	1	1.6	64	100		
Sexual response							2.320	0.178*
Basson	38	95.0	2	5.0	40	100		
Others	159	98.8	2	1.2	161	100		
GHQ-indicative of anxiety or depression							0.175	0.653*
Yes	27	96.4	1	3.6	28	100		
No	170	98.3	3	1.7	173	100		

Table 5.11, continued.

VARIABLES n=163	Orgasmic Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Husbands age							0.090	1.000*
< 50	108	97.3	3	2.7	111	100		
≥ 50	51	98.1	1	1.9	52	100		
Husband medical illness							1.101	0.295*
Yes	42	95.5	2	4.5	44	100		
No	117	98.3	2	1.7	119	100		
Husband smokes							0.485	0.604*
Yes	53	96.4	2	3.6	55	100		
No	106	98.1	2	1.9	108	100		
Husband ED status							<b>12.545</b>	<b>0.009*</b>
None to mild	139	99.3	1	0.7	140	100		
Mild to moderate	20	87.0	3	13.0	23	100		

\*Fishers Exact Test

Table 5.12 Association of Sexual Dissatisfaction with selected variables

VARIABLES n=201	Sexual Dissatisfaction				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							0.189	0.649*
≥ 50 years	152	96.8	5	3.2	157	100		
< 50 years	42	95.5	2	4.5	44	100		
Education level							0.038	0.595*
Tertiary	23	95.8	1	4.2	24	100		
Others	171	96.6	6	3.4	177	100		
Occupation							0.152	0.525*
Medical officers	19	95.0	1	5.0	20	100		
Others	175	96.7	6	3.3	181	100		
Frequency of SI							3.857	0.062*
≥ 2x/week	101	99.0	1	1.0	102	100		
< once a week	93	93.9	6	6.1	99	100		
No of children							0.335	1.000*
≤1 or < 2	46	97.9	1	2.1	47	100		
≥ 2	148	96.1	6	3.9	154	100		
In laws staying							0.058	0.579*
Yes	22	95.7	1	4.3	23	100		
No	172	96.6	6	3.4	178	100		
Arranged marriage							0.000	1.000*
Yes	28	96.6	1	3.4	29	100		
No	166	96.5	6	3.5	172	100		
Presence of maid							1.425	0.602*
Yes	33	100.0	0	0.0	33	100		
No	161	95.8	7	4.2	168	100		
Years married							0.406	0.682*
< 20	133	97.1	4	2.9	137	100		
≥ 20	61	95.3	3	4.7	64	100		
Sexual response							<b>6.311</b>	<b>0.030*</b>
Basson	36	90.0	4	10.0	40	100		
Others	158	98.1	3	1.9	161	100		
GHQ-indicative of anxiety or depression							00.01	1.000*
Yes	27	96.4	1	3.6	28	100		
No	167	96.5	6	3.5	173	100		

Table 5.12, continued.

VARIABLES n=163	Sexual Dissatisfaction				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Husband's age							0.006	1.000*
< 50	107	96.4	4	3.6	111	100		
≥ 50	50	96.2	2	3.8	52	100		
Husband has medical illness							<b>4.975</b>	<b>0.046*</b>
Yes	40	90.9	4	9.1	44	100		
No	117	98.3	2	1.7	119	100		
Husband smokes							0.736	0.406*
Yes	52	94.5	3	5.5	55	10		
No	105	97.2	3	2.8	108	100		
Husband's ED status							<b>14.197</b>	<b>0.004*</b>
None to mild	138	98.6	2	1.4	140	100		
Mild to moderate	19	82.6	4	17.4	23	100		

\*Fishers Exact Test

Table 5.13: Association of Sexual Pain Disorder with selected variables

VARIABLES n=201	Sexual Pain Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
Age							0.189	0.649*
≥ 50 years	152	96.8	5	3.2	157	100		
< 50 years	42	95.5	2	4.5	44	100		
Education level							0.131	0.538*
Tertiary	23	95.8	1	4.2	24	100		
Others	172	97.2	5	2.8	177	100		
Occupation							0.683	1.000*
Medical officers	20	100.0	0	0.0	20	100		
Others	175	96.7	6	3.3	181	100		
Frequency of SI							0.750	0.440*
≥ 2x/week	100	98.0	2	2.0	102	100		
< once a week	95	96.0	4	4.0	99	100		
No of children							0.342	0.626*
≤1 or < 2	45	95.7	2	4.3	47	100		
≥ 2	150	97.4	4	2.6	154	100		
In laws staying							0.799	1.000*
Yes	23	100.0	0	0.0	23	100		
No	172	96.6	6	3.4	178	100		
Arranged marriage							0.025	1.000*
Yes	28	96.6	1	3.4	29	100		
No	167	97.1	5	2.9	172	100		
Presence of maid							1.215	0.592*
Yes	33	100.0	0	0.0	33	100		
No	162	96.4	6	3.6	168	100		
Years married							0.940	0.385*
< 20	134	97.8	3	2.2	137	100		
≥ 20	61	95.3	3	4.7	64	100		
Sexual response							0.041	1.000*
Basson	39	97.5	1	2.5	40	100		
Others	156	96.9	5	3.1	161	100		

Table 5.13, continued.

VARIABLES n=201	Sexual Pain Disorder				TOTAL		$\chi^2$	P
	Normal	%	Dysfunction	%	n	%		
GHQ-indicative of anxiety or depression							0.039	1.000*
Yes	27	96.4	1	3.6	28	100		
No	168	97.1	5	2.9	173	100		
VARIABLES n=163								
Husband's age							0.003	1.000*
< 50	109	98.2	2	1.8	111	100		
≥ 50	51	98.1	1	1.9	52	100		
Husband has medical illness							1.130	0.564*
Yes	44	100.0	0	0.0	44	00		
No	116	97.5	3	2.5	119	100		
Husband's smokes							0.000	1.000*
Yes	54	98.2	1	1.8	55	100		
No	106	98.1	2	1.9	108	100		
Husband's ED status							0.932	0.368*
None to mild	138	98.6	2	1.4	140	100		
Mild to moderate	22	95.7	1	4.3	23	100		

\*Fishers Exact Test

Table 5.14: Logistic Regression for FSD by selected variables

VARIABLES	$\beta$	S.E.	Wald	d.f.	<i>p</i> value	OR	95% CI	
							Lower	Upper
Freq of SI ≥ 2x/week* < once a week	1.609	0.795	4.097	1	0.043	5.000	1.052	23.756
Duration of marriage (years) < 20* ≥ 20	1.407	0.646	4.736	1	0.030	4.083	1.150	14.497
Husband's ED status None to mild* Mild to moderate	3.193	0.856	13.911	1	<0.001	24.353	4.549	130.371

\* Reference

Table 5.15 : Multiple Logistic Regression for the significant independent variables

Final multivariate model for FSD

VARIABLES	$\beta$	S.E.	Wald	d.f.	<i>p</i> value	Adjusted OR	95% CI	
							Lower	Upper
Husband's ED status None to mild* Mild to moderate	3.309	0.898	13.575	1	<b>&lt;0.001</b>	<b>27.360</b>	<b>4.706</b>	<b>159.082</b>
Frequency of SI ≥ 2x/week* < once a week	1.908	1.183	2.601	1	0.107	6.742	0.663	68.541
Duration of marriage (years) < 20* ≥ 20	0.911	0.894	1.039	1	0.308	2.486	0.431	14.324
Constant	-6.020	1.255	23.019	1	0.000	0.002		

\* Reference

Table 5.16: Logistic Regression for Sexual Desire Disorder by selected variables

VARIABLES	B	S.E.	Wald	d.f.	p value	OR	95% CI	
							Lower	Upper
Freq of SI ≥ 2x/week* < once a week	2.551	0.552	21.330	1	<0.001	12.815	4.342	37.829
Education level Others* Tertiary	1.119	0.468	5.717	1	0.017	3.062	1.224	7.663
Number of children ≤1 or < 2* ≥ 2	1.114	0.558	3.989	1	0.046	3.046	1.021	9.087
Years married < 20* ≥ 20	0.964	0.369	6.835	1	0.009	2.622	1.273	5.402
Husband's ED status None to mild* Mild to moderate	1.051	0.496	4.498	1	0.034	2.861	1.083	7.556

\* Reference

Table 5.17: Logistic Regression for Sexual Arousal Disorder by selected variables

VARIABLES	B	S.E.	Wald	d.f.	p value	OR	95% CI	
							Lower	Upper
Husband's ED status None to mild* Mild to moderate	3.376	1.144	8.703	1	0.003	29.263	3.106	275.741
Sexual Response Others* Basson	1.767	0.786	5.055	1	0.025	5.582	1.254	27.299

\* Reference



Table 5.18: Logistic Regression for Lubrication Disorder by selected variables

VARIABLES	B	S.E.	Wald	d.f.	<i>p</i> value	OR	95% CI	
							Lower	Upper
Husband's ED status None to mild* Mild to moderate	3.376	1.144	8.703	1	0.003	29.263	3.106	275.741

\* Reference

Table 5.19: Logistic Regression for Orgasmic Disorder by selected variables

VARIABLES	B	S.E.	Wald	d.f.	<i>p</i> value	OR	95% CI	
							Lower	Upper
Husband's ED status None to mild* Mild to moderate	3.037	1.179	6.635	1	0.010	20.850	2.067	210.304

\* Reference

Table 5.20: Logistic Regression for Sexual Dissatisfaction by selected variables

VARIABLES	B	S.E.	Wald	d.f.	<i>p</i> value	OR	95% CI	
							Lower	Upper
Sexual Response Others* Basson	1.767	0.786	5.055	1	0.025	5.582	1.254	27.299
Husband's ED status None to mild* Mild to moderate	2.676	0.900	8.842	1	0.003	14.526	2.490	84.758

\* Reference

Table 5.21: Correlation between FSD and IIEF-5 scores

		Overall score FSD	IIEF-5 score
Overall score FSD	Pearson Correlation	1	<b>0.597**</b>
	<i>p</i> value (2-tailed)		<b>&lt;0.001</b>

\*\*Correlation is significant at the 0.01 level (2-tailed)

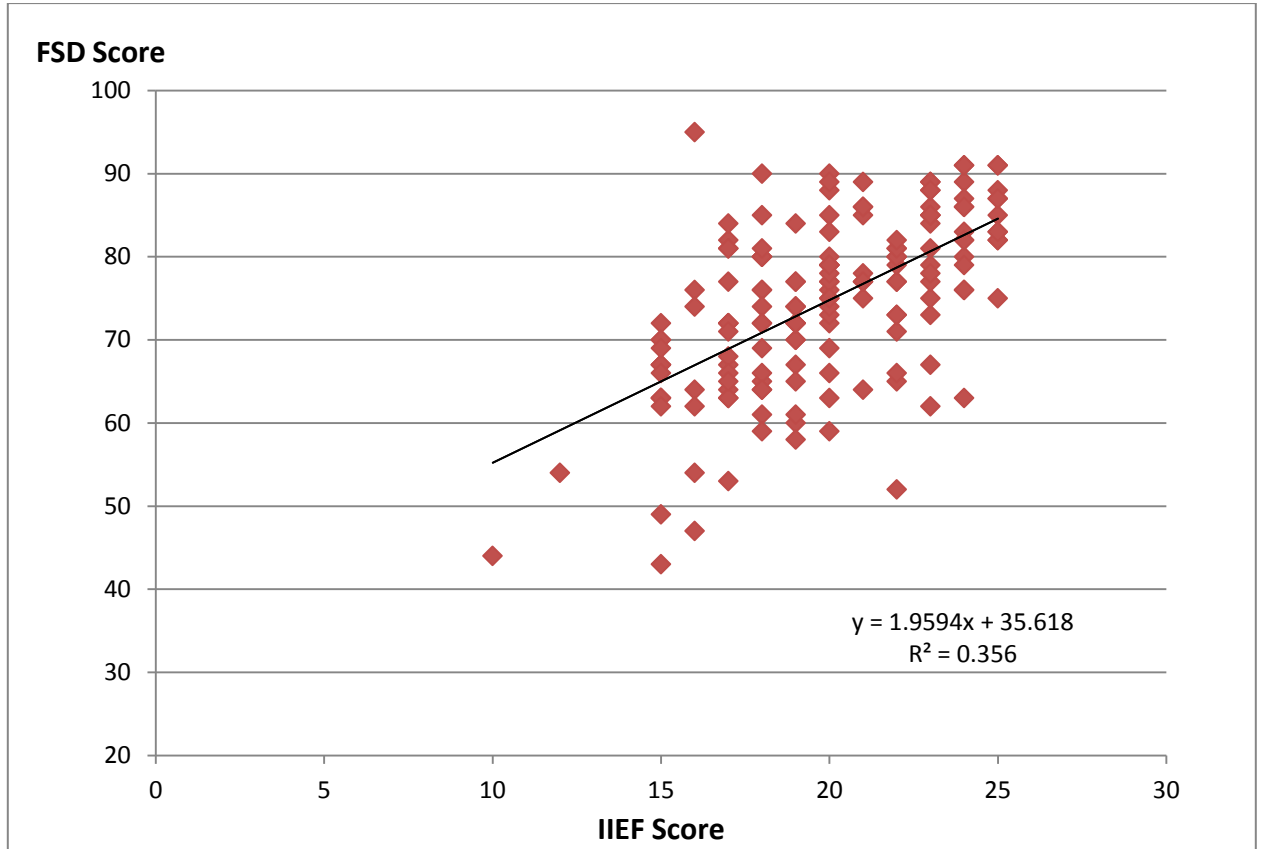


Figure 6: Scatter plot with regression line for relationship between IIEF and FSD score

## CHAPTER 6: DISCUSSION

Local studies pertaining to sexual problems in women have only begun to surface in the last few years. The availability of the MVFSFI has certainly made it possible to classify and quantify FSD and its domains, but the interest in studying sexual problems in women is almost certainly also a reflection of shifting cultural attitudes and increased awareness of how these problems contribute to a woman's overall quality of life. One also cannot discount the effects of the huge plethora of resources that are widely available and accessible to the masses, from traditional print media to the ever expanding avenue that is offered by the Internet; this would have most certainly played a part in disseminating information informally to the general public. There has been some controversy over the role of the media and the pharmaceutical industry in promoting FSD, a case of disease mongering as alleged by some parties (Tiefer, 2006). Despite that, there has been a surge in awareness and efforts to seek valid therapies for these disorders.

To the best knowledge of the author, locally there have been no studies done of the prevalence of FSD in healthy populations of women. Most if not all of the local studies were carried out in primary care or specialist clinics where women came to seek treatment for other problems. The author is not aware of any population based survey either. Most local studies also employed universal sampling method and the author is not aware of any local study that utilized a randomized sample.

In line with the objectives of the dissertation, the discussion will first focus on the prevalence of FSD and dysfunctions with its specific domains. A review of the prevalence

of ED will also be included. The discussion will also focus on the association of FSD and dysfunction within specific domains to selected variables.

### 6.1: Prevalence of FSD

It is an established observation that rates of FSD tend to vary widely between studies. Leading authorities in this field of study have estimated that some 20-50% of women will be affected by FSD(Basson et al., 2000). In this study the prevalence of FSD was 5.5%. A total of 11 out of 201 women fulfilled the criteria for FSD ( $FSFI \leq 55$ ). This low rate is in stark contrast to the other studies that have been done locally, which have found rates of 18.2% to 29.6% (Ishak et al., 2010, Sidi et al., 2007e, Kamaralzaman S, 2010). The discrepancy in the rate of FSD is explained by the differing methodology and populations sampled.

Both the studies done by Sidi and Ishak were conducted in primary care settings. The study by Kamaralzaman was also done in community primary care clinics but among diabetic women. There are other local studies investigating the rate of FSD in specific populations. In a study by Periasamy among uro-gynaecological patients in major hospital, the rate of FSD was found to be extremely high at 50.6%. It must be pointed out that a large proportion of the women sampled in this study were of older age, and suffered from a problems such as urinary incontinence, chronic cystitis, pelvic organ prolapse and menopause(Periasamy, 2010). In another study done amongst women suffering from infertility, the rate of FSD was found to be only 11.3%(Yeoh, 2011). The author explained

this lower than expected rate to stem from a lower mean age of the sample, having less medical problems as well a high rate of non-respondents in his study.

Hence the higher rates found in these studies are to be expected as these women are sampled from clinics and suffering from a variety of medical illnesses either acutely or chronically. The association between medical problems and increasing age has been established by earlier studies (Lewis et al., 2004). Another potential reason for the discrepancy in the FSD rate in this study compared with other locally done studies is the utilization of non-randomized sampling methods in the other local studies, therefore introducing the possibility of selection bias which could lead to overestimates of the rates.

The rate of 5.5% in this study can be compared to an epidemiological study done on a representative sample in Denmark whereby the authors found a rate of 11% (Christensen et al., 2011). The Danish study used a random sample of nationally representative adults from a national register out of which 2295 women responded and were subject to an interview by a trained rater. The rate of 11% from the Danish study is twice of that in this study, and is quite possibly a reflection of the much lower sample size which affected the power of this study. The use of trained interviewers is also a factor that will improve the detection of FSD but will be quite impossible to conduct in the Malaysian context in view of cultural sensitivities with regards to sexuality.

Another potential reason for low prevalence of FSD in this study is the husbands were generally healthy as well. Physical wellbeing of the spouse is an important determinant of the sexual wellbeing of the woman. Only 27% of the husbands in this study suffered from medical problems, and with low rates of the more severe medical illnesses such as

hypertension (8.0%) and diabetes (14.1%). These two illnesses are highlighted as they are associated with ED which is an important determinant female sexual function and will be discussed later. In this study only a small proportion of men suffered from mild to moderate ED (13.5%), only 0.6% suffered from moderate ED and there were no men in the study with severe ED.

There was a statistically significant association between FSD and the frequency of SI, with those women who had SI less than once a week having a higher risk of FSD ( $p=0.043$ ,  $OR=5.0$ ,  $95\% CI 1.052, 23.756$ ). The association between the frequency of SI and FSD has been established in other local studies (Sidi et al., 2007a, Sidi et al., 2007e). Laumann also highlighted that women with low sexual activity were at higher risk for sexual dysfunction (Laumann et al., 1999). Even amongst women with medical conditions such as diabetes, a lower frequency of SI is significantly associated with FSD (Azura Dina M, 2010). While an association between the frequency of sexual activity and FSD is clearly present, how this is mediated remains debatable. A low frequency of SI could be an indication of low sexual desire, pain, and lubrication or of medical problems in the woman or her partner.

Another significant association was between the duration of marriage and FSD, the risk of FSD being higher if married more than 20 years ( $p=0.030$ ,  $OR=4.083$ ,  $95\% CI 1.150, 14.497$ ). There is one study done locally among women with diabetes that examined this variable in relation to sexual dysfunction but the association was specific to orgasmic difficulties (Kamaralzaman S, 2010). A study amongst married couples in Ghana did show that a longer duration of marriage was associated with a higher risk of sexual dysfunction in women, but the generalizability of this study is limited, due to the marked cultural

differences and methodology used in the study (Amidu et al., 2011). Nevertheless other studies examining sexual satisfaction or sexual dysfunctions across different cultures have also found that the longer length of marriage was associated with more sexual problems (Chien, 2003, A Rahmani 2009). Again the argument is how the duration of marriage affects the sexual function; a pragmatic approach would be a multi-factorial one, taking into consideration the quality of the marital relationship, a host of psychosocial variables, age related physiological and medical problems in one or both partners, and indeed the perceived physical attractiveness of one's partner.

The effect of the male partner's sexual functioning was also found to have a significant impact on FSD in this study. ED in particular has shown to have major repercussions on a woman's sexual well being and previous studies have shown this association (Rust et al., 1988). In this study, there were 163 male respondents, with up to 65% of the males having some degree of ED (mild ED =50.9%, mild to moderate ED=13.5% and moderate ED=0.6%). Statistical analysis showed that FSD was significantly associated with ED whereby those women whose partners suffered from mild to moderate ED were more at risk ( $p < 0.001$ , OR=24.353, 95% CI 4.549, 130.371). When multiple regression analysis was applied to assess the impact of the ED and the other variables discussed earlier, the results showed that ED was in fact the strongest predictor to influence FSD after controlling for duration of marriage and frequency of SI ( $p < 0.001$ , OR 27.30, 95% CI 4.706, 159.08). While the OR was high and very significant, there is a wide CI which is probably due to the smaller sampler of male respondents compared to females. The lower respondent rate again reflects the sensitivity of sexually related topics among the local

population. Nevertheless, the impact of ED on a woman sexual function is significant and valid.

Linear regression showed that the correlation between male sexual function and FSD was significant. The IIEF-5 and MVFSFI scores, which were normally distributed were analyzed and showed a positive correlation (Pearson's  $r = 0.597$ ,  $p < 0.001$ ). This result is consistent with the study conducted locally by Yeoh on FSD among couples with infertility problems. He found that male sexual function as assessed by the IIEF-15 was strongly correlated with FSD( correlation coefficient  $r = 0.432$ ) and in fact with all domains of the MVFSFI (Yeoh, 2011). In Yeoh's study, the prevalence of ED was 62.2%, which was similar to the rate in this study. Despite Yeoh's study being done on a primarily younger population, the ED rate was high, reflecting that the male erectile problems are potentially widespread, and not confined to the older male population and those with medical problems.

The significance of this association is in the clinical management of patients who present with sexual problems; when faced with sexual dysfunction, therapy must involve the couple, as the problems may not be restricted to one partner. There is a tendency for Asian men in particular to delay seeking help (if at all) for the erectile problems, potentially due to embarrassment, the issue being taboo, accepting it as a normal part of aging, or a combination of these and other factors (Wah-Yun Low, 2007). Hence a female presenting with sexual complaints presents an opportunity to screen for erectile problems in her partner, which as we now know contributes significantly to FSD.



Another variable pertinent to the discussion was the association between GHQ scores and FSD. There was no significant association ( $\chi^2=0.175$ ,  $p=0.653$ ) although the author had expected some degree of association in light of the fact that sexual problems are abundant in patients suffering from depressive and anxiety symptoms. The limitations of the GHQ-30 as a screening tool must be considered and the pickup rate of actual cases of depression or anxiety disorders may have been significantly improved with the use of a clinician-rated tool such as the Mini-International Neuropsychiatric Interview (M.I.N.I.).

## 6.2 Sexual Desire Disorder

This was the most prevalent disorder in the study, being present in 18.9% of the women. In DSM-IV TR the equivalent classification is Hypoactive Sexual Desire Disorder (HSDD). The rate is approximately half of that of females who sought treatment in primary care clinics where Ishak recorded a rate of 39.3% (Ishak et al., 2010) and 40.9% amongst diabetic women (Kamaralzaman S, 2010). Interestingly in Yeoh's study, the prevalence of sexual desire disorder was lower at 10.7%, but this difference could be due to the fact that these women were having infertility problems, there was an inclination towards engaging in SI with hopes of conceiving ((Yeoh, 2011). At the other end of the spectrum, the prevalence of low sexual desire was understandably high at 45% amongst women with uro-gynaecological problems (Periasamy, 2010). An overview of studies done abroad showed prevalence data that are consistent with the findings of this and other local studies, with rates of between 20-30% (Palacios et al., 2009). The actual prevalence of HSDD as defined by the DSM-IV TR is likely to be much lower and indeed such prevalence data are

not available locally. A study of nationally representative women in the United States for example found the prevalence of women with complaints of low sexual desire to be 36.2% but those actually fulfilling criteria for HSDD were represented by a much lower rate of 8.3% and was significantly associated with surgical menopause(West et al., 2008).

The prevalence of sexual desire disorder at 18.9% was much higher than that for overall FSD, which was only 5.5%. One of the plausible reasons the prevalence sexual desire disorder was rather high as measured by the MVFSFI is the fact that desire may be considered a taboo subject within the local context, more so amongst women. While in cultures which have liberal attitudes towards sex, women are encouraged to assert their sexuality, needs and desires, the same cannot be said for the majority of Malaysian women. Strong sexual feelings or desire are considered taboo, and not a matter that ought to be expressed openly (Hatta Sidi, 2006), and women typically take on a more submissive role in a sexual relationship, although attitudes are probably changing now. Sexual desire may be more expressed among couples in the earlier stage of their relationship; later in the marriage a couple's sexual relationship may be compounded by a host of other factors. Sexual desire is also an emotion that women may not be conscious of, and is closely related to arousal, which further complicates efforts to quantify or measure it.

A host of variables that impact upon a woman's sexual desire have been identified from previous studies. Laumann found that lower educational attainment, poor emotional adjustment, and having a previous adverse sexual experience such as a sexually transmitted disease are associated with lower sexual desire. A lower frequency of SI was also consistently found to be associated with lower sexual desire(Laumann et al., 1999).

In this study the risk of having sexual desire disorder was found to be significantly higher for those women with a higher educational attainment i.e. degree or postgraduate level ( $p < 0.017$ , OR=3.062, 95% CI 1.224, 7.663). This finding was contradictory to Laumann's but it can be argued that socio-cultural factors may also play a role. In this study, the majority of those with degrees or postgraduate qualifications were medical officers, and the stressors associated with the job may well contribute to the low sexual desire in this group. Sidi had also found that FSD was associated with a higher education attainment in Malaysian women and this association may be mediated via problems of low sexual desire (Sidi et al., 2007e). Further studies specifically within this group are warranted.

Sexual desire disorder was also found to be significantly associated with lower frequency of SI, whereby in those couples whose frequency of SI was less than once a week, the female partner was at higher risk ( $p < 0.000$ , OR=12.815, 95% CI 4.432, 37.829). This result was very significant although it had a wide CI. The association between low frequency of SI and sexual dysfunctions has been shown in other studies as was earlier discussed in the section above. The cause-effect relationship of this association is difficult to delineate with certainty, at least with the current evidence base. Bearing in mind the population sampled was a healthy cohort of females, the reasons for the low sexual desire and a low frequency of SI may be related to the working environment of the medical field, which is notorious for long hours, uncertainty of work schedules, organizational problems and bullying to name a few (Wong, 2008).

In this study, low sexual desire was also found to be associated with the number of children and the duration of marriage. Those women with 2 more children were at significantly higher risk of suffering from sexual desire disorder ( $p < 0.046$ , OR=3.046, 95%

CI 1.021, 9.087). Higher risk of sexual desire disorder was also significantly associated with duration of marriage of 20 years or more ( $p=0.009$ , OR=2.622, 95% CI 1.273, 5.402). The association between FSD and a longer duration of marriage and a larger number of children had been established by Sidi in his study done on women attending a primary care clinic (Sidi et al., 2007e). A similar study by Ishak also showed an association between FSD and a longer duration of marriage (Ishak et al., 2010). To the best knowledge of the author, there are no internationally done studies that have specifically found an association between low sexual desire and these two variables. Having more children may contribute to low desire as the demands of caring for many children at home is a stressor in itself, being physically demanding and very time consuming, leaving little time for the woman to spend with her partner. A longer duration of marriage meanwhile may contribute to low sexual desire by a variety of means; from monotony in the relationship to physical changes in either partner. Also, women who have been married more than 20 years are likely to be in the pre-menopause or menopausal stage of life and the effects of declining levels of sex hormones have been established to contribute to sexual problems in later life (Gracia et al., 2004).

Another significant association of sexual desire disorder was ED in the partner. Women whose husbands suffered from mild to moderate ED were at higher risk of suffering from low sexual desire ( $p=0.034$ , OR=2.861, 95% CI 1.083, 7.556). The impact of ED on a woman's overall sexual function and within specific domains of sexual function has been established (Fisher et al., 2005). Indeed the study by Fisher also showed that women whose partners were using phosphodiesterase-5 inhibitors to treat ED had more satisfying sexual experience thereafter. Having a partner with ED may cause frustration for both partners

and decrease the quality of the marital relationship, even more so if neither partner feels comfortable to discuss their sexual needs or seek help. In a conservative culture such as in Malaysia, the male may choose to ignore or be in denial of his difficulty for fear of “losing face”; his wife meanwhile may stay silent on the issue for the same reason, or out of fear of upsetting her husband who may respond by way of rejection or even anger. Nevertheless, attitudes are changing, fueled in part by the efforts of the pharmaceutical industry in educating the public about ED and the treatment options available.

The association between GHQ-30 scores that were indicative of depression or anxiety was not statistically significant ( $\chi^2=3.718$ ,  $p=0.054$ ) but was very close to achieving significance. It does indicate a trend that may have been more conclusive if the sample size was increased and warrants further investigation. A large proportion of the respondents were mental healthcare workers and perhaps had reservations or uneasiness about answering the GHQ, hence leading to some bias in the manner in which they answered the questionnaire, perhaps by minimizing their symptoms. Alternatively, mental health workers may have a better capacity for dealing with emotional or anxiety problems, hence leading to lower scores on the GHQ. Also it is pertinent to bear in mind that the GHQ is a self-rated screening instrument, hence having its limitations. The use of a clinician-rated scale such as the M.I.N.I. or other structured instruments may have yielded a totally different picture.

### 6.3 Sexual Arousal Disorder

The prevalence of sexual arousal disorder in this study was very low at a rate of only 3.5%. Sidi had found a prevalence rate of 18.0% to 60.9% for sexual arousal disorder in a primary care setting (Sidi et al., 2007d, Sidi et al., 2011). Ishak meanwhile found a rate of 25.8% also in a primary care setting (Ishak et al., 2010), which was very similar to the rate of 22.7% among female diabetic patients in Malaysia (Kamaralzaman S, 2010). Meanwhile Laumann found a more modest rate of 14% for arousal problems in a large survey in the United States (Laumann et al., 1999). Clearly the prevalence varies widely and this is likely a reflection of the complexities of the disorder itself. What constitutes arousal itself is complex and for the most part is not something a woman is aware of during sexual activity; this makes it difficult for a women to quantify such as when answering a questionnaire. It is conceptualized as a combination of emotions with the associated physical response. Hence there is a lot of overlap between arousal with desire and potentially with other components of the sexual response cycle. Studies have in fact shown a strong correlation between sexual desire and arousal (Nik Ruzyanei Nik Jaafar, 2009). In the traditional models of female sexual response, arousal is the bridge between desire and orgasm and a woman with sexual arousal problems is very likely to have problems with desire and orgasm as well, making it difficult to measure sexual arousal per se, or to pinpoint the principal cause of sexual dysfunction on the whole.

Previous studies found that low sexual arousal was associated with a longer duration of marriage (14 years or longer), having 3 or more children and having a lower educational achievement (Rawa Bau, 2010, Sidi et al., 2007d). Other significant associations of low

sexual arousal were having a lower frequency of SI, an older husband, and for the woman, being older and in the post-menopausal phase in life. Laumann also concluded that low sexual arousal had a strong positive association with a host of negative physical and emotional satisfaction parameters (Laumann et al., 1999). This study however did not have any similar associations.

In this study, there was a significant association between sexual arousal and the degree of ED in the husband, whereby those women whose husband suffered from mild to moderate ED were at higher risk ( $p=0.003$ ,  $OR=29.263$ , 95% CI 3.106, 275.741). In view of the extremely wide CI, this result is to be interpreted with caution. This result is likely due to the small number of women ( $n=7$ ) who actually fulfilled the criteria for sexual arousal disorder. A larger sample will have potentially given a clearer picture on the association, but nevertheless the relationship between a woman's level of sexual arousal and the ED status of her husband can rationally deduced.

The other significant association in this domain was with the type of sexual response. In this study, the women were asked to choose which sexual response type best described their experience. They were given the options of choosing the models proposed by Masters & Johnson, Kaplan or the non-linear type proposed by Basson. There was also the option of 'none of the above'. Those who responded that their sexual response cycle was best described by the model proposed by Basson were at higher risk of sexual arousal disorder ( $p=0.025$ ,  $OR=5.582$ , 95% CI 1.254, 27.299). Again the wide CI in this result warrants for the interpretation of this result to be done with caution. The other pertinent issue with regard to these results is the validity of the questionnaire used. The descriptions of the models of sexual response were in Malay, and had been translated by Professor Hatta Sidi

but not validated. In fact these descriptions of the sexual response cycles have not been used in any local study to the best knowledge of the author. There were some comments from the respondents that the descriptions were somewhat difficult to understand, yet other women who participated in the study felt it was easily understood. In any case, a validation study may be indicated for future use of these instruments in Malay. Nevertheless, it was interesting to note that the non-linear model proposed by Basson was associated with sexual arousal problems as it reinforces the current belief that any form of sexual dysfunction is not likely to be limited to a single domain as represented in the traditional models, but rather are part of a more complex interaction of a range of variables that are dynamic and is constantly changing in response to a woman's environment, her physical circumstances and her relationships.

#### 6.4 Lubrication Disorder

This study showed a very low prevalence of lubrication disorder of 2.5%, which bearing in mind that the population sampled was essentially a healthy cohort appears reasonable. Local studies have found rates of lubrication disorder of 21.5% to 50.4% in primary care patients (Ishak et al., 2010, Sidi et al., 2007e). Interestingly Periasamy found a rate of only 12.5% among older patients attending a specialized uro-gynaecological clinic(Periasamy, 2010). A large population based survey found a modest rate of 7% in Denmark(Christensen et al., 2011) while other studies done in older women in the United States found rates of 16.9% to 28.4%(Huang et al., 2009). These significant discrepancies in rates from various studies reflect methodological differences in study design and



populations surveyed. There were a number of studies that investigated female sexual dysfunction but did not have a sub domain of lubrication, conceptualizing it as an inherent part of the arousal phase. This again reflects the lack of agreement with regards to the classification system for female sexual dysfunctions in general.

Difficulties with vaginal lubrication may be a result of changes in hormone levels, such as those associated with menopause, due to interruption of crucial nerves or vessels as a complication of surgery or radiotherapy, due to side effects of medications or chronic medical problems and due to the effects of psychological problems. In this study, most of the variables did not show any significant association with difficulties in lubrication, which in view of the very low prevalence is expected. However logistic regression did show an association whereby women whose husbands had mild to moderate ED were more likely to have lubrication disorder ( $p=0.003$ ,  $OR=29.263$ ,  $95\% CI 3.106, 275.741$ ). However no reliable conclusions can be made with regards to this association in view of the wide CI which is a direct result of the very small number of women ( $n=5$ ) who actually suffered from lubrication disorder as defined by the MVFSFI in this study.

### 6.5 Orgasmic Disorder

The prevalence of orgasmic disorder in this study was only 2.0%. Previous studies done locally among primary care patients have yielded very diverse rates 16.6% to 59.1% (Ishak et al., 2010, Sidi et al., 2007e, Sidi et al., 2008) . Interestingly, the rate of orgasmic disorder among diabetic female patients from a community sample was only 4.5%(Kamaralzaman S, 2010). In Periasamy's study done among uro-gynaecological

patients, the rate was 2.5%(Periasamy, 2010). While it is reasonable to presume that the rates of orgasmic problems will be higher in populations with medical problems such as diabetes or gynecological problems, the findings above seem contradictory. In a study large done among healthy Austrian women, the authors found that 39% of the women had orgasmic difficulties which were significantly associated with increasing age (Ponholzer et al., 2005). Meanwhile in another large study done in Japan, the authors found that the rate of orgasmic disorder increased with the women's age; for women in their 30's the rate was 15.2% and for women in their 60's it was 32.2%(Hisasue et al., 2005). It must be noted that while both the Austrian and Japanese studies had large sample sizes, neither used validated questionnaires to measure FSD. In other large epidemiological surveys the rates for orgasmic dysfunction have been found to be approximately 29% in American women(Laumann et al., 1999) and a large global survey found a rate of 16% for inability to reach orgasm(Laumann et al., 2005). The wide variation in rates may be attributed to cultural differences and sexual attitudes in addition to the methodology used in each study.

The only statistically significant association found in this study was that of orgasmic disorder with the ED status of the husband ( $p=0.010$ ,  $OR=20.85$ , 95% CI 2.067, 210.304). However in view of the small number of actual respondents with orgasmic disorder ( $n= 4$ ) and the corresponding wide CI, no reliable conclusions may be made with this result.

## 6.6 Sexual Satisfaction

The prevalence of sexual dissatisfaction in this study was 3.5%. Sidi found a rate of sexual dissatisfaction among women attending a primary care clinic to be 52.2%, which was significantly associated with having an older husband, and infrequent SI (Sidi et al., 2007c). Another study done by Ishak among primary care patients found a rate of 21.5% for satisfaction problems (Ishak et al., 2010). A study done among uro-gynaecological patients found a rate of 16.4% for low sexual satisfaction (Periasamy, 2010) and among women attending an infertility clinic the rate was 13.3% (Yeoh, 2011). In a recent study on a large number of women in the United States, researchers found that 78% of all sexually active women were satisfied with their sex life and that sexual satisfaction tends to increase with age among older women (Trompeter et al., 2012). The study also found that sexual satisfaction was related to emotional closeness and this in turn affected other domains of sexual function such as arousal, lubrication and orgasm.

Sexual dissatisfaction is perhaps one of the more difficult domains of female sexual function to measure and most certainly takes into account marital satisfaction (Michael Y, 2000). Various experts in the field have attempted to define sexual satisfaction some being very straightforward as proposed by Derogatis & Melisaratos; whereby one is simply satisfied or not with her sexual relationship (Derogatis, 1979). Others have also defined it in much a similar way as simply the absence of dissatisfaction (Renaud, 1997). More inclusive definitions have been proposed, such as that by Lawrance and Byers who defined sexual satisfaction as "an affective response arising from one's subjective evaluation of the positive and negative dimensions associated with one's sexual relationship" (Lawrance, 1995). Despite the ample range of definitions of sexual

dissatisfaction, the dilemma remains as to how precisely satisfaction can be gauged, because satisfaction is most certainly not an 'all or none' phenomenon as it is influenced by a broad range of physical, psychosocial, cultural and even religious factors(Davidson, 1995).

In this study, there was a significant association between sexual dissatisfaction and the type of female sexual response, whereby women whose sexual response was best described by the non-linear model (Basson model) were at increased risk ( $p=0.025$ ,  $OR=5.582$ , 95%  $CI$  1.254, 27.299). This result favors the concept that the female sexual response is in fact a function of a wide range of variables, but needs to be interpreted with caution as the questionnaires used to describe the types of sexual response were not validated in Malay, hence leading to the possibility of inaccuracy in the results. Certainly validation of questionnaires to assess for types of female sexual response is warranted for future studies in the area.

The significant association was sexual dissatisfaction and the ED status of the husband, whereby women whose husbands had mild to moderate ED were at increased risk ( $p=0.003$ ,  $OR=14.526$ , 95%  $CI$  2.490, 84.758). This result was very significant and it is understandable how ED may influence a women's sexual satisfaction, but in view of the wide  $CI$ , needs to be interpreted with caution. If the number of male respondents was higher, a more reliable and valid result may have emerged.

## 6.7 Sexual Pain Disorder

Sexual pain disorder may be divided into dyspareunia and vaginismus. The MVFSFI however does not distinguish between the two. In this study, the rate for sexual pain disorder was 3.0%. Local studies have found the rates of sexual pain disorders to range from 16.6% to 67.8% (Ishak et al., 2010, Sidi et al., 2007e) in primary care populations and was found to be 21.7% among women attending a uro-gynaecological clinic(Periasamy, 2010). Laumann found the 8-21% of women experience pain during SI, with younger women being at higher risk. Other factors found to be associated with pain during SI were lower education level, lower socio-economic status, the presence of urinary tract problems and having stress or emotional problems(Laumann et al., 1999). Many studies on sexual pain have distinguished between vaginismus and dyspareunia, which makes sense as the etiology of each disorder tends to differ significantly. Studies on dyspareunia have estimated the rates to be anywhere from 14.4% to 18.0% although lifetime rates of experiencing pain during SI are much higher(Laumann et al., 1999, Dunn et al., 1998). The prevalence rates for vaginismus meanwhile has been estimated at between 15-17% at sex therapy clinics(Spector and Carey, 1990), but the rate in the community are probably much lower. Clearly no firm estimates of sexual pain disorder are present.

This study did not find any significant association between any of the explored variables with sexual pain disorder. Keeping in mind that only 6 women qualified for sexual pain disorder based on the MVFSFI and the fact that these were generally healthy women, this is not an unexpected result.

## 6.8 Erectile Dysfunction

While this was not the principal objective of the study, a discussion is warranted nonetheless. This study showed that up to 65% of men had some form of ED (50.9% for mild ED, 13.5% for mild to moderate ED and 0.6% for moderate ED). This was consistent with Yeoh's study which recorded a rate of 62.2% in couples seeking treatment for infertility (Yeoh, 2011). Other studies have found ED to affect 1 in 5 males aged 20 and above, with the prevalence increasing with age and being associated with hypertension, diabetes, obesity and smoking (Saigal et al., 2006). Laumann's study meanwhile recorded rates of ED in only 5% of the population sampled (Laumann et al., 1999).

The finding of this study highlights the fact that the prevalence of ED is relatively high and probably only comes to medical attention when severe and causing significant distress to the patient. It is likely that most men ignore the problem and are embarrassed to discuss it or seek help, at least when the degree of ED is mild. There is thus a pressing need to educate the population in general about ED and to detect it earlier with the hopes of addressing modifiable risk factors that may then delay or modify the progression of the disease. The other pertinent point is the association of ED with FSD and its specific domains in this study; the association was found to be significant repeatedly. Although there was significant association between ED and FSD, however, due to the smaller number of male respondents in this study, the power of the study was compromised. Nevertheless, the impact of ED on FSD cannot be denied and this warrants further studies with larger sample size to investigate the relevance of this contributing factor.

## CHAPTER SEVEN

### Conclusion:

1. The overall prevalence of FSD among healthy female healthcare workers in three government hospital was 5.5%. The prevalence of women with sexual desire disorder was 18.9%, sexual arousal disorder 3.5%, lubrication disorder 2.5%, orgasmic disorder 2.0%, sexual dissatisfaction 3.5% and sexual pain disorder 3.0%.
2. The prevalence of FSD in this study is lower compared to other studies done locally but closer to the rates found in large population based surveys of nationally representative samples in some international studies. The high rate of sexual desire disorder is also consistent with other studies of FSD which have shown low sexual desire to be the most common sexual problem affecting women in general.
3. The prevalence of ED among the husbands of the healthcare workers was 50.9% for mild ED, 13.5% for mild to moderate ED and 0.6% for moderate ED. There were 35% of males with no ED.
4. Overall FSD was found to be significantly associated with a lower frequency of sexual intercourse, a longer duration of marriage and having a husband with mild to moderate ED.

5. Sexual desire disorder was found to be significantly associated with a higher educational attainment, a lower frequency of SI, a longer duration of marriage, having  $\geq 2$  or more children and having a husband with mild to moderate ED.
  
6. Sexual arousal disorder was found to be significantly associated with the non-linear model of female sexual response (Basson Model), lending further evidence to the current belief that the female sexual response is much more complex than previously described in the traditional models.
  
7. A total of 13.9% of the female healthcare workers had GHQ-30 scores that were indicative of depression and/or anxiety disorder. GHQ scores were not significantly associated with FSD or any of its domains in this population.



### Limitations:

1. The sample size may not have been large enough to demonstrate differences and significance for some variables, hence some large CI range upon applying logistic regression. The even lower response rate among the husbands also reduced the power of this study. There was a definite sense of reluctance to participate in the study despite anonymity, reflecting the somewhat conservative attitudes of Malaysians towards sexual matters.
2. The women were instructed to answer the questionnaires in private, without disclosing the contents to colleagues and more importantly to their husbands. This was because there are questions in the MVFSFI that ask specifically about satisfaction with the partner, hence if the female respondent were to answer the questionnaire in the presence of her spouse, she may not do so honestly. There was no way of ensuring that the women answered the questionnaire privately, although diligent effort was made to stress on this point.
3. Although all the questionnaires were in Malay and validated (exception was the descriptions of the female sexual response), there is still the possibility that some women had difficulty understanding the questions. This may be particularly so for those women with only a primary education and those from Chinese or Indian ethnicity. These subgroups of women are possibly represented among hospital attendants.

4. The generalizability of this study may be limited as it was done exclusively amongst healthcare workers. Furthermore healthcare workers may be exposed to unique stressors and working conditions such as working shifts and being on call which can lead to fatigue and exhaustion and hence negatively impact their sexual health. These factors were not specifically explored and may represent potential confounders in this study. Nevertheless it does provide a glimpse of sexual problems among healthy women.
  
5. Some errors may have occurred in measurement as a result of recall bias; an event that is unavoidable in cross sectional studies. The possibility of social desirability bias cannot be discounted, bearing in mind the sexual nature of the questionnaires, the women may not, for example, wish to portray herself as a person with a high sex drive. The same situation could be applied to the male respondents who may not have honestly answered the IIEF-5 questionnaire.
  
6. The FSFI is largely based upon the traditional models of female sexual response, and in view of the current evidence base which is leaning towards the non-linear or circular model, may not represent an accurate description of FSD.

## Recommendations:

1. The study may be replicated with a larger sample size for better power. It may be limited to healthcare workers or extended to a larger population based survey of a nationally representative cohort hence enabling a true estimate of FSD within the population.
2. Other variables in relation to the women's psychosocial or physical circumstances as well as those in her husband could be explored in future studies examining FSD in order to gain more insights into the factors that exert its effects on a woman's sexuality.
3. Validation of questionnaires to describe the types of female sexual response may be indicated for use in future studies.
4. Further studies employing a larger sample of male respondents are proposed to delineate the true relationship between ED and FSD.
5. The proportion of female healthcare workers with GHQ-30 scores that are indicative of depression and /or anxiety disorders is high which puts them at risk of potentially suffering from untreated or unrecognized affective or anxiety disorders. This warrants more regular screening of health care workers and in that line of thought, counseling could be offered to them as primary prevention of such disorders.

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