Sexually Transmitted Diseases and Sexual Function

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ABSTRACT

Introduction. There is a need for state-of-the-art information in the area of sexually transmitted infections (STIs) in relation to sexual function. There are an estimated 60 million people living with and 340 million with treatable STIs. Surveys show sexual problems to be as high as 35% for men and 55% for women; however, there is little research directly assessing relationships between infection and sexual function.

Aim. To show that STIs are associated with (and may cause) sexual dysfunction. Conversely, sexual dysfunction can increase patients’ risk of STI acquisition. In men, erectile dysfunction (ED) associated with condom use may lead to unsafe sexual practices and, hence, STI acquisition. The role of various therapies including phosphodiesterase type 5 inhibitors in the treatment of ED in positive men taking social drugs will be explored.

Methods. To provide state-of-the-art knowledge concerning sexual function and STIs, representing the opinions of five experts from four countries developed in a consensus process and encompassing a detailed literature review over a 2-year period.

Main Outcome Measure. Expert opinion was based on the grading of evidence-based medical literature, widespread internal committee discussion, public presentation, and debate.

Results. This article highlights major factors causing the spread of STIs and suggests management interventions to prevent further spread of HIV/STIs, focusing on the juxtaposition between STIs and sexual functioning. Women’s unique vulnerabilities to HIV/STIs (biological and physiological issues, gender-based violence, gender inequity) and their impact on women’s sexual function are reviewed. Similarly, men’s unique vulnerabilities to HIV/STIs including condom use, disclosure, voluntary counseling and testing, multiple concurrent sexual partners, and recreational drug use—particularly in homosexual men—are explored, as is the association of prostatitis and sexual function. Lastly, the article reviews the relationship between circumcision and sexual dysfunction.


Key Words. **

Introduction

It is a reasonable assumption that people who contract sexually transmitted infections (STIs) do not have sexual dysfunction and that those who are dysfunctional would not have the capacity to develop STIs. In this review, we have put forward what we believe is a raft of compelling scientific evidence showing that these realms do, in fact, interact, often in causative fashion. Because sexual dysfunction symptoms may be found in up to half of nonbiased population studies and the rates of STIs are measured in tens of millions, these issues potentially affect a sizeable proportion of sexually active men and women in most countries. To date, a systematic and broad review of the interaction of these two major themes has not been undertaken, but with the spread of HIV and other STIs...
worldwide, it is a timely mission that we have been
asked to tackle. Although much of the material in
this chapter has high-grade references, the evi-
dence base levels are low in some instances. This is
due to the newness of the topic, a fact that posi-
tively opens many future possibilities for future
research and improved evidence-based levels.

Overview of HIV and HIV in Men

Effects of HIV Itself

Introduction

HIV that is left untreated severely impairs the
immune system by infecting CD4 lymphocytes.
Groups that are most affected in North America,
Western Europe, and Australia are men who have
sex with men (MSM), and intravenous drug users.
In the developing world, heterosexual sexual inter-
course and vertical (mother to child) remain the
primary routes of transmission (http://www.unaids./org/en/Knowledgecentre/hivdata/Epidemiology/
epipublications.asp). Since the advent of effective HIV treatment
(highly active antiretroviral therapy [HAART])
in the mid-1990s, rates of STIs and HIV acquisi-
tion have continued to increase in the developed
countries (http://www.hpa.org.uk/) [1]. In devel-
oping countries, the incidence of HIV remains
explosive, and, without effective treatment, the
outlook seems devastating (http://www.unaids.
.org/en/Knowledgecentre/hivdata/Epidemiology/
epipublications.asp).

HAART generally produces a sustainable sup-
pression of plasma HIV virus (viral load) and an
increase in circulating CD4 cells. More than 25
antiretroviral drugs from six therapeutic classes are
now available for the management of HIV infec-
tion and mortality in HIV-infected patients now
approaches that of the uninfected population [2].

Sexual difficulties appear to be common in
patients with HIV. They were reported by 33.3%
of individuals with HIV in a recent French
national survey [3] and MSM in the United
Kingdom are five times more likely to report
sexual problems than uninfected MSM [4]. Fur-
thermore, patients on HAART with sexual diffi-
culties are more likely to report poor adherence to
HAART [5].

HIV Encephalopathy (HIVE)

HIVE is the infection of the CNS directly caused
by HIV. If untreated, some 15–20% of patients
will eventually develop the disease [6]. HIVE
generally only occurs in the later stages of the HIV
infection when there is a profound immune sup-
pression (CD4+ T-cells <200/μL) [7] (http://

HIVE is a subcortical dementia which emerges
over the course of weeks and months. Typical
complaints include slowing of reasoning and emo-
tional blunting which could, in theory, underpin
sexual disinhibition [6,8,9].

There are no systematic reviews of sexual func-
tioning of HIVE patients. Anecdotal reports by
the authors had clinical pictures of low sexual
desire, erectile dysfunction (ED) and sexual disin-
hibition. HIVE and other CNS manifestations are
less likely in individuals on HAART and are more
likely to improve on HAART [10,11].

Adjustment Disorders, Depression, and Anxiety
in HIV

At the beginning of the AIDS pandemic, affective
disorders (such as depressed mood) were seen in
a considerable number of HIV-1-infected individu-
als [12]. In the era of HAART, mental illness
related to physical weakness is declining [13].

A survey of patients in the United States found
that 54% of HIV patients had Axis I psychiatric
disorders, including 20% with major depression
and 18% with depressive symptoms associated
with adjustment disorder [14].

Patients with mild adjustment disorders result-
ing from bad news (i.e., giving the patient an HIV
diagnosis or the worsening of HIV disease status)
and patients with major depression may benefit
from supportive psychotherapy [15].

Anxiety and depression are common among
persons living with HIV, with a prevalence of
nearly 50% in a U.S. screening sample of 2,864
HIV-infected persons [16]. It is not known
whether the introduction of HAART has led to a
decline in depression and anxiety disorders among
HIV-infected persons. However, minor cognitive
motor disorders have significantly declined in the
HAART era [9,17–22].

The presence of depression and anxiety has
been shown to be an important patient-related
barrier to adequate adherence to HAART [23,24].
Despite the consistent association between depres-
sion and HAART adherence behavior, there have
been few detailed analyses of this issue. It is also
possible that HIV-associated neurocognitive dis-
turbances, which become more prominent as
HIV disease advances, might be responsible for
nonadherence. However, to our knowledge, the
relationship between adherence to HAART and

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neuropsychological performance has been assessed in only one recent study, which suggested a negative effect of neuropsychological impairment on adherence to antiretrovirals [25].

Men with HIV who have multiple sexual problems were likely to suffer from major depression. Factors independently associated with multiple sexual problems among the HIV-negative gay men were poorer general health and interpersonal isolation, whereas for the HIV-positive gay men, factors were adoption of avoidant strategies to cope with daily life stress, sexual risk taking in casual encounters, and the use of antidepressants [26].

Endocrine

Hypogonadism among HIV-infected men in the HAART era is usually attributable to hypothalamic/pituitary dysfunction [27]. The prevalence and etiology remain unclear. However, given its association with increasing age, the prevalence of hypogonadism may rise as HIV-infected men survive to older ages [27]. Hypogonadism appears to be associated with decreased muscle mass quantity and function, changes in corporal fat mass distribution and quantity, secretion of adipocytokines, and endothelial dysfunction. Hypogonadism may be due to the metabolic syndrome which may have overlapping features with the lipodystrophy syndrome [28]. HIV-associated hypogonadism is also associated with sexual dysfunction, namely ED and low sexual desire [4,27,29,30]. Furthermore, there is increasing evidence that men with HIV complain of low sexual desire, particularly those on HAART who have raised estradiol levels [4,29,30].

Direct Effects of HIV Infection

Lipodystrophy

Lipodystrophy is a pathological fat redistribution problem manifesting in central obesity and peripheral, including facial, fat atrophy. Lipodystrophy is associated with protease inhibitors (PIs) and lipoatrophy is likely to be due to thymidine analogue reverse transcriptase inhibitors; however, the exact physiological mechanisms are unknown [31]. The psychological effects of lipodystrophy are potentially devastating. Patients fear disclosure and often exhibit features of depression, which can affect sexual function; self-image and self-esteem are compromised [32]. The incidence of lipodystrophy and lipoatrophy is reducing due to newer antiviral agents.

Neuropathy

Peripheral neuropathy is a well-documented complication of both HIV infection by direct viral toxicity and HAART, most notably thymidine analogue nucleoside reverse transcriptase inhibitors, e.g., zidovudine-AZT [33]. There is little data on the relationship of peripheral neuropathy and sexual dysfunction in patients with HIV. The relationship between retarded ejaculation and peripheral neuropathy within the context of HIV is likely to be an autonomic and sensory neuropathic process. However, other relevant causes of retarded ejaculation need to be considered [34,35]. In non-HIV settings, men with diabetes and consequent associated peripheral neuropathy have been reported to complain of retarded ejaculation [36].

Iatrogenic Low Sexual Desire

Low sexual desire in the post-HAART era appears to be related to their HIV therapy [37–39]. Experience in a previously reported study from a London HIV center showed that up to half of MSM on HAART complained of low sexual desire which was associated with raised estradiol levels [4]. Other workers have also found significant changes in testosterone and estradiol levels in men on HAART [30]. Using aromatase inhibitors in men with HIV and low sexual desire has an effect suggesting that the organic mechanism is raised estradiol [29].

New Treatments

Efavirenz, a commonly used antiretroviral agent since the late 1990s, has been shown to have CNS side effects; however, there does not exist any evidence for increased sexual dysfunction in controlled studies [40]. Currently, newer antiretrovirals are licensed on a yearly basis; however, effects on sexual dysfunction or interaction with current pharmaceutical agents used to manage sexual dysfunction are not systematically investigated. PIs cause increased plasma levels and clinical effects of all phosphodiesterase type 5 (PDE5) inhibitors via the inhibition of cytochrome P450 liver isoenzymes [41–43].

PDE5 Inhibitor Use and Sexual Function with Particular Regard to MSM

Common sense would suggest that MSM using PDE5 inhibitors to maintain strong erections would lead to safer sex, e.g., a man who feels his erection might fail while putting on condom
would not do so and so have unprotected high-risk
sex but would have a hard erection under PDE5
inhibitor cover and so feel able to use a condom.
However, the current evidence appears contradic-
tory to this concept. Rosen et al. reported at the
Bolger conference that PDE5 inhibitor use is asso-
ciated with recreational drug use (e.g., crystal meth
or cocaine) which in turn may lead to central
excitement but peripheral (penile) vasoconstric-
tion [44]. In order to overcome this recreational
drug-induced ED, MSM resort to PDE5 inhibitor
use, which seemingly in the United States is fre-
cently obtained online, not via a physician, and
with little or no safer-sex counseling [44]. Further-
more, the disinhibition induced by these recre-
atonal drugs may well be enhanced by similar
CNS effects of the PDE5 inhibitors themselves
[45]. A further problem is that PDE5 inhibitor use
has been shown to be much more likely to lead to
condom breakage and has also been suggested to
lead to anal vasoengorgement in MSM with con-
sequent facility of transfer of HIV at anal sex [44].
Recent qualitative and quantitative work in MSM
who have recently HIV seroconverted shows that
use of recreational drugs, past and current sexual
assault, and current depression are cumulatively
associated with unsafe sex and HIV acquisition
[46] [47]. Addressing these issues is important both
to ensure good HAART compliance as well as
safer sex [48–50].

Circumcision as a Strategy to Reduce HIV
Infection in Men

Circumcision is believed to have originated in
Egypt more than 6,000 years ago and may be the
“oldest” elective operation in the history of man
[51]. Today, circumcision has resurfaced as a hotly
debated topic and come to occupy center stage in
public health policy directed toward the control of
the HIV epidemic. Studies have shown reduced
relative risk of urinary tract infections in boys,
carcinoma of the penis, genital ulcer diseases, and
human papilloma virus (HPV) transmission in
association with male circumcision (MC) [52–57].

Circumcision and HIV Risk

Varying rates of MC in different parts of the con-
tinent may be responsible for the highly variable
prevalence rates of HIV in different parts of sub-
Saharan Africa [58]. Observational studies per-
formed in the 1980s had suggested the protective
effects of circumcision in preventing HIV infec-
tion in men [59,60]. Following these studies, the
recommendations for MC in sub-Saharan Africa
were based on three landmark, randomized con-
trolled studies in Africa demonstrating unequi-

vocally that nonritual, properly performed
circumcision can reduce HIV acquisition by 50%
or more [61–63]. The results of the first of these
trials in Orange Farm, South Africa were published
in 2005. In late 2006, the remaining two
randomized controlled trials of MC in Africa were
terminated by the National Institutes of Health
(NIH) due to a preponderance of evidence sup-
porting the protective effect of circumcision
against HIV infection. The World Health Orga-
nization (WHO) and UNAIDS issued statements
recommending circumcision as an intervention in
heterosexual men to reduce the risk of acquiring
HIV infection in March of 2007. The findings
from these trials, published between 2005 and
2007, confirmed the considerable benefit of cir-
mucosal breach of the
cervical fluids, as well as mucosal breach of the
inner mucosa of the penile shaft to vaginal and
cervical fluids, as well as mucosal breach of the
frenulum and the distal shaft due to the minor
trauma of intercourse. Other studies have docu-
mented the lower incidence of genital ulcer disease
in the keratinized penile skin of circumcised men,
yet another factor that may be protective against
acquiring HIV infection [57,63,65–70].

Potential Complications and Ethical Aspects

A systematic review of complications of MC in
Anglophone Africa was performed in 2007 and
included such factors as indications for MC, com-

m-
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Complications reported, age of patients, and category of circumcisers [71]. The study was based on a systematic review of peer-reviewed articles. The prevalence of reported complications ranged from 0% to 50.1%. One study on hemophiliac patients reported a very high complication rate of with 50.1%, but excluding this series, most of the reported complications in the reported studies were of only minor severity without serious sequelae. Interestingly, the prevalence of complications of MCs performed by physician surgeons was not significantly different than those performed by nonphysician health professionals. Given the relatively short duration of the studies and inadequate long-term follow-up, it is evident that the information pertaining to at least some adverse events (i.e., keloid formation) may not be properly captured to date. The authors concluded that there is inadequate data to conclusively assess the prevalence of complications of MC in the region [71]. The overall complication rate reported in the 1,475 patients constituting the intervention arm of the South African randomized study was 1.8% which is not dissimilar to rates reported in the West and the industrialized nations [72]. The reality of complications associated with any surgical procedure as well as the complexities of the various religious, cultural, and societal values pertaining to circumcision mandate careful attention to the ethical aspects of circumcision in Africa and the developing world. Some of the medical, legal, and ethical aspects of treating sexual dysfunction in the HIV-positive male have been previously addressed [44,73,74]. In the context of circumcision, as it relates to HIV prevention, attention to human rights and ethical considerations are paramount, especially as they relate to children. Stemple points to the nature of the disease typically affecting the marginalized and the poor, as well as the fact that the spread of disease can lead to further inequality and hardship, to encourage debate that is focused on informed consent and children’s’ rights [75]. He also urges an increase in the use of treaty-based judicial mechanisms and rewarding human rights compliance with preferential trade agreements [75].

**Circumcision Outcomes and Effects on Sexual Function**

Implementation of policies for mass circumcision as a measure to control the HIV epidemic has raised concerns about possible impairment of sexual function. A number of investigators have evaluated the effects of circumcision on a range of sexual satisfaction measures. Despite conflicting results in some of the historical observational studies, most recent articles do not show evidence of adverse effects on sexual function [76]. Senkul et al. evaluated the effects of adult circumcision on sexual function using the Brief Male Sexual Function Inventory (BMSFI) and ejaculatory latency time in men circumcised only for religious or cosmetic reasons. After a 12-week interval, the BMSFI evaluation and ejaculatory latency time measurements were repeated and it was noted that despite a postcircumcision increase in the mean ejaculatory latency time, which the authors suggested can be considered an advantage, differences in the mean BMSFI scores were not statistically significant [77]. Similarly, a small prospective study of the effects of circumcision using the BMSFI administered before and after the procedure with a minimum 12 weeks follow-up revealed no statistically significant difference in the BMSFI composite scores of reported sexual drive, erection, ejaculation, problem assessment, or overall satisfaction [78].

In the randomized trial of MC performed in Rakai, Uganda, Kigozi et al. investigated self-reported sexual satisfaction and function among 4,456 sexually experienced HIV-negative males. Overall, less than 2% of the participants in either arm of the study reported problems with sexual satisfaction and function at 6, 12, and 24 months follow-up. The authors concluded that sexual satisfaction and sexual function are not adversely affected by circumcision [79].

The effect of adult MC on men’s sexual function and pleasure was also evaluated by the investigators of the previously reviewed Kisumu, Kenya, randomized controlled trial of circumcision to reduce HIV. The arms of the study included immediate or delayed circumcision after 2 years, similar to the Rakai trial. Both the circumcision and control groups had significantly decreased rates of any sexual dysfunction from 23.6% and 25.9% at baseline to 6.2% and 5.8% at month 24 [80]. Changes pertaining to increased penile sensitivity were reported by 64.0% of the circumcised men and approximately half of the circumcision group reported significantly increased ease of reaching orgasm at month 24. These changes notwithstanding, the authors concluded that MC was not associated with sexual dysfunction [80]. The same group examined MC outcomes among healthy, sexually active, uncircumcised, HIV-seronegative men aged 18–24 years in an African setting and reported 27 adverse
events in 26 procedures (1.8%) out of a total of 1,475 procedures. It was further reported that among the study participants, 92% were “very satisfied” with the procedure outcome 3 months after the surgery [72].

Table 1 below is a summary of these findings:

<table>
<thead>
<tr>
<th>Study</th>
<th>Design</th>
<th>Number</th>
<th>Sexual dysfunction assessment tool</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senkul</td>
<td>Observational cohort 12 weeks</td>
<td>?</td>
<td>BMSFI inventory</td>
<td>No change except slight increase in IVELT</td>
</tr>
<tr>
<td>Kigosi</td>
<td>Randomized trial</td>
<td>4,996</td>
<td>IIEF + supplementary questions</td>
<td>No difference between groups</td>
</tr>
<tr>
<td>Collins</td>
<td>Observational cohort 12 weeks</td>
<td>?</td>
<td>BMFSI</td>
<td>No change</td>
</tr>
<tr>
<td>Krieger 2008</td>
<td>24 months randomized trial</td>
<td>2,784</td>
<td>Nonvalidated Likert + dichotomized scales</td>
<td>No difference</td>
</tr>
<tr>
<td>Krieger 2007</td>
<td>Observational cohort</td>
<td></td>
<td>Nonvalidated questionnaire</td>
<td>Very satisfied</td>
</tr>
</tbody>
</table>

BMSFI = Brief Male Sexual Function Inventory; IIEF = International Index of Erectile Function.

The Future and Global Health Policy

Comparative evaluation of the costs of neonatal circumcision in the United States in relation to later health benefits has confirmed that the post-neonatal circumcision is significantly (10x) more expensive than neonatal circumcision and that the latter will confer lifetime benefits at little or no cost [81]. Although these findings are not directly applicable to the setting in sub-Saharan Africa, it is likely that the future trend for HIV prevention will gradually evolve toward earlier circumcision. Any global policies for undertaking large-scale circumcision programs must take into consideration the important ethical dilemmas as well as the delicate cultural sensitivities of each region. The landmark findings of the three randomized controlled trials on the protective effects of circumcision on reducing HIV acquisition are major breakthroughs in epidemiology, the role of patient education and low-risk sexual behavior must be repeatedly stressed.

HIV in Women

Introduction

It is estimated that up to 17 million women over the age of 15 years are infected with HIV worldwide. Globally, this represents 50% of the disease burden. However, in sub-Saharan Africa, young women may be three times more likely to be infected than young men (http://data.unaids.org/pub/GlobalReport/2008/ev1510_2008_global_report_pp211_234_en.pdf).

Sexual dysfunction in women with HIV is not likely to be raised as a topic by patient or health-care worker. Thus, as few as 4% of HIV health care workers in the United Kingdom ever ask their HIV-positive female patients about sexual functioning [82]. This neglect of clinical care is likely underpinned by ignorance, lack of time, and embarrassment [82,83].

Sexual functioning issues in women with HIV in developing countries worldwide are more likely to be focused on male coercive sex and domestic violence [84–86]. Gender power differentials and poverty can force women to engage in unsafe forced sex in order to secure food and economic security for themselves and their children [86].

The best predictors of female sexual dysfunction (FSD) in general are lack of general emotional well-being states found in conditions such as depression, anxiety, and relationship difficulties [87,88].

Rates of Sexual Dysfunction and General Etiology

Studies Reported Pre-HAART

Small studies on socially disadvantaged and intravenous drug user women in the 1990s in North America suggested that FSD was commoner in women who were HIV-positive compared with HIV-negative, and that a sexual adjustment period after being told the diagnosis persisted for up to a year [89,90]. In spite of needing to adjust to having HIV, 44% had resumed sexual intercourse after 4 weeks [90]. Hypoactive sexual desire disorder (HSDD)-(DSM-IIIR) was reported by 39% of such women over the previous 4 weeks in the absence of clinical depression [91].

Brown and colleagues carefully followed up 54 HIV-positive women from the U.S. armed forces for over 5 years [13]. Heterosexual intercourse was the presumed mode of transmission in most cases. By their third follow-up visit, 14 of the 28 still attending had developed HSDD (DSM III-R) for at least 4 weeks in the absence of psychiatric illness [92].

HAART Era—Quantitative Studies

Denis and Hong, in an Australian study in 2003, compared 43 HIV-positive with 73 non-HIV
women from a community sample. Using an adapted version of the Sexual Function Questionnaire (SFQ) for women, they found the HIV-positive women had significantly lower total SFQ scores, plus lower scores on a number of the sub-scales including sexual interest, activity, satisfaction, and orgasm [93]. Two clinically based European surveys [17,18] suggest that such sexual problems, particularly low desire, might be caused either directly by PIs or as a secondary effect via iatrogenic lipodystrophy (see below) [39,94]. Unfortunately, the data for women in these studies are not reported separately. A recent Italian cohort study demonstrated a strong correlation between FSD and self-reported nonadherence to HAART [5]. Two further studies on women with HIV do not show that PIs or indeed any antiretrovirals have any great impact on women’s sexual dysfunction or psychosocial status [95,96]. This contention is supported by data that women in general in the HAART era have not shown any antiretrovirals to have any great impact on their sexual functioning or psychosocial status [97].

Three recent cross-sectional studies show strong associations between FSD and psychiatric illness (Table 2) [95,98,99].

### HAART Era—Qualitative Studies

Further understanding of the psychosocial issues that underpin FSD in the HAART era has been explored in recent qualitative studies [100,101] (Table 3).

### General Psychosocial Management

Studies looking at socially disadvantaged HIV-positive women in North America suggest that focus groups may enhance the social support of these patients, and that using psychological coping styles rather than physical coping mechanisms (i.e., enhancing positive cognitions rather than attending to practical issues) may be associated with significantly less distress and depression [102,103].

### Other Issues

#### Genital Arousal

There are no studies directly addressing issues pertaining to impairment of genital arousal in HIV-positive women. Indirect evidence comes from a number of studies such as the large Women’s Interagency HIV Study in the United States where insulin resistance was found to be significantly associated with HIV (compared with HIV-

### Table 2  HAART era cross-sectional studies

<table>
<thead>
<tr>
<th>Design</th>
<th>Numbers</th>
<th>Findings</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cross-sectional descriptive study of women New England; wide CD4 count range; majority low income; 64% drug use; wide ethnic background</td>
<td>101 women</td>
<td>Good sexual functioning in the main; sexual dysfunction correlated to poorer mental health, less positive meaning to HIV, poorer life quality, fewer HIV symptoms, ever drug used 35% depressed; 60% anxiety; 42% sexually dysfunctional; significant correlation between depression and sexual dysfunction; 40% had been sexually abused</td>
<td>Bova et al. [98]</td>
</tr>
<tr>
<td>Cross sectional self-selected UK; 75% Black Africans; wide CD4 count range; HAART status unknown</td>
<td>82 women</td>
<td></td>
<td>Lambert et al. [99]</td>
</tr>
<tr>
<td>Cross sectional study Pan European; 83% Caucasian; CD4 &gt; 500 in 60%; Most women using HAART</td>
<td>166 women</td>
<td>FSFI &lt; 10 (high grade dysfunction) 25%; Low FSFI not associated with organic illness/HAART but with anxiety/depression</td>
<td>Florence [95]</td>
</tr>
</tbody>
</table>

**HAART** = highly active antiretroviral therapy; **FSFI** =.

### Table 3  Qualitative studies in HAART era

<table>
<thead>
<tr>
<th>Subjects</th>
<th>Themes</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>74 women in pre HAART era; 74 women in HAART era (30% on HAART); New York City; Mixed race; low income</td>
<td>Similar findings both eras: fear of HIV transmission; loss of sexual spontaneity and freedom; diminished participation in sex; fear of rejection; relationships a hassle; diminished sense of self-attractiveness</td>
<td>Siegel et al. [96]</td>
</tr>
<tr>
<td>21 women London UK; 67% Black African in HAART era; 81% currently taking HAART; No history of drug abuse</td>
<td>Fear of HIV transmission; fear of disclosure; relationship avoidance; reduced sense of intimacy; sex with casual partners to avoid disclosure; dislike of condoms</td>
<td>Keegan et al. [100]</td>
</tr>
</tbody>
</table>

**HAART** = highly active antiretroviral therapy.
negative women)—particularly with use of the NRTI stavudine [104]. Arteriosclerosis has been found to be associated with HIV infection itself, likely via local cytokine release, the duration of infection, age, abnormal fat distribution, nadir CD4 count, and PIs [105,106]. Screening for autonomic neuropathy by history suggests that it is not an uncommon problem in women and men in a population with a mean CD4 count of just over 300 [107].

**Body Image**

The pathogenesis of HIV-associated lipodystrophy is multifactorial. However, the PIs have been incriminated in fat accumulation and the nucleoside analogue reverse transcriptase inhibitors with lipoatrophy [108]. A recent pan U.S. cross-sectional study involving 183 HIV-positive women and 142 well-matched negative controls, however, demonstrated that peripheral fat atrophy (face, cheeks, arms, legs, buttocks) occurred in 28% of the HIV women but only 4% of the controls. Central (visceral) hypertrophy was present in around 60% of both groups, was associated with HAART use, and was not associated with peripheral atrophy [109]. Two further HIV-negative-matched cross-sectional studies in women from the United States confirmed that lipodystrophy is significantly associated with poor body image and depression and may result in patients stopping HAART [110–112]. In an African setting, fat redistribution (facial and buttocck atrophy and abdominal adiposity) can render these women easily recognizable, and hence, significantly affects psychological and social domains of the quality of women’s lives to the extent that they feel stigmatized and marginalized socially and sexually [113].

**Exercise training** (level 1) and facial lipofilling with either autologous fat or polylactic acid infiltrates (level 3) can result in a marked improvement in self-image and self-esteem [114,115].

**Sex Hormones**

When HIV disease becomes advanced in women, low body mass index is associated with significant reduction in free testosterone [116]. An early study suggested that iatrogenic visceral lipodystrophy was associated with significantly raised free testosterone levels, but this was not confirmed in a later study of similar design [117,118]. In terms of sexual desire and arousal, it is likely that some women are more sensitive than others to falling levels of androgens [119]. Replacing testosterone in women with HIV-associated weight loss appears to be safe and well tolerated at least in the short term (level 2) and significantly increases muscle strength (level 2) [120,121]. Its effect on sexual responses in women is not known.

It has been argued that estrogens may be protective against Tat protein–induced inflammatory pathways in human vascular endothelium-induced arteriosclerosis, and may be protective against HIV dementia [122,123]. However, estrogen containing contraceptives may interact with antiretrovirals, and consideration should be given to this therapeutic scenario in each individual case, along with consideration of dual methods of contraception [124].

**Unsafe Sex**

A French cohort study followed up 176 men and 47 women over a median of 24 months who initially had primary HIV infection. Sexual behavior at risk for transmission of HIV (SBR) was defined as inconsistent use of condoms at sex, compared with always using condoms. SBR rates for women were higher than for men but mostly occurred with seropositive partners. After a mean of 5 years follow-up, 21% of patients had had SBR with a casual partner (9% at study outset). SBR sex with steady partners, however, remained constant at about 5%. Other risk factors for SBR were the onset of lipodystrophy and anxiety/depression [125].

Adolescents who had acquired HIV nonsexually either at birth or via transfusion appear to have little knowledge of safer sex and, in an African context, are both marginalized by short stature and low weight as well as worrying if they can ever marry [126,127]. However, condom use in postmenopausal women with HIV does not appear to decrease after the menopause, unlike typical HIV-negative women [128]. In a recent U.K. study, 80% of women who attended a clinic for emergency contraception after unprotected sex had not heard of postexposure HIV prophylaxis [129].

**HPV and Sexual Dysfunction**

HPV causes benign condyomata or genital warts and is known to have oncogenic strains. More than 120 HPV subtypes have been identified. Of the 120 subtypes of HPV, 30 infect genital epithelium. HPV is spread through direct skin-to-skin contact during oral, genital, or anal sex with an infected partner. Genital warts can be caused by strains 6, 11, 30, 42, 43, 44, 45, 51, 52, and 54. However, types 6 and 11 are responsible for 90% of genital...
Sexually Transmitted Diseases and Sexual Function

warts cases [130]. Most infected individuals do not develop genital warts: the rate of subclinical infection is high. HPV is also associated with cervical cancer and anal cancer; types 16 and 18 account for 70% of HPV-associated cancers including oral cancers [131]. The incidence of HPV infection has increased in the last 35 years, likely the result of earlier age of initial sexual contact and an increased number of sexual partners [130]. The estimated prevalence rate of HPV genital infection in the U.S. adult population is 10–20%. The incubation period of HPV varies from 3 weeks to 8 months, with a mean of 2–3 months after initial contact [130].

There are now two prophylactic vaccines for HPV; a bivalent vaccine Cervarix which induces protective immunity against HPV 16 and 18; and a quadravalent vaccine, Gardasil, inducing protective immunity against HPV 6, 11, 16, and 18 [132,133]. There is also unpublished evidence that these vaccines reduce both the incidence and virulence of genital cancers in men. Public health officials in Australia, Canada, Europe, and United States recommend vaccination of young women against HPV to prevent cervical cancer and genital warts and possibly oral cancers.

There is currently conflicting data to link sexual problems including emotional distress in men and women with HPV infection [134–138]. In practice, many clinicians managing men and women with genital warts realize the association between genital warts and changes in sexual functioning and relationship issues. Clearly, more research is required.

Genital Herpes (GH)

GH is usually caused by type 2 herpes simplex virus (HSV), but type 1 is becoming an increasingly common cause nowadays [139]. A recent population study in the United States estimated that 17% of those between the ages of 14 and 49 had acquired HSV type 2 [139]. Up to 90% of those who acquire HSV type 2 antibodies have never knowingly had a clinical outbreak of GH [140]. Symptoms can be severe in a primary outbreak, particularly in women, where fever, headache, malaise, and myalgia are reported in up to 70% of cases [141]. Classically, the lesions progress from erythema to vesicles to pustules, and then break down to form erythematous-bordered painful ulcers [141]. The ulcers heal by crusting in nonmoist areas. About 30% of patients have a milder clinical course, likely either because of pre-existing HSV 1 or HSV 2 [141].

Routine diagnostic testing is either via cell culture or nowadays increasingly commonly in-house polymerase chain reaction testing [142]. Patients are usually in too much pain to even consider intercourse during a primary infection. If left untreated, the symptoms can persist for weeks, but antivirals such as acyclovir can resolve the symptoms within days. Recurrences of GH are less common where the initial infection was HSV type 1 [143].

Many patients have frequent recurrences. These are usually confined to a small area of the genitals and rarely persist for longer than 7 days even if untreated. It is not so much the pain of the genital lesions that may prevent some patients from having intercourse but, rather, the concern of transmission even if they do not have any current outbreak. Other important patient issues are the stigma of having a sexually transmissible disease as well as the psychosocial and psychosexual issues that may accompany recurrences in some vulnerable patients.

There is little doubt that recurrent GH is associated with psychological distress and psychosexual problems. However, opinion differs as to whether these problems are the result of the stress of having GH, caused by preexisting stressors or a combination of the two [144,145]. Many patients with recurrent GH complain of feeling low in mood, tense, and having sleep disturbances for a day or two prior to a recurrence. This may be because of release of systemic cytokines prior to the clinical manifestations of the recurrence [144].

Disclosure to partners may be problematic. Patients with recurrent GH appear less likely to tell partners their diagnosis if they perceive them as “casual” and if they are depressed. Decisions to inform partners are more based on perceived likelihood of discovery and honesty rather than control of transmission [146].

Patients who have frequently recurrent GH need to be empowered with information regarding their illness and likely transmission to others. Even if they abstain from intercourse at outbreaks, there is about a 5% chance per year that the partner will acquire GH (via asymptomatic shedding of virus) [147]. This rate can be halved if the patient takes continuous antiviral prophylaxis and is significantly decreased with regular condom use [147,148]. Patients should be told that even if the recurrence is not in the genital area, e.g., buttock region, that asymptomatic
genital shedding of virus is a common contemporaneous event [149].

Continuous antivirals for patients with regular and frequent recurrences, such as acyclovir, valacyclovir, or famcyclovir, will significantly decrease the clinical outbreak rate, increase the quality of the patient's life in general, and decrease anxiety, illness concern, and the chance of transmission at sex [147,150,151]. It is the clinical impression of clinicians that psychosocial problems per se also decrease. Patients should also be told that, in general, recurrence rates decrease over the years [152].

In the United States, there are some centers that advocate serological testing as part of routine screening for STIs. In spite of concerns that this will cause a torrent of long-term psychological and sexual sequelae, this does not appear to be the case in general, although those who are vulnerable prior to testing, e.g., depression, poor self-image may suffer consequent psychological distress [153–155].

It is generally thought that lesions of GH can enhance rates of transmission of HIV. This was not confirmed in a recent study [155]. However, this may be because patients who have fewer recurrences, i.e., in an active treatment arm for GH, developed behavioral disinhibition [156].

Chlamydia Trachomatis (CT), Gonorrhea (GC), and Associated Pelvic Inflammatory Disease (PID)

Recent WHO estimates estimate the prevalence of CT in European women as between 2.7% and 8.0%, with rates of up to 13% in African countries (http://www.who.int/vaccine_research/diseases/chlamydia_trachomatis/en/). Rates for GC worldwide ranged from between 0.1% and 3.5% and resulted in a total of 62 million cases between 1995 and 1999 (http://www.who.int/vaccine_research/diseases/soa_std/en/index2.html#disease%20burden).

Mass screening programs are important in order to decrease the prevalence of CT and its complications. Careful assessment of 20,000 men and women randomly screened from general practice in the United Kingdom showed that the screening process did not have a negative impact on psychological well-being where the results were negative; in fact, they suggested that the process can lead to a general decrease in anxiety [157]. Both qualitative research and a thematic analysis of the literature strongly suggest that CT-positive patients are at increased risk of general anxiety, fear of infecting their partner and concern about infertility [158–160]. In particular, women tended to blame themselves for acquiring CT and feel stigmatized, whereas men are less concerned, in general, about CT, less willing to disclose to partners, and tend to project the blame of acquisition onto others rather than themselves [158–160]. A Danish study of 277 men and women based in general practice showed that 10% of those who found out they were CT positive ended their current relationship as a direct result of the infection [161]. A history of past sexual abuse in patients with recurrent bacterial STIs was associated with a higher degree of psychological distress compared with those who did not suffer sexual abuse in the past [162].

Consistent and correct condom usage has been shown to confer a statistically significant degree of protection against bacterial STIs such as CT and GC [163].

CT and GC are the most likely organisms to cause acute PID, but other conditions such as bacterial vaginosis (see BV section) and Mycoplasma genitalium may be involved [164,165]. Gonococcal PID is usually more severe, but less likely than CT to cause long-term sequelae. The incidence of PID in women who are CT infected ranges from 5% to 30% [166]. The important outcomes of PID are pelvic pain, infertility, and ectopic pregnancy. Deep dyspareunia may or may not be present with background pelvic pain—it is associated with anxiety, depression, and a history of sexual abuse [167].

Young women may continue to have intercourse in spite of dyspareunia because they feel sexual intercourse affirms them being a normal woman and to satisfy their partner’s sexual needs [168].

Tubal infertility can be associated with distress, anxiety, depression, and relationship problems. In one study of tubal infertility, about a third of women felt this had a negative effect on their sex lives [169].

Sexual Dysfunction and Chronic Prostatitis/Chronic Pelvic Pain Syndrome (CP/CPPS)

Introduction

Limited data are available to suggest a proven association between prostatitis and sexual dysfunction. Since a high percentage of men with prostatitis-like symptoms do not have a known infectious or inflammatory prostate-related etiology for their symptoms, the investigation of the relationship is complicated and must be based on
Sexually Transmitted Diseases and Sexual Function

Table 4 Percentage of erectile dysfunction in Men with CP/CPPS

<table>
<thead>
<tr>
<th>Author</th>
<th>Reference</th>
<th>Percentage of ED in CP/CPPS (%)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anderson et al.</td>
<td>[18]</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Liang et al.</td>
<td>[19]</td>
<td>15</td>
<td>Additional ejaculation</td>
</tr>
<tr>
<td>Lee et al.</td>
<td>[20]</td>
<td>72</td>
<td>Ejaculatory dysfunction</td>
</tr>
<tr>
<td>Trinchieri et al.</td>
<td>[21]</td>
<td>23</td>
<td>Cases of NIH II included</td>
</tr>
</tbody>
</table>

CP = chronic prostatitis; CPPS = chronic pelvic pain syndrome; ED = erectile dysfunction; NIH = National Institutes of Health.

The generally accepted definition of the NIH prostatitis panel (Table 4) [170,171]. The evaluation of the effects of prostatitis on sexual function should take into consideration the adverse effects of drug therapy of CP/CPPS on sexuality, as well as the more interesting direct interactions between prostatitis symptoms and disorders of libido, erectile function, and ejaculation. In this context, it is noteworthy that some investigators are convinced that “prostatitis” does not necessarily impair sexual function, whereas others suggest a rather strong association [172,173]. The failure to demonstrate a concrete link between sexual dysfunction and prostatitis may be based on the following two factors: (i) The use of unacceptable classifications of “prostatitis,” and (ii) analysis of a generally dysfunctional or disturbed sexuality without clear definition of the different entities. An acceptance of the new prostatitis definition and a clear identification of the items of disturbed sexuality are necessary to improve the understanding of the association.

Prostatitis—Classification and Related Urogenital Infections Inflammations

The NIH classification of prostatitis syndromes is supported by the International Prostatitis Collaborative Network (Table 5) [170].

Type I acute bacterial prostatitis (ABP) is a severe infection with fever, inflammatory host response, and voiding disturbances excluding active sexuality. Type IV prostatitis is considered an asymptomatic inflammatory condition in patients in whom white blood cells are found in prostatic tissue or in prostatic secretions and is thus difficult to relate to sexual dysfunction. Therefore, when considering disturbed sexuality, only type II chronic bacterial prostatitis and type III CP/CPPS have to be considered.

Chronic bacterial prostatitis (NIH II)—typically caused by coliform bacteria) is a rare disease in about 5% of all men presenting with “prostatitis” symptoms which are indistinguishable from CP/CPPS [171,174]. Recurrent urinary tract infections in the history and the evidence of bacteriuria in semen are other clinical findings common for this entity [175]. In CP/CPPS (NIH III), men with “prostatitis” symptoms, mainly pelvic pain, are classified to the inflammatory (NIH III a) or noninflammatory (NIH III b) group. The differentiation is made by the finding or exclusion of leukocytes in the urine after prostatic massage, EPS, or in semen [170,171,174,175]. It is an ongoing debate whether both entities are really to be considered as different [176,177]. There remain also major concerns regarding the validity of the NIH-CPSI questionnaire as instrument for diagnosis, classification, and severity of CP/CPPS [176,177]. The WHO has pointed out that the symptoms of CP/CPPS may relate not only to pathology in the prostate but also to the whole male pelvic genital region, especially to the epididymides and the seminal vesicles [178]. There is little direct evidence that sexually transmitted bacteria such as CT or Mycoplasma species cause CP/CPPS, in part, due to problems of urethral contamination of prostatic secretions [170,179]. Hopefully, the interaction between IL-8 and antichlamydiaal mucosal IgA in the ejaculate provides a new opportunity to establish a better organ-related diagnosis of potentially STIs of the prostate in the future [179].

Analysis of the Literature

We searched the PubMed database covering the last 8 years (English–German) using the search terms urogenital infections, prostatitis, chronic urethritis, chronic bacterial prostatitis, CP/CPPS, MAGI, ejaculate infection, ejaculate inflammation, sexual dysfunction, ED, libido disorders, sexual excitability, ejaculatory dysfunction, premature ejaculation (PE), ejaculatory pain, loss of ejaculate volume. Furthermore, all supplements (2000–2008) covering these topics in Andrologia, Human Reproduction, European Urology, Journal of Sex Medicine **:***–**

Table 5 Prostatitis NIH Classification

<table>
<thead>
<tr>
<th>Type</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Acute Bacterial (ABP)</td>
</tr>
<tr>
<td>II</td>
<td>Chronic Bacterial (CBP)</td>
</tr>
<tr>
<td>III</td>
<td>Chronic Prostatitis/Chronic Pelvic Pain Syndrome (CP/CPPS)</td>
</tr>
<tr>
<td></td>
<td>1. inflammatory</td>
</tr>
<tr>
<td></td>
<td>2. non-inflammatory</td>
</tr>
<tr>
<td>IV</td>
<td>Asymptomatic, Inflammatory</td>
</tr>
</tbody>
</table>

NIH = National Institutes of Health; CP = chronic prostatitis; CPPS = chronic pelvic pain syndrome.
of Urology and Journal of Sexual Medicine have been looked through for items addressing sexual disorders in their relation to infections/inflammations of the urogenital tract.

These searches identified a total of 62 articles. This was followed by a review of the titles and abstracts following the modification of the U.S. Department of Health and Human Services (1992) giving an evidence-based guideline. Fifty-one articles met the criteria for inclusion. Astonishingly, no systematic reviews or meta-analyses could be included. Most of the articles detailed results of case series and cohort studies (Levels 2 and 3 evidence).

**Sexual Dysfunction and “Prostatitis” Symptoms**

Early anecdotal experience in the 1980s suggested a significant association between “chronic prostatitis” and sexual dysfunction [182]. Later on, these postulated interactions between CP, the psychological and physical health status, and the direct influence on sexual activity have been addressed in two overviews [183,184]. In 2005, Lutz et al. were the first to analyze systematically the interaction between urogenital (pelvic) pain and sexual function [185]. The authors used the NIH-CPSI with a cutpoint of >4 in the pain score and the BMSFI [176,186]. In this study, men with significant “pelvic pain” had a higher chance of suffering from ED than patients without pelvic pain (Level 3 evidence). Recently, Marszalek et al. analyzed the prevalence of CP/CPPS in an urban population (Vienna) in association with erectile function [187]. The study confirmed a significant correlation between CP/CPPS symptoms measured by the NIH-CPSI and ED measured by the International Index of Erectile Function (IIEF) (Level 2 evidence). Using the same questionnaires, Qiu et al. were not able to confirm such a significant correlation (Level 3 evidence) [188,189].

Four studies analyzed the percentage of ED measured by the IIEF in men suffering from CP/CPPS according to NIH criteria (Table 6). Anderson et al. analyzed 146 patients with CP/CPPS defined by NIH criteria and stated ED in 45, meaning a percentage of 31% (Level 3 evidence) [190]. Liang et al. analyzed the prevalence of sexual dysfunction, meaning ED and PE in “prostatitis” patients demonstrating a prevalence of ED in only 15% (Level 3 evidence) [191]. Most of these patients revealed ED and/or problems with PE: 7.7% suffered from both pathologies. In a recently published study from China, 296 participants seeking help for CP/CPPS have been evaluated, 72.3% reported sexual dysfunction (Level 3 evidence) [192]. In this study, in most men, ejaculatory dysfunction was common, and in men reporting both ED and ejaculatory difficulties, worse CP/CPPS symptoms and a reduced quality of life became evident (Level 3 evidence). Finally, one study from Italy has to be mentioned. This study included not only men with CP/CPPS, but also men with CBP. The authors demonstrated an incidence of ED in about 23% of the patients (Level 3 evidence) [193].

In conclusion, symptoms of sexual dysfunction, especially ED, do occur in between 15% and 72% of all patients seeking help for “prostatitis”-related symptoms. This is particularly notable in cases of CP/CPPS. A significant correlation between severity of ED and increasing CP/CPPS symptoms remains debatable. Unfortunately, age-matched control studies including the general accepted risks for ED are not published in this context to date. Until an evidence-based confirmation of this association becomes available, it is difficult to ascertain the validity of the proposed links between the two conditions.

Another very important concern is the interaction between CP/CPPS symptoms and ejaculatory dysfunction. As already mentioned, two Chinese studies demonstrated the relevance of PE in symptomatic prostatitis patients [191,192]. This finding was later corroborated by a study from Turkey where a modern definition of PE using the intravaginal ejaculation latency time was utilized: 77% of all men with CP/CPPS suffered from this disorder (Level 3 evidence) [194]. In a very similar

<table>
<thead>
<tr>
<th>Author</th>
<th>Reference</th>
<th>Type of study</th>
<th>Effect on CP/CPPS symptoms</th>
<th>Effect on sexual dysfunction</th>
<th>Association between both symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yang et al.</td>
<td>[45]</td>
<td>Prospective study</td>
<td>Yes</td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Aliaev et al.</td>
<td>[46]</td>
<td>Cohort study</td>
<td>Not analyzed</td>
<td>No better prostatic arterial flow</td>
<td>No</td>
</tr>
<tr>
<td>Lin et al.</td>
<td>[47]</td>
<td>Prospective study</td>
<td>Yes</td>
<td>Yes</td>
<td>Negative correlation</td>
</tr>
<tr>
<td>Esilevskii et al.</td>
<td>[48]</td>
<td>Prospective study</td>
<td>Not analyzed</td>
<td>Better arterial status of the prostate</td>
<td>Unclear</td>
</tr>
</tbody>
</table>

CP = chronic prostatitis; CPPS = chronic pelvic pain syndrome; PDE5 = phosphodiesterase type 5.
study from Italy, Screponi et al. reported a high incidence of “inflammatory prostatitis signs” in men with PE [195]. Their findings are more controversial and debatable due to the use of poorly defined “prostatitis” diagnostic tools (no evidence).

Besides PE, “prostatitis” patients may be bothered by ejaculatory pain [196]. Despite lack of concrete evidence, many patients may be encouraged to refrain from ejaculation when suffering from this condition [172]. Conversely, other investigators have suggested that improvement of prostatitis symptoms may follow better prostatic fluid drainage with regular sexual activity and increased ejaculatory frequency [197] (no evidence).

**“Prostatitis” and Benign Prostatic Hyperplasia (BPH)**

The impact of infection/inflammation on the pathogenesis of BPH is the subject of ongoing discussions. It is well known that histologically proven inflammation can be demonstrated in the majority of BPH pathologic specimens and that the presence of inflammation may be a predictor of progression outcomes of BPH (Level 1 evidence) [198]. The interaction between chronic immune response and fibromuscular growth of BPH is one possible explanation for the similar pathogenesis [122]. A second arguably more important pathway may be the similar cytokine expression by epithelial and stromal prostate cells in men suffering from BPH and CP/CPPS [199]. In men presenting with lower urinary tract symptoms (LUTS), an important diagnostic goal is to establish or to exclude the pathogenesis of the symptoms as being related to BPH [200]. Usually, the AUA Symptom Index or the IPSS are recommended for symptom assessment. A recommendation for special questionnaires pertaining to other items such as altered sexual function is not routinely given [200]. The Alf-One study elegantly demonstrated the direct interaction between severity of LUTS and sexual dysfunction, especially ejaculatory disorders (Level 2 evidence) [201]. The key message of this study and consecutive articles is that in sexually active men with LUTS suggestive of BPH, those with painful ejaculation have more severe LUTS, more frequently suffer from ED, and have reduced ejaculatory volume as compared with patients who only have LUTS. In this context, it seems to be important that the presence of pelvic pain may increase the risk for ED independently of age [187]. On the other hand, cross-sectional data suggest no improvement of LUTS by an increased frequency of ejaculation [184]. In a study bridging the gap between LUTS and ED, Muller and Mulhall have speculated on the negative impact of CP/CPPS on life quality, leading to consecutive impairment of erectile function [202]. These arguments are important for the understanding of the close relationship between chronic pelvic pain symptoms, disturbed sexuality, impact on life quality, and psychosomatic implications including depression [177,182–184,203]. New “phenotyping” and classification systems for patients with urologic pelvic pain that focus on different etiologies (urinary, psychosocial, organ specific, infection, neurologic, and tenderness) and integrate the central nervous and brain factors may provide a better understanding of this complex situation and help guide therapies in the future [204].

**Therapeutic Considerations**

The 6th International Conference on New Developments in Prostate Cancer and Prostate Diseases in Paris 2005 summarized all types of therapy based on an evidence-based approach for all types of prostatitis and CP/CPPS [171]. In this context, it seems to be the consensus that only therapeutic strategies reducing symptoms, especially against pelvic pain, are of relevance in relation to changes of sexuality. The use of alpha-blockers has to be addressed as one study demonstrated a special benefit on painful ejaculation in LUTS patients. In patients with CP/CPPS, alpha-blockers are often prescribed as the first therapeutic choice for several reasons [205,206]. Besides the proven efficacy for LUTS, the blockage of alpha-adrenergic receptors located in the nervous system has been discussed as a possible strategy in long-term pain syndromes [207]. Furthermore, a direct effect on neurogenic inflammation has been noted [206]. Concerning CP/CPPS, a new randomized study using alfuzosin did not demonstrate a reduction of symptoms in comparison to placebo (Level 2 evidence) [208]. This outcome is contrary to the widespread use of alpha-blockers in all types of prostatitis and especially not in concordance with several trials in the last decade. Nevertheless, there is similarity to the study of Alexander et al. who did not find a reduction of symptoms in a four-arm study using fluoroquinolones, tamsulosin, both drugs, or placebo (Level 2 evidence) [209]. Discussing these negative findings, Weidner argued already in 2004 against the efficacy of alpha-blocker therapy due to highly variable treatment periods, different populations, and inhomogeneous inclusion criteria of the different studies [210]. In conclusion, it is questionable whether the...
effects of alpha-blocker therapy are thoroughly
directed against the symptoms that comprise
CP/CPPS. A subgroup of men with proven sub-
vesical obstruction and/or proven CBP (NIH II)
may benefit from alpha-blockers, but adverse
effects on ejaculatory function typical for at least
some alpha-blockers have to be taken into account.
Unfortunately, all other types of treatment of
CP/CPPS have been evaluated without a clear
effect on sexual symptoms in comparison to
placebo including phyotherapeutic agents such as
pollen extract, quercetin, or saw palmetto
[206,211]. Unfortunately, a new randomized study
with pollen extract in patients with inflammatory
CP/CPPS did not show an improvement of the
mean sexuality domain of a life satisfaction ques-
tionnaire, although compared with placebo, the
pollen extract significantly improved total symp-
toms, pain, and quality of life (Level 2 evidence)
[212]. For the authors, these results are to be inter-
preted as a weak interaction between CP/CPPS
symptoms and disturbed sexuality.
Concerning the combined use of alpha-blockers
and PDE5 inhibitors in men suffering from LUTS
and ED, it seems to be the consensus that this
combination may be more effective than each drug
administered alone [213]. Stimulated by these
results, different authors speculate on the benefit
of PDE5 inhibitors in CP/CPPS. A relaxation of
prostatic duct smooth muscles increasing the
washout of prostatic reflux products interacting
with pain receptors was suggested as one beneficial
pathway [214]. Furthermore, the better arterial
vasodilatation provided by the degradation of
cyclic guanosine monophosphate into GMP cata-
yzed by cyclic nucleotide PDE enzymes in the
prostate has been suggested to be useful in the
administration of CP/CPPS [214,215]. Unfortunately,
recently published studies concerning the interac-
tion of the effect of PDE5 inhibitors on CP/CPPS
symptoms and disturbed sexuality do not show
significant effect either due to the study design or
to the missing correlation between CP/CPPS
symptoms and ED (Table 6) (no evidence).

Sexual, Sociocultural, and Economic Issues
of HIV with Particular Reference to Sub-Saharan
African Women

Introduction
AIDS continues to be the single largest cause of
mortality in sub-Saharan Africa, and of the global
total of 2.1 million (1.9 million–2.4 million) adult
and child deaths due to AIDS in 2007, 1.6 million
(1.5 million–2.0 million) occurred in sub-Saharan
Africa. This is mostly because of inadequate access
to HIV prevention and treatment services (http://
data.unaids.org/pub/GlobalReport/2008/jc1510_
2008_global_report_pp211_234_en.pdf.)
The disease is spread by a complex interplay of
sexual behavior and biological factors that affect
the probability of HIV transmission per sex act
and sexual behavior patterns are determined by
cultural and socioeconomic context [216]. In sub-
Saharan Africa, macroscopic parameters such as
the subordinate position of women, impoverish-
ment and decline of social services, rapid urban-
ization and modernization, wars, and conflicts
have contributed to extensive spread of HIV [216].
Women and young people are especially vul-
erable to HIV. Half of all new infections occur in
young people aged 15–24 years and young women
account for 62% of the 11.8 million people living
with HIV [217].

Microcosmic influences that contribute to the
rapid spread of HIV include peer pressure, sensa-
tion seeking, personal risk assessment, behavioral
intention, condom use at first sexual intercourse,
and sexual victimization [218]. An integrated
sociobehavioral approach as a means of prevention
of HIV/AIDS is of vital importance [219].

The Feminization of HIV
This is evident via statistics such as these: In sub-
Saharan Africa, young women (15–24 years) are
approximately three times more likely to be HIV
infected compared with young men of the same
age [220]. Fifty percent of infected people world-
wide are women and half of new infections
occurred between spouses with women often at
risk from their main male partner [221].

Gender-based violence (GBV) is the most sig-
ificant reason for women’s greater vulnerability
to HIV. It is partly explained by women’s inability
to negotiate the terms and conditions of sex as well
as very high levels of sexual and domestic violence
[222]. A review of research articles from 1996 to
2002 found nine studies showing that women who
experienced sexual coercion were more at risk of
HIV transmission [222]. The high rate of rape, the
unfavorable economic position of women, and the
inability to insist on condom usage render these
women powerless to protect themselves against
HIV/AIDS [223,224].

A study examined gender attitudes and sexual
violence-supportive beliefs (rape myths) in a
sample of South African men and women at risk
for HIV transmission. The authors speculated that
women’s risks for STI/HIV are the product of partner characteristics and male-dominated relationships which include a sexual assault history and rape myth acceptance, along with alcohol and other drug use history [224]. Women’s characteristics include those who exchanged sex to meet survival needs, to have had multiple male sex partners, greater rates of unprotected vaginal intercourse, lower rates of condom use, more sexual contacts involving blood and greater rates of STIs. This suggests that socially constructed gender roles and sexual scripts [224] influence women’s vulnerability to HIV.

Intimate partner violence (IPV) or “femicide” is violence perpetrated by an intimate partner [220]. Globally, between 10% and 69% of women report physical abuse by an intimate partner at least once in their lives (235).

This intersection of IPV, GBV, and HIV is explained by biological as well as sociocultural and economic factors [220]:

1. Direct transmission through sexual violence [220].
2. Indirect transmission through sexual risk taking
   This includes multiple partners, nonprimary partners, or engaging in transactional sex [220]
3. Indirect transmission through inability to negotiate condom use.
4. Indirect transmission by partnering with riskier/older men
5. Violence as a consequence of being HIV positive.
6. Mother-to-child (perinatal) HIV transmission
7. Women who have sex with women (WSW)

Sexual Behavior and HIV/AIDS/STIs

Although HIV has been identified as the etiological agent causing AIDS, transmission of this virus depends on human behavior related largely to sexuality and drug use [222]. It is important not to assume that individuals make rational decisions when engaging in sexual activity. It is impulsive and driven by physiological needs [219]. Add to this “contextual personal” and sociocultural variables such as gender and racial/ethnic culture and the complexity of HIV/AIDS becomes clearer [219].

Concurrent partnerships are a major contributing behavior that places people at risk. Morris’s study results indicate that concurrent partnerships exponentially increase the number of infected individuals and the growth rate of the epidemic during its initial phase. Adimora and Schoenbach’s study similarly found that mathematical modeling demonstrates that concurrent sexual partnerships spread transmission of HIV through sexual networks more effectively than does serial monogamy for the same total number of sexual partners [225,226].

The Vulnerability of Men and HIV/AIDS/STIs

Little is known about the current prevalence of HIV among lesbians, gays, bisexuals, and transgendered individuals now that the dominant mode of transmission is seen as heterosexual, and with women at most risk, less data exist on heterosexual men and HIV/AIDS. Dunkle and Jewkes name the following as male factors that increase their risk for HIV [222]:

1. Men and low condom use
2. Men and VCT: Recent national studies in South Africa found that only one in five South Africans aware of VCT have been tested and that men accounted for only 21% of all clients receiving VCT
3. Men and ART: A study conducted at Johannesburg General Hospital indicated women accessing ARVs outnumbered men 2:1. Men were also likely to use ARVs later in the disease trajectory than women.
4. Men and alcohol: World Health report noted that South African men were more likely to be “heavy drinkers.” Alcohol is a risk factor for GBV and HIV.
5. Men and MC (see section on this topic above)
6. Men and partner reduction: surveys suggest that the spread of HIV is accelerated where men have multiple concurrent partners and practice unsafe sex [225–227].

MSM

Recent studies demonstrate that unprotected anal sex between men is a factor in HIV prevalence. Research into MSM in Africa is limited. Johnson reports that most Africans have also engaged in sex with women [228]. Once again, myths make men more vulnerable to HIV, as does economic exchange, and inconsistent condom use. Sexual abuse of MSM is common. In summary, management and prevention require a person to get tested, use condoms, and choose partners carefully. In addition, long-term sustained strategies should address the social, cultural, economic, and political factors that influence the spread of HIV/AIDS.
Conclusions

**Recommendations for the Diagnosis and Treatment of HIV in Men**

Early diagnosis of associated sexual dysfunction is important in the context of infection and units should have provision to diagnose/manage or refer to specialists as indicated. Physicians caring for both infected and negative MSM should be aware of the likely psychosocial interaction between recreational drugs, PDE5 inhibitors, unprotected sexual behavior, and transmission.

There should be the recognition that there is a likely association between encephalopathy and sexual dysfunction. Specialist management of associated sexual dysfunction should be in collaboration with a physician. There should be recognition that there is an interaction between HAART and sexual dysfunction. Patients with and endocrinopathy should have an assessment of sexual functioning.

There are direct effects of HIV infection. Recognition of possible association between lipodystrophy and sexual dysfunction is important. Physicians looking after patients should recognize that associated neuropathy may include symptoms of sexual dysfunction.

Patients may suffer from iatrogenic low sexual desire. They should be formally assessed for endocrinopathy.

Caution and vigilance using newer anti-HIV therapy should include assessment of sexual function.

**Circumcision as a Strategy to Reduce Infection in Men**

MC reduces the risk of acquisition of the HIV virus in heterosexual men. Heterosexual MC is not associated with behavioral disinhibition and engaging in high-risk sexual behavior. There is a paucity of literature pertaining to the complications of MC in Africa. The available literature does not allow a complete comparison among various studies, as there is great heterogeneity with regard to indications, follow-up, and the skill set level for the circumcisers. Adult MC can be performed in the developing country setting with acceptable outcomes and complications rates similar to those observed in developed nations.

**Recommendations for the Diagnosis and Treatment of HIV and STIs in Women**

Female HIV infection is associated with sexual dysfunction. All women with HIV should have a sexual dysfunction screen.

All patients with primary and recurrent GH should be seen and counseled about the condition. Those with frequent recurrences of GH should be assessed psychologically and psychosocially and given appropriate treatment for any coexisting psychological illness. Patients with frequent recurrence of GH should be assessed regularly by a clinician. They can have their sexual functioning and quality of life enhanced by giving continuous antiviral cover.

CT, GC, and associated PID are associated with sexual dysfunction. HPV infection is likely to affect sexual function; however, more research is needed.

**Sexual Dysfunction and CP/CPPS**

ABP interferes with sexual function due to the severity of the acute disease. CBP may be associated with ejaculatory pain. CP/CPPS is associated with ED in 15% to 72%. PE has been described in 77% of men with CP/CPPS. Therapy of CP/CPPS is limited by a 40% placebo effect. An improvement of symptoms with PDE5 inhibitors remains debatable.

**Sexual, Sociocultural and Economic Issues of HIV with Particular Reference to Sub-Saharan African Women**

Management interventions fall into two categories: macrocosmic and microcosmic. The former includes the following recommendations. Programs targeting gender attitudes and norms should be supported. For example, the subordinate position of women must be acknowledged and addressed. Microfinance includes the economic empowerment of women.

The role of health services in addressing GBV should include strengthening the links between reproductive health and HIV/aids programs. Community-based services in increasing contraceptive use and changing behavior are required for safer sexual behavior and protection against unwanted pregnancy and infection. Community-based services must give attention to male reproductive and sexual health.

Advocate for better policies supporting better links to accelerate progress on RH/MCH and HIV/STI goals and drive better resource allocation. Strengthening applicable laws and policies (i.e., on domestic violence and gender issues) is important. “Keep them in school”; the importance of education as a protective factor against must be emphasized. Partner reduction campaigns should be supported. Prevention efforts must be
Sexually Transmitted Diseases and Sexual Function

undertaken for sex workers, occasional sex traders, and men who have concurrent sexual partners. Implementation of gender relations, economics, and migration as an alternative to the “abstain, be faithful, use condoms” strategy may be helpful.

Microcosmic changes are also recommended. Early coital debut should be delayed as it is a significant predictor of HIV. Negotiation and disclosure skills should be taught in school programs. VCT should be vigorously encouraged at every clinic, and educational seminar, VCT should be widely accessible. There should be increased demand for availability of VCT. Stigmatizing attitudes toward people living with AIDS should be discouraged to promote VCT. HIV prevention strategies must be blended with AIDS care services.

Sexual assertiveness, condom self-efficacy for women and parental monitoring, traditional morality, HIV knowledge, and talking about sex with partners should be taught and encouraged. More interventions should be targeted towards male clients of sex workers. Prevention interventions are needed to address behaviors that put WSW at risk for infection. Pap smears must be encouraged for WSW. Disclosure must be encouraged. “Knowledge gaps” should be filled and seen as primary intervention in communication campaigns. Knowledge and appropriate attitudes are necessary for bringing about risk-reduction behavior, but they are not sufficient.

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