

# Sexual Behavior, Function and Satisfaction in Headache Associated with Sexual Activity: A Systematic Review of Literature

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## Abstract

**Introduction:** Headache associated with sexual activity (HSA) is the painful event of head and neck precipitated only by sexual activity. The negative impact of sexuality is expected to be more severe in HSA patients and their partners than other headache disorder. In addition, social and cultural taboo may conceal sexual problem or hinder seeking counseling for sexual perplexity. A sufficient scientific evidence is therefore needed to clarify the misunderstanding and schedule appropriate education in clinical practice. **Methods:** A systematic review of literature was completed to elucidate the sexual behavior, function and satisfaction in HSA patients and their partners. **Results:** A total of 97 publications are eligible after careful screening. However, most of the studies focus on the etiopathogenesis or treatment. Sexual change was mentioned in 23 publications. Orgasmic headache is the most frequent type of HSA. The HSA occurs more frequent in dyadic than extradyadic sexual activity. Intercourse is the leading sexual act for HSA occurrence, following by masturbation. A few patients suffer HSA under specific sexual position, like kneeling, and trigger, such as cannabis. Pain can be rapidly ceased in half of patients when sexual activity was halted. Sexual function and sexual satisfaction may decrease in HSA patient and partner but improve after pain reversal. **Conclusions:** A shortage of sexuality data of HSA is documented in literature but that still clarifies the extradyadic and masturbatory effect on HSA occurrence. Nevertheless, HSA disturbs sexual function and satisfaction in patients and their partners. The pathogenesis of pain includes two components, the hypersympathetic status and exertional action. Therefore, physician can schedule their education and counseling for HSA according to these findings. Further investigation for sexual function and satisfaction is warranted.

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## Keywords

Headache, Sexual Activity, Masturbation, Intercourse, Pain

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## 1. Introduction

Sexuality is fundamental for species generation in animal kingdom including human. However, sexual behavior, function and satisfaction, which determine the success and quality of sexuality, are negatively impacted by a variety of physiological and psychological problems, such as pain disorder [1]. Indeed, an impairment of sexual behavior, function and/or satisfaction has been revealed in patients with migraine and other headache disorders before [2] [3] and even after appropriate treatment [4]. On the other hand, a poor sexual quality may in turn detriment sexual behavior, function and/or satisfaction in both headache-off or headache-on period [5] [6]. Sexuality and physiopsychological problem mutually interlude with each another and negative sexual impact may even continue after treatment or at headache-off period.

Headache associated with sexual activity (HSA) is a headache disorder which is precipitated by sexual activity only [7]. The relationship between headache and sexuality had been mentioned since the time of Hippocrates who suggested that HSA might be brought on by immoderate venery (or sexual indulgence) [8]. After the middle of this century, HSA is increasingly reported and its etiopathogenesis and treatment strategy have been widely discussed [9]. Since HSA is provoked merely by sexual activity and even specific act in some patients, it is expected to affect the sexuality more severe than other headache and pain disorder at headache-on and also headache-off period. In this study, we completed a systematic review literature covering the sexual behavior, function and satisfaction in patients with HSA and their partners to provide strategy for prevention or correction of sexual adversity in HSA patients and their partners.

## 2. Materials and Methods

The aim of this study was to elucidate the sexuality in HSA patients and their partners before and after treatment. A systematic literature review following the guidelines of Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) was performed [10]. The main interests were to find out the sexual history (premorbid sexual history like sexual orientation, preference, abuse and others) sexual behavior (partnering, pattern of sexual act, specificity of sexual act, trigger of pain, pain factor) and sexual function (libido, arousal and orgasm) in HSA patients, and sexual satisfaction in HSA patients and between with their partners.

### 2.1. Literature Search

A computer-based search of the literature was performed. However, there was

no formal terminology before until HSA was popularly adopted by medical professionals. Therefore, we used a list of keywords, which had been coined for headache related to sexual activity in books, publications and medical society before [7] [9] [11] [12], for searching in scientific databases. These keywords were “headache associated with sexual activity”, “coital headache”, “coitus headache”, “sexual headache”, “preorgasmic headache”, “orgasmic headache”, “postorgasmic headache”, “masturbatory headache”, “masturbation headache”, “benign sex headache”, “benign vascular sexual headache”, “coital cephalalgia”, “intercourse headache”, “orgasmic cephalalgia”, “preorgasmic cephalalgia” or “postorgasmic cephalalgia”. The English scientific databases included PROQUEST, PUBMED and Cochrane Database of Systematic Reviews. The Chinese scientific databases included the Taiwan Periodical Literature System (<http://readopac.ncl.edu.tw/nclJournal>) and Airiti Library (<http://www.airitilibrary.com>).

To obtain a large pool of data, all papers, books, proceedings, and abstracts that were published before December 2016 were considered in this study. Additionally, the references of each manuscript, book chapter and proceeding were further reviewed to ensure coverage of the literature.

## 2.2. Data Extraction

During the identification process in PRISMA [10], duplication, editorial comment, book comment, club meeting, reply from author, and non-human study were firstly excluded. In some investigating groups, they have been collecting HSA patients continuously and published their follow-up data in different time periods. Therefore, only the latest published clinical case-serial study was enrolled in this situation during the screening process in this study. Finally, publications were included only when they were case-controlled trial, observational study or case report study concerning for HSA in human. Each publication was then carefully read to search the content for any record of sexual history, sexual behavior, sexual function and sexual satisfaction in HSA patients and their partners as aforementioned interest.

## 2.3. Classifications of Headache Associated with Sexual Activity

Before formal classification was announced, HSA was practically classified into preorgasmic, orgasmic and postorgasmic headache basing on the time onset of pain. Since classification system was firstly used at 1988, the classification of HSA has changed three times till now (Table 1). In the first edition of International Classification of Headache Disorders (ICHD) at 1988, HSA was classified into three types, namely the dull, explosive and postural type that actually coincided with headache occurring before, during and after orgasm respectively [11]. In the second edition ICHD at 2004, HSA was classified into preorgasmic and orgasmic type. The postural type in previous classification was categorized into the “Headache attributed to spontaneous (or idiopathic) low cerebral spinal fluid pressure” [12]. In the third-beta version of ICHD at 2013, HSA was classified

**Table 1.** The diagnostic criteria of headache associated with sexual activity proposed by the International Classification of Headache Disorder (ICHD).

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The first edition at 1988

A. Diagnostic criteria:

- 1) Is precipitated by sexual excitement;
- 2) Is bilateral at onset
- 3). Is prevented or eased by ceasing sexual activity before orgasm
- 4) Is not associated with any intracranial disorder such as aneurysm

B. Types

- 1) Dull type (dull ache in the head and neck that intensifies as sexual excitement increases)
- 2) Explosive type (A sudden severe explosive headache occurring at orgasm)
- 3) Postural type (Postural headache resembling that of low CSF pressure developing after coitus)

The second edition at 2004

A. Diagnostic criteria and types

- 1) Preorgasmic headache
  - a) Dull ache in the head and neck associated with awareness of neck and/or jaw muscle contraction and meeting criterion (2)
  - b) Occurs during sexual activity and increases with sexual excitement; (3) Not attributed to another disorder
- 2) Orgasmic headache
  - a) Sudden severe “explosive” headache meeting criterion (2); (2) Occurs at orgasm; (3) Not attributed to another disorder

The third edition at 2013

A. Diagnostic criteria and type

1. Primary headache associated with sexual activity
  - 1) At least two episodes of pain in the head and/or neck fulfilling criteria (2)-(4)
  - 2) Brought on by and occurring only during sexual activity
  - 3) Either or both of the following:
    - a) increasing in intensity with increasing sexual excitement; b. abrupt explosive intensity just before or with orgasm
  - 4) Lasting from 1 minute to 24 hours with severe intensity and/or up to 72 hours with mild intensity
  - 5) Not better accounted for by another ICHD-3 diagnosis
2. Probable headache associated with sexual activity
  - 1) Either of the following:
    - a) a single headache episode fulfilling criteria (2)-(4);
    - b) at least two headache episodes fulfilling criterion (2) and either but not both of criteria (3) and (4)
  - 2) Brought on by and occurring only during sexual activity
  - 3) Either or both of the following:
    - a) increasing in intensity with increasing sexual excitement; b. abrupt explosive intensity just before or withorgasm
  - 4) Lasting from 1 minute to 24 hours with severe intensity and/or up to 72 hours with mild intensity
  - 5) Not fulfilling ICHD-3 criteria for any other headache disorder

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into definite and probable type only [7]. Since studies were published at different time periods and different classification systems were used, we therefore adopted the practical terminology of preorgasmic, orgasmic and postorgasmic headache which are still popularly used in many studies.

### 3. Results

After an exclusion of duplications and studies from the same groups and data, there were a total of 97 publications eligible, including 1 community observational study [13], 1 health checkup study [14], 20 clinical case-series studies

(more than 5 patients in index report) [15]-[34], and 75 case-report studies (1 to 5 patients in index report) (Figure 1).

The lifetime prevalence of HSA was 1% in a community study [13]. The frequency of HSA was 0.28% in 1 health checkup study [14] whereas 6.06% in 1 emergency service-based study of any sexual complication events [15], and ranged from 0.28% to 1.63% (average being 0.36%) in 5 clinic-based studies [16] [17] [18] [19] [20] (Table 2). Frese *et al.* [26] suggested the frequency of HSA to be 1% in their database but the total number of headache patients was unknown.

In those 97 eligible publications, the sexual history, behavior, function or satisfaction compatible with our aforementioned interest were mentioned in only 23 publications [24] [25] [26] [29] [30] [31] [32] [35]-[50]. The main findings were described on the following paragraphs.

### 3.1. Types of Headache

#### 3.1.1. Type of Headache

The type of headache was mentioned in 12 case-serial studies [20] [22]-[31] [33]. Two studies were excluded; type of headache was recorded in only 1 out of 6 patients in one study [24] and only orgasmic headache patients were enrolled in another study [29]. In the remaining 10 studies, the frequency of pre-orgasmic headache was 0% - 57.9%, orgasmic headache 26.3% - 100%, postorgasmic or postural headache 0% - 19.2%, mixed headache 0% - 13.3%, and uncertain headache 0% - 4.8% of HSA patients. Therefore, the average frequency of preorgasmic, orgasmic, postorgasmic/postural, mixed and uncertain headache in these studies was 26.3%, 65.4%, 4.8%, 3.1% and 0.4%, respectively. Orgasmic headache was the leading type of HSA and constituted two-third of all HSA events.

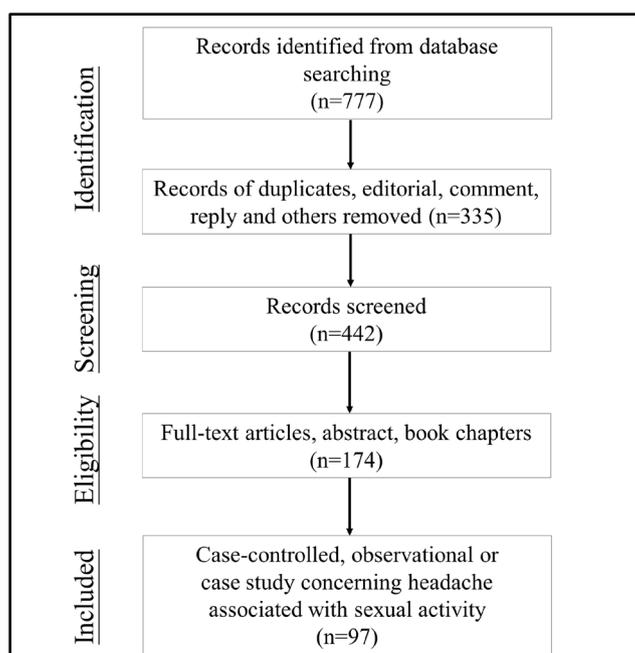


Figure 1. The selection process according to the PRISMA.

**Table 2.** The frequency of headache associated with sexual activity (HSA) collected in literature.

Authors Years	Region	Case/total number (%)	Source	Male: female	Mean of age (year)	Types of headache*	Masturbatory HSA (%)
Hanashiro <i>et al.</i> , 2015	Japan	7/2546 (0.28%)	Health checkup	NR	NR	NR	NR
Pfortmueller <i>et al.</i> , 2013	Swiss	27/445 (6.06%)	Emergency service	23:4	Men 34 Women 43	NR	NR
Pascual <i>et al.</i> , 2008	Spain	18/6412 (0.28%)	Clinic	14:4	40	NR	NR
Tuğba <i>et al.</i> , 2008	Turkey	4/245 (1.63%)	Clinic	NR	NR	NR	NR
Lamer, 2006	United Kingdom	25/ 6,019 (0.42%)	Clinic	19:6	41.6	NR	NR
Kraft, 1979	Denmark	6/460 (1.3%)	Clinic	NR	NR	NR	NR
Nick & Bakouche, 1960	France	16/5800 (0.28%)	Clinic	NR	NR	3/11/0/2	NR

NR: Not reported; \*Types of headache: case number of preorgasmic/orgasmic/postorgasmic/mixed type of headache.

### 3.1.2. Gender Difference

The gender difference of HSA was mentioned in one case-serial study. In the series of Chakravarty [25], preorgasmic headache occurred in 14 males patients, whereas orgasmic headache in 1 male patient and 5 female patients.

### 3.2. Sexual History

In all studies, the sexual orientation, preference and abuse history were not mentioned.

### 3.3. Sexual Behavior

#### 3.3.1. Sexual Partner

The identity of sexual partner in HSA attack was mentioned in 3 case-series studies. Chakravarty [25] reported all 15 men to have HSA during or after intercourse with their usual partners, whereas 2 women with their husband. No identity was mentioned in another 4 women. Frese *et al.* [26] reported 2.0% of HSA patients to have HSA attack during intercourse with extramarital partner whereas 94% with marital or usual partners. The definition of usual partner was unclear in these studies. In the series of Porter and Jankovic [30], a 40-year-old man suffered orgasmic headache during intercourse with both the dyadic and extradyadic partners. In other case reports, sexual partner identity was not mentioned.

#### 3.3.2. Sexual Act

Sexual act was mentioned in four case-serial studies. Lance [31] reported that sexual act was intercourse, masturbation and intercourse/masturbation in 18 (85.7%), 1 (4.8%) and 2 (9.5%) patients, respectively. Silbert *et al.* [29] reported

the sexual act to be intercourse only in their 45 patients. Chakravarty [25] reported the sexual act to be intercourse in 83.3% whereas masturbation in 16.7% of their patients, respectively. Frese *et al.* [26] reported 18 out of 51 patients to have HSA attack under masturbation. Intercourse was the most common sexual act in HSA, following by masturbation.

Regarding to masturbatory HSA, a total of 31 patients reported in literature [24] [25] [26] [31] [35]-[40]. These patients included both genders. Their headache was exclusively the orgasmic type. HSA was limited to masturbation alone in 8 patients, masturbation and intercourse in 22 patients, and uncertainty in 1 patient. Intracranial abnormality was found in only 2 of them; aneurysmal subarachnoid hemorrhage in 1 patient [35] and right middle cerebral artery spasm and posterior fossa arachnoid cyst in another 1 patient [39].

Foreplay [41] or pornography-associated HSA [42] was reported in 1 patient, respectively. The headache type was mixed pre-orgasmic and orgasmic type in the former whereas pre-orgasmic in the latter.

Arikanoglu *et al.* [43] and Dexter *et al.* [44] reported a total of two patients whose HSA was provoked by any sexual activity. However, the pattern of sexual act was not further mentioned.

Other sexual acts, such as anal sex, zoophilia, sadomasochism, swapping, causal sex, trade sex, orgy or other, were entirely not mentioned in any study.

### 3.3.3. Sexual Position

The position of specific sexual act for HSA was mentioned in three case-serial studies. In the series of Frese *et al.* [26], HSA occurred under specific act of intercourse in 5 (8.4%) out of 51 patients, including kneeling position in 2, supine position in 2, and fellatio in 1 patient respectively. In the series of Valença *et al.* [24], a 44-year-old woman suffered HSA under masturbation or intercourse with her husband in standing position. In the series of Porter and Jankovic [30], a 40-year-old man suffered HSA in kneeling position.

### 3.3.4. Trigger

Trigger was mentioned in three case-serial studies and 1 case report. In the series of Lance [31], a patient suffered HSA from intercourses mainly after close successions. In the series of Paulson and Klawans [32], a 27-year-old woman suffered HSA for 4 months after contraceptive pill use. Her HSA did not recur after pill withdrawal. In the series of Silbert *et al.* [29], a 42-year-old man suffered his first time of HSA after returning from a prolonged posting. Alvaro *et al.* [45] described a 33-year-old man to have his first time of preorgasmic headache after cannabis use. Headache did not recur after cannabis was ceased. Otherwise, there was no report concerning for specific trigger, such as sex-promoting drug, in all other studies.

### 3.3.5. Pain Factors

The relationship of pain occurrence and sexual role was mentioned in three case-serial studies and 1 case report. Silbert *et al.* [29] reported that all their HSA patients suffered pain during undertaking the active role in intercourse. Frese *et al.* [29] reported a resolution of pain by passive role in 26 out of 51 patients

(51%). On the other hand, Lance [31] and Bandini *et al.* [46] separately reported 1 patient whose preorgasmic headache did not ameliorate after changing from active to passive role.

The relationship between the intensity of pain and magnitude of sexual excitement was mentioned in 3 case reports [37] [43] [47]. In these reports, a total of 3 patients stated that the intensity of pain correlated in parallel to the magnitude of sexual excitement during sexual activity.

The effect of cessation of sexual activity on pain was mentioned in one case-series study and 4 case reports [41] [42] [43] [48]. Frese *et al.* [26] reported that 8 out of 11 (72.7%) patients with preorgasmic headache and 12 out of 40 (30%) patients with orgasmic headache achieved a decrease or a resolution of pain when they ceased sexual activity abruptly before pain increment. Immediate cessation of sexual activity rapidly ameliorated pain in another 3 patients [41] [42] [43] but showed uncertain benefit in another 1 patient [48].

### **3.4. Sexual Function**

The sexual function of HSA patient was not mentioned in all studies, except one case report in that Chen *et al.* [49] described a man to have impotence during the headache-on period. The pain and impotence made this patient to avoid orgasm during intercourse committed with his wife who also suffered anorgasmia concurrently.

### **3.5. Sexual satisfaction**

#### **3.5.1. Sexual Satisfaction**

Sexual satisfaction in HSA patient or partner was mentioned only in one case report. Chen *et al.* [49] reported the change of Golombok-Rust Inventory of Sexual Satisfaction in a 43-year-old man who suffered intercourse HSA. This man showed a high score for satisfaction, avoidance, infrequency and non-communication whereas his wife for dissatisfaction, infrequency and non-communication.

Porter and Jankovic [30] reported the partner of a 40-year-old HSA man to show high anxiety for index pain problem.

#### **3.5.2. Sexual Adjustment**

Sexual adjustment was not mentioned in all studies. In order to prevent HSA, 2 patients selected avoidance of sexual activity [43] [50].

### **3.6. Sexuality after Treatment**

There was no study concerned for any change of sexual behavior, function or satisfaction after treatment or headache-off period except for one case report in that impotence, dissatisfaction, avoidance, infrequency and non-communication significantly subsided to baseline level in a man after index HSA was successfully abolished by renin antagonist [49].

### **3.7. Summary of Literature Findings**

- 1) The lifetime prevalence of HSA was 1.0% in community population. The

clinic-based frequency of HSA was 0.36%. Orgasmic headache was the leading type of HSA.

2) HSA occurred more frequent in dyadic than extradyadic relationship, and intercourse than masturbation.

3) HSA was provoked with specific sexual position in 8.1% of patients. Active role of sexual act seemed to potentiate pain occurrence, whereas passive role decreased pain in half of patients. The intensity of pain was in parallel to the magnitude of sexual excitement in some patients. Rapid cessation of sexual activity before pain increment might prevent further pain ongoing, especially in preorgasmic headache.

4) Sexual function and sexual satisfaction might be disturbed in HSA patients and their partners but concerning data was insufficient.

5) No data was documented for sexual behavior, function or satisfaction after treatment with pain resolution.

#### 4. Discussion

Our study is the first systematic review of sexuality in HSA patients. In contrast to an overwhelming data of etiopathogenesis and treatment method, a relative shortage of information concerning for sexual change in HSA is clearly revealed in this study. This discordance implicates an underestimation or neglect of sexual health care and concept within the clinically-based framework of health care. Since sexual health is an indispensable component of health care and well-being, it is better for promoting the quality of patient-centered care by increasing sexual knowledge and sensitivity in clinical training course.

Although laypersons consider that extradyadic relationship is risky, stressful and unhealthy, current findings interestingly show that HSA predominantly occurs under sexual activity with spouses or usual partners than extradyadic persons. Factually, extradyadic involvement is not uncommon in both modern western and eastern society, ranging from 50% - 82% of men and 26% - 70% of women [51]. It is estimated to be 25.0% of monogamous relationship in United States [52] and 15.2% of Chinese migrant workers [53]. Generally, the frequency is higher in men than women in both the western [54] and eastern countries [55]. If so, our results may be challenged invalid as HSA patients may selectively report committing intercourse only with spouses or usual partners but not extradyadic ones to protect their dyadic relationship. Indeed, sexuality is an embarrassing topic in consultation although patients generally hope to get more information about the impact of sexual activity on their health [56]. Nevertheless, these challenges are merely speculated unless more objective evidence can be raised to support them. Since pain and headache generally relate to acute or chronic stress and extradyadic involvement is considered stressful for health, it wonders if stress or its related change also involves with HSA in dyadic relationship.

Besides of sexually transmitted diseases, a higher frequency of cardiovascular events is recently found in extradyadic individuals [57], probably related to

stress-mediated hypersympathetic vasoconstriction and cardiomyopathy [57]. In this study and previous HSA reports, there are four lines of evidence to support hypersympathetism in HSA. First, an outnumbered orgasmic type of headache is characterized in overall HSA patients [14] [15] [16], [26]-[34]. Second, intracranial vasospasm is occasionally found in primary and secondary HSA [22] [23] [24]. Third, Charavaty [25] reported a woman (Case E) who acknowledged her HSA occurred under a passionate sex with husband during shower. Fourth, propranolol and other sympatholytics favorably benefit for HSA [21]-[26] [29]. Taken together, we think that a higher frequency of HSA in dyadic relationship also results from, at least, hypersympathetic status. Our results do not encourage extradyadic relationship in HSA patients. Rather, health care providers should honestly inform that HSA can occur in both dyadic and extradyadic relationship and patients with HSA should modify their sexual relationship and daily living to avoid hypersympathetism, such as stress or concomitant drug or alcohol usage that frequently co-exists with extradyadic relationship.

In contrast to several hundred patients of intercourse HSA, there are only a total of 31 masturbatory HSA collected in this study [24] [25] [26] [31] [35]-[40]. In United States, the National Survey of Sexual Health and Behavior [58] has shown that the frequency of masturbation in alone or with partners ranges from 27.9% to 68.6% of men whereas approximately 20% of women in each age group in the past month. On average, masturbation is slightly more frequent than vaginal intercourse in men but vice versa in women. In Australia, the Second Australian Study of Health and Relationships [59] found that 51% of the men and 24% of women had masturbated in the past 1 month. Accordingly, a discordant frequency of intercourse and masturbatory HSA is obviously seen, especially in men. Since the majority of masturbatory HSA co-exists with intercourse HSA, reportée may omit or overlook their masturbatory HSA upon consultation.

In contrast to intercourse, solo or partnered masturbation is to stimulate the genitalia to the point of orgasm with an essential autoerotic component. In this study, the masturbatory HSA exclusively occurs at orgasm [24] [25] [26] [31] [35]-[40] and is therefore suggested to share a hypersympathetic basis along with a different process for pain occurrence with intercourse HSA. Two findings may account for a relative lower frequency of masturbatory HSA. First, although masturbation and intercourse terminate to orgasm similarly, response to cardiovascular stress is different, however. The penile-vaginal intercourse benefits the blood pressure reactivity to stress but masturbation unfortunately reduces this beneficial effect [60] [61], suggesting that masturbation exposes individual to risk for hypersympathetic status. Second, a modest prevalence of exertional headache is seen in HSA [29] and a cessation of intercourse [25] [26] or masturbation [24] [25] [26] can abolish or attenuate the pain. Clearly, exertion during intercourse or masturbation is another factor crucial for HSA occurrence. Masturbation generates exertion less effort than intercourse and is reasonable to provoke HSA less frequent than intercourse. Therefore, exertion and hypersym-

pathetism are likely two interacting but independent factors for pain occurrence in HSA, and account for different HSA occurrence between masturbation and intercourse.

Specific sexual position is mentioned for pain triggering in 8% of HSA patients, including supine, standing, kneeling or fellatio [26]. These positions are not compatible with the vertical change in postural or orthostatic HSA which results from cerebrospinal fluid leakage. Since specific act-associated HSA principally occurs during orgasm, it may relate to the disharmony of cerebrovascular tonicity regulation under exertion and hypersympathetic status during intercourse. Generally, cerebral blood flow progressively increases to compete with cerebral metabolic demand in exercise [62]. The sympathetic and vascular responses are modulated by a few factors, especially the position [63], carbon dioxide tension and lactate. In high-intensity exercise, the distribution of cerebral blood flow changes, that is, a decrease of blood flow in internal carotid artery whereas vice versa in external carotid artery to facilitate thermal regulation [64]. Although reporté do not approve if the index specific act facilitates their orgasm more easier than other position, specific sexual act may provoke HSA through the dysregulation of sympathetic and vascular response unique to individually sexual consequence of metabolic change during intercourse.

Current available data find that sexual function is generally overlooked in HSA patients. Only an adult man who suffered impotence under HSA attack was reported [49]. Depression was not documented. Sexual dysfunction is not uncommon in patients with migraine and other headache disorders [65] [66]. Generally, sexual response cycle is consistently disturbed in female migraineurs [67] whereas mainly erectile dysfunction in male migraineurs [65] [68] [69]. Sexual dysfunction is related to depression but not the severity or disability of female migraineurs [67]. On the other hand, the risk factor is not determined in male migraineurs for sexual dysfunction [65]. Nevertheless, a parallel resolution of HSA after a correction of impotence and other sexual dysfunction in index patient strongly indicate a causal relationship between HSA and sexual dysfunction in man [49] similar to other headache disorder. An improvement of pain occurrence is the first step for sexual dysfunction in HSA patient but organic cause should also be cautioned.

Satisfaction is important for stabilizing bonding and pairing in couples. Although human can adjust oneself for stress in many acute and chronic conditions, dissatisfaction is still an unstable bomb for breaking relationship at any time during relationship. Regarding to HSA, sexual dissatisfaction is revealed in a HSA man and his spouse concurrently [49]. Sexual satisfaction, but not general dissatisfaction [2] is usually lower in migraineurs than migraineurs [2] [67], The prevalence of sexual dissatisfaction in migraineurs ranges from 30.4% in Spanish [70] to 66.7% in Ghanaian [69]. Interestingly, sexual dissatisfaction continuously persists in some migraineurs even under appropriate treatment due to different causes, such as drug effect [70] or psychological factor [71]. Although sexual satisfaction significantly improves in index HSA patient after pain resolution [49],

more data is warranted for making a more appropriate suggestion in clinical practice. Drug adversity should also be cautioned for sexual pharmacotoxicity in HSA patient.

The HSA is seemingly not a malignant pain disorder as pain spontaneously subsides in over two-third of sufferers [26]. In the remainders, presumptive and abortive treatment usually gives beneficiary effect. However, the sexual function is barely mentioned in HSA patient and spouse/partner under and after treatment. Limited data show that sexual function and sexual satisfaction improve to baseline level after pain subsided in a HSA man [49]. However, more evidence is needed for conclusion, especially in chronic HSA patient and their partner.

The main limitation in this study is that almost all of the HSA studies and reports focus only on the etiology, diagnosis and treatment. The sexuality of HSA patients and their partner is seriously overlooked. The data of sexual behavior, function and satisfaction before, under and after treatment is sparse. This neglect disadvantages for understanding the effect of HSA on the sexual well-being and relationship in HSA patients and partner and hinder to schedule counseling strategy for sexual complication in HSA.

Although sexual health care has been announced by the World Health Organization more than a decade ago, current study still discloses a shortage of sexuality concept in HSA care. In order to promote the sexuality concept and care in HSA and other conditions involving sexual complication, two educational ideas are suggested. First, sexual health education, including communication skill, should be scheduled in continuous medical program. Second, the quality of clinical case report or study should be improved. At least, the sexual identity, behavior, function and satisfaction must be mentioned. A formal template can be designed for this situation.

## 5. Conclusion

Misunderstanding and prejudice treat sexuality-related event non-scientifically and hostilely. This study cannot cover all aspects of sexuality for HSA but still provides scientific evidence to elucidate the sexual behavior, function and satisfaction in HSA patients and their partners. Orgasmic headache is the most frequent type of HSA. The HSA can occur in dyadic and extradyadic sexual activity. Intercourse is the leading sexual act for HSA occurrence, following by masturbation. A few patients suffer HSA under specific sexual position, like kneeling, and trigger, such as cannabis. Sexual function and sexual satisfaction may decrease in HSA patient and partner, and improve after pain reversal. The pathogenesis of pain is multifactorial and includes two components, the hypersympathetic status and exertional action. Therefore, physician can schedule their education and counseling for HSA according to these findings. Further investigation for sexual function and satisfaction is warranted.

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