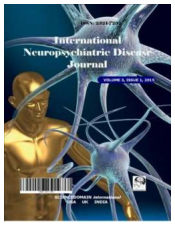

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Delusional Jealousy: A Brief Literature Review and a Case Report of 'Unfaithful Husband' with Sociocultural Repercussions

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Authors' contributions

This work was carried out in collaboration among all authors. Authors NAQ, DSAD, AMAB, SOS and AAH designed the study and wrote the protocol. Authors NAQ, DSAD and SOS preformed the statistical analysis, managed the literature search and wrote the first draft of the manuscript with assistance from authors AMAB and AAH. All authors read and approved the final manuscript.

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ABSTRACT

Background: Pure delusional jealousy [DJL] is an uncommon disorder and is characterized by unshakable false belief of infidelity, lack of hallucination, thought disorder and mood disturbance, and not associated with alcohol or other drug abuse or any co-morbid illness.
Objective: This paper aims to review qualitatively the relevant literature (2000-2015) and present a case of delusional jealousy.
Case History: A 31-year-old housewife with three minor children developed an unshakable belief that her husband was having an extramarital affair since 5 years and no longer loved her. She was diagnosed with delusional jealousy and was managed with aripiprazole and brief psychotherapy.

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Within three months, most of her symptoms improved, however she developed post-psychotic depression and attempted suicide by taking 125 mg diazepam. She was immediately rushed to a private hospital and admitted to the intensive care unit (ICU). She recovered within five days and was shifted to the public hospital for the management of depression, where she was stabilized and discharged after two weeks.

Conclusion: Typical and atypical antipsychotic drugs combined with psychotherapy are the main treatment options for patients with DJL with or without co-morbid physical and psychiatric disorders. Post-psychotic depression and suicide attempts, devastating biosocial consequences among patients with DJL need timely and appropriate interventions and continued follow up.

Keywords: Delusional jealousy; infidelity; aripiprazole; psychotherapy; depression; suicide attempt.

1. INTRODUCTION

According to Diagnostic and Statistical Manual of Mental disorder V, delusional disorder [DD] is classified into 7 types based on predominant single theme; persecutory, somatic, erotomania, jealous, grandiose, mix and unspecified type [1]. Previously, we have reported several cases of somatic delusional disorder including delusional pregnancy [2], delusion of bromosis/olfactory reference syndrome [3], and novel somatic delusion of turabosis–the conviction of body continually being covered by sand from sandstorms [4] and also reviewed the pertinent literature [2-4]. Therefore, we briefly shed light on somatic delusions and then will focus on delusional jealousy which is the main topic of this paper. In a recent review, Robles and colleagues described somatic delusions in details; delusions of parasitosis, i.e., false and fixed belief about worm-creeping like sensations under the skin; Morgellons disease, i.e., fixed and false belief that some material or fibres are imbedded or emerging from the skin; body dysmorphic disorder (BDD), i.e., imagined defect in normal body appearance and it is not a psychotic condition because of intact insight. However, a person with bodily imagined defect is highly preoccupied that gives a sense of delusion with lack of insight – psychotic type; and olfactory reference syndrome (delusions of bromhidrosis), i.e., false and fixed belief in unpleasant odor emanating from skin; and highlighted their treatment seeking pathways [5]. Similarly, a large number of young patients with psychiatric diagnoses including dysmorphophobia/BDD with poor social adjustment consult cosmetic surgeons [6]. Furthermore, a team of researchers advocated the concept of delusional BDD to be included in DSM-5 [7]. Evidently, patients with somatic delusions pose diagnostic and therapeutic challenges both for dermatologists and cosmetologists who need to keep abreast with these uncommon psychiatric conditions. These disorders are frequently missed in respective settings resulting in poor outcome and poor quality of life. Phillips and colleagues reported outcome of these patients: 10% patients do not improve; a third of patients (35.3%) improved significantly with pimozide; 49.3% of patients tend to recover and another 40.3% improve [7]. According to Trabert, the pure form of delusion of parasitosis (DP) is reported commonly in female population with advancing age; however DP syndrome could be found in schizophrenia, affective disorder, organic psychosis and neurotic disorder. The estimated frequency of induced DP is between 5 to 15%. Full remission attributed to a short duration of illness was reported in 50% of cases during followup, pharmacotherapy further increased remission rate by 18% [8]. Over the past two decades, many patients with somatic DD were reported in the literature who tends to improve with selective serotonin reuptake inhibitors (SSRIs) and cognitive behavior therapy (CBT) or additional antipsychotic medication might be required in some cases [9-17].

1.1 Aims, Significance and Relevance

This paper provides a narrative review and an update of relevant literature on delusional jealousy (DJL) published after year 2000. In addition, a case of DJL is presented with a focus on its serious sociocultural consequences. The significance of this study is that it will increase awareness of DJL among mental health professionals in particular physicians. This research will ensure early recognition of the disease along with timely and appropriate interventions as most recently suggested by a team of researchers based on four psychopathological dimensions in terms of paranoid, cognitive, affective and schizoid and complexity of DD [18]. Evidently, most cases of DJL seek psychiatric help very late, are misdiagnosed and remain untreated. Notably,

people with DJL largely contribute to family dysfunctions, marriage breakups, violent behavior, suicide and homicide. To our knowledge, no case of DJL has been reported form the Kingdom of Saudi Arabia.

1.2 Search Methods

Computer searches of several databases including PubMed/MEDLINE, Quertle® and Google Scholar (2000 to 2015) were made using keywords such as delusional jealousy, morbid jealousy, pathological jealousy, conjugal paranoia, Othello syndrome, paranoid jealousy, insane jealousy and jealousy disorder. These searches retrieved thousands of references with abstracts [n=4370], without abstracts [n=3205], full access articles [n=100], purchasable articles [n=2430], unrelated articles [n=6520], and non-English language articles [n=1105]. When computer search removed words 'disorder', 'paranoid' and 'syndrome' from keywords, the number of articles retrieved reduced considerably [n=1230]. All these articles were screened with a focus on delusional jealousy. Articles related to single case report (level D), case series (level C), case-controlled studies/non-blind-nonrandomized (level B), randomized controlled trials, systematic reviews, and meta-analyses (level A) on delusional jealousy were retained for further appraisal. Articles which described delusion of jealousy secondary to physical diseases, organic brain diseases, alcoholism and substance abuse, dementias, depression, obsessive compulsive disorder, psychopathy, and schizophrenia disorders were also included in the present study. Some seminal papers published before year 2000 were also included in this study. Three of authors' (NAQ, AHAH & DSAD) independently reviewed all articles and based on mutual consensus selected 88 pertinent papers for this study (Chart 1). However, papers which focussed on other 6 types of DD except somatic DD mentioned up were excluded from this review.

1.3 Literature Review

1.3.1 Definition of jealousy

Jealousy is a complex emotional state with multiple facets [19] and is described along a spectrum from normal jealousy to delusional jealousy. However, its various approximating terms such as morbid jealousy, irrational jealousy, pathological jealousy, conjugal paranoia, sexual jealousy, emotional jealousy, paranoid jealousy, jealousy disorder, delusional jealousy, Othello complex, and Othello syndrome are also mentioned in the literature. Jealousy is a mix of various emotions including envy [20,21] and is reported to have emotional, cognitive and behavioural components. Jealousy is categorized into two types; psychotic and non-psychotic/neurotic. People with neurotic type of jealousy have no delusion or hallucinations and their insight is preserved [22]. Unlike jealousy, envy is used in context of possession of inanimate objects [23]. There is a difference between being jealous and being suspicious. Jealousy often develops as a result of perceived threat to a romantic intimate relationship and is coupled with behaviors planned to retain a romantic partner [24]. In normal romantic jealousy, it would diminish as the relationship strengthens and partners have faith in each other. Morbidly jealous partners continue to be intensely suspicious, possessive and dominating. In early 1920s, Sigmund Freud described three grades/layers of jealousy which are normal or competitive, projected and delusional jealousy [quoted from 18]. Interestingly homosexual delusional jealousy, i.e., 'the phantom other' is a person of the same gender as the individual supposedly having an affair is reported in two heterosexual women [25].

1.3.2 Sex-divergent behavior

Jealousy has sociocultural colouring and its prevalence varies across diverse cultures of the world. Morbid jealousy is not always caused by a partner's act of infidelity. More often morbid jealous people find grounds for suspicion and accusations in unintentional, unavoidable and routine behaviours of their partners. Many studies have reported sex-divergent behaviors related to morbid jealousy including violence directed against partners to prevent their infidelity [26,27]. According to Shackelford and colleagues, most men with delusional jealousy use physical violence at close range against their partners, which may prove to be dangerous. Men often attempt to kill their partners, and in actually murder them when reputation is at stake. They often use their hands rather than weapons [27,28]. On the other hand, women usually do not resort to violent behaviors such as homicide, except in self-defence and use blunt objects or knifes when attacked by their partners [29].

1.3.3 Clinical features

Clinically, delusional jealousy is characterized by monothematic, encapsulated and incorrigible

false fixed belief of more than one month duration, absence of signs and symptoms supportive of the diagnosis of schizophrenia, lack of gross functional impairment and no evidence of substance abuse or medication use or any medical conditions (Table 1). The estimated prevalence of delusional jealousy is less than 1% in the world population [1,30]. Delusion could be non-bizarre and systematized, e.g., delusion is about situations that could occur in real life, such as being deceived by one's spouse (jealousy), being followed (persecutory), being loved (erotomanic) and having a physical disease or symptom (somatic). Bizarre delusion symbolizes severe psychoses and unlike non-bizarre delusion, is not understandable, implausible and incompatible with real life situations and experiences. Furthermore, delusions that express a loss of control over mind or body are generally considered to be bizarre and include belief that one's thoughts have been removed by an outside force, that alien thoughts have been put into one's mind, or that one's body or actions are being acted on or manipulated by an outside force. This distinction is supported by DSM-V when diagnosing DD [1]. Delusional jealousy is relatively more common among males and is reported to have a stable course with no severe deterioration overtime. The morbid jealousy could develop at any age but middle age, e.g., after 45 is commonly reported in the literature. Most of reported cases of DJL in general were married, employed, distressed, and had low socioeconomic status. Celibacy was common among men with DJL while widowhood was linked more to women with DJL [17]. Depression and anxiety symptoms and stalking behavior may emerge in delusional jealousy. Mullen and colleagues reported Axis-I diagnosis in 62 stalkers (62/145, 42.8%), however only 5 patients had morbid jealousy (5/62, 8%) [31]. Similarly, cognitive impairment, memory changes, hypersexual behavior and other additional symptoms can develop when delusional jealousy as a syndrome emerges in a wide variety of organic brain disorders including dementia, Alzheimer's disease, Parkinson's disease, stroke, epilepsy, head injuries and other conditions. Careful exploration of patients with pure DJL and their relatives/caregivers will help in excluding these medical and psychiatric illnesses. Mental status examination, physical and systemic examination, laboratory investigations and radiological evaluation further help in excluding those conditions. In fact, DJL is a diagnosis of exclusion.

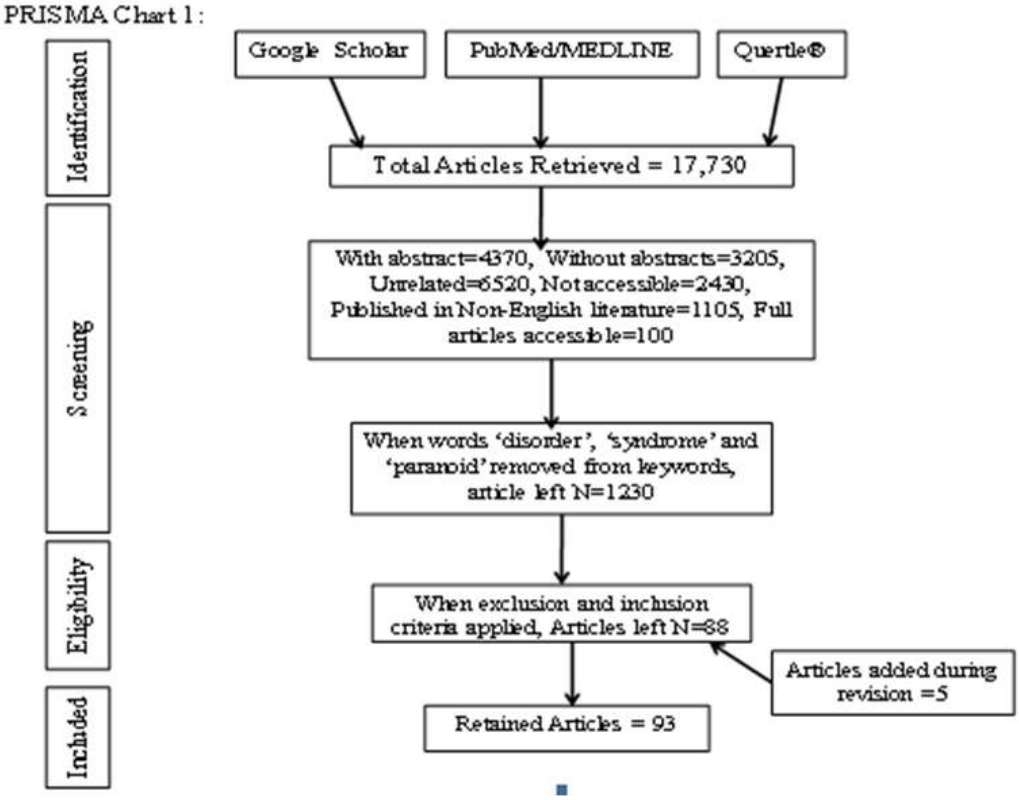

Table 1. Criteria of delusional disorder

Criteria	Description	Remark
1	Bizarre or non-bizarre delusion (s) lasting for at least 1 month's duration	In delusional jealousy, single delusion of infidelity predominate the clinical picture. Non-prominent hallucinations may be found.
2	Criterion A for Schizophrenia has never been met, which requires two or more of the following; delusions, prominent hallucinations, disorganized speech in terms of frequent derailment or incoherence, grossly disorganized or catatonic behavior, and negative symptoms such as affective blunting, alogia, or avolition.	Tactile and olfactory hallucinations may present in DD if they are related to the delusional theme. Criterion A of Schizophrenia requires only one symptom if delusions are bizarre or prominent hallucinations include voice commenting on person's thoughts or behavior or two or more voices conversing with each other.
3	Apart from the impact of the delusion (s) or its ramifications, functioning is not markedly impaired and behavior is not obviously odd or bizarre.	Overall, behavior and functioning of the person remain stable.
4	Total duration of concurrent mood episodes is shorter than the duration of delusional periods.	If mood episodes concur with delusion and lasts more than one month, exercise caution in diagnosing DD
5	Delusion (s) not due to substance abuse or medication use or a general medical condition or not explained by psychotic variants of OCD and BDD with absent insight and delusional beliefs.	Delusion of infidelity – impure- may occur in a variety of medical conditions, organic brain diseases, psychiatric disorders, substance use disorders and requires treatment of medical/psychiatric diseases along with delusional jealousy.

1.4 Morbid Jealousy Database Analysis

Easton and colleagues carried out a detailed analysis of Morbid Jealousy Database, from year 1940 to 2002 and found 398 case histories (M=298, F=100, no diagnosis available in 89 case histories) [32]. We especially focus on this report because it is highly comprehensive and relevant to the topic at hand. This analysis revealed variable frequencies of diagnoses, from the most common to least common: 32.4% (n=100) of delusional jealousy/delusional disorder, 12.9% (n=40) of depression/major depressive disorder, 8.7% (n=27) of schizophrenia/paranoid schizophrenia, 7.4% (n=27) of morbid jealousy, 3.6% (n=11) of obsessive jealousy/obsessive-compulsive jealousy, 3.6% (n=11) of paranoid disorder, 3.2% (n=10) of psychopathy/psychopathic personality, 2.9% (n=9) of alcoholism/alcohol intoxication/alcohol hallucinosis, 2.9% (n=9) of pathological jealousy, 2.6% (n=8) of DJL due to organic factors/brain disease, 2.3% (n=7) obsessive-compulsive disorders, 1.9% (n=6) of not specified DD,1.9% (n=6) of DJL/morbid jealousy, 0.64% (n=2) Othello delusion/DJL and 12.9% (n=40) of other disorder. This analysis also described what percentages of case histories met the diagnostic criteria of DSM-IV-TR [30] for DD (jealous type). Accordingly most cases exhibited delusions (88%), delusions of infidelity (92.5%), hallucinations (39.5%), hallucination related to delusions (72.7%), normal functioning (56.6%), mood fluctuations (95.2%), mood fluctuations occurring during /after delusions (86.8%), shorter duration (72.7%), medical conditions (63.2%), alcohol abuse (44.4%) and drug abuse (42.9%). Overall, only 16 case histories (4%) met all DSM-IV-TR criteria. Furthermore, less than 50% of case histories reported a diagnosis of DD (jealousy type). Easton and colleagues suggested that DSM-IV-TR criteria are not inclusive of all cases of jealousy disorder [32]. An updated analysis of Morbid Jealousy Database was not traceable. In a review paper, Manschreck and Khan described distribution of various DD in a sample of 224 cases; somatic (n=80, 35.7%), erotomanic (n=6, 2.2%), jealousy (n=12, 5.4%), persecutory (n=85, 37.95%), grandiose (n=0, 0.0%), mixed (n=12, 5.4%) and other not specified (n=30, 13.4%). Other interesting observations of this review were; patients tend to respond positively to typical and atypical antipsychotic medications

including clozapine irrespective of type of delusional theme; adherence to medication linked to better outcome; and overall 50% of patients showed good improvement [33].

1.5 Types of Delusional Disorders

There are seven types of delusional disorders [1]. Delusional jealousy needs to be differentiated from other types of DD for monitoring epidemiological trends, diagnostic consistency, therapeutic interventions, prognosis, and outcome (Table 2). Furthermore, somatic delusional disorder often improves with SSRIs, however other delusional disorders respond to antipsychotic drugs in doses used to treat other psychoses. Additional use of suitable psychotherapy such as CBT may further enhance response rate and quality of life of patients with DJL.

1.6 Aetiology-multifactorial

Delusional jealousy is multifactorial in origin and various aetiologies including biological, psychodynamic, social and cognitive models are described in the literature and accordingly diverse interventions from psychotherapy to medications, standalone or combined, are used in its management with variable outcome (Table 3) [19,22,33-45]. According to Batinic and colleagues, obsessive jealousy due to relative deficiency of serotonin in the brain closely matches OCD phenomenology and is ego-dystonic, and its victims manifest recurrently nonsensical, irrational and unpleasant ruminations about partner's unfaithfulness, and compulsively crosscheck partner's behavior. Unlike delusional jealousy, which is treated by antipsychotic medications, SSRIs and CBT are the main treatment of obsessive jealousy [39]. Miller and colleagues reviewed Othello syndrome along with psychopharmacological interventions and suggested dialectical behavior therapy and collaborative approach [38]. Dopamine agonists, which are used in the treatment of patients with Parkinson's disease [PD], could induce Othello syndrome/DJL [36,38], hypersexual behaviour and frotteurism [46]. A reduction in doses of dopamine agonists or its complete removal was reported to improve completely Othello symptoms in some patients [n=2] but others [n=3] required additional clozapine and quetiapine [36]. Other medications including steroids, amantadine and toxic metals had been reported to induce delusional jealousy/Othello syndrome [33,34,47]. Amantadine is a weak antagonist of the NMDA-type glutamate receptor, increases dopamine release, and blocks dopamine reuptake. According to Cipriani and colleagues, 30% cases of Othello syndrome co-occur with a number of neurological diseases including dementia, stroke, PD, traumatic brain injury and frontal lobe dysfunctions could be the underlying mechanism of this syndrome [37]. Anoxic brain injury is also reported to cause delusional jealousy that often requires admission and management with antipsychotic medications and proper rehabilitation [48]. Hashimoto and colleagues studied 208 patients with dementia and found that 18 patients (8.7%) manifested with DJL. DJL, preceded by serious physical diseases in 50% of cases was significantly common among those who had Lewy bodies dementia (26.3%) compared to Alzheimer' disease (5.5%). DJL resolved in 15 of 18 patients (83%) after treatment interventions with antipsychotics, donepezil, and antiparkinson agents reflecting its benign course in demented population [49]. Alzheimer's disease [AD] associated with hippocampal-sparing may also manifest with DJL treated with acetylcholinesterase inhibitors [50]. A research team retrospectively studied delusions in AD and found patients with delusion of abandonment and delusion of jealousy to have hypoperfusion in the right inferior temporal and frontal regions and hyperperfusion in the middle frontal gyrus, insula and posterior cingulate gyrus. This study concluded that delusions in AD are classifiable and each delusion related to different neural networks in the brain [51]. Delusional jealousy resolved with pharmacotherapy is also reported in a patient with Wilson' disease [52]. DJL is reported to develop among patients with PD even without cognitive impairment [53]. Several researchers identified various neurotransmitters such as dopamine and serotonin, and D2 receptor genetic perturbations, and neural correlates of DD including morbid jealousy [17,34,35,39,40]. Bömmer and Brüne explained that the pure DD could be attributed to misinterpretation to social signals, and disturbances in emotional recognition, theory of mind reading and pragmatic (no-nonsense) language understanding, however basic social cognitive functions were without any impairment [43]. Mele described self-deception as the core issue in the development of delusions including delusional jealousy and also described reverse Othello syndrome, which is defined as incorrigible belief in the fidelity of a romantic partner [54]. Others reported threatened self-esteem as a mediator of DJL and aggression

being its causative factor [55]. Notably, a wide variety of psychiatric and medical diseases are common denominators of all DD including erotomania [16] and delusional jealousy. In a comprehensive review, Blackwood and colleagues reported a number of neuropsychiatric models of persecutory delusions including reasoning bias [56] which also may apply to other DD including delusional jealousy. According to some researchers, organic brain pathology affects higher centers in the brain and possibly removes the control over instinctual behavior akin to evolutionary behavior of jealousy in animals [57].

1.7 Comorbid Disorders

The delusional jealousy is reported to co-morbid with psychopathic, borderline, paranoid, narcissistic and dependent personality disorders. DJL also co-occurs with psychotic OCD, paranoid schizophrenia, depression, alcohol addiction, amphetamine, morphine and cocaine abuse, medical conditions, normal pressure hydrocephalous, delusion of parasitosis, and organic brain diseases including Parkinson's disease, Alzheimer's disease, and other dementias and stroke in right hemisphere [19,35, 36,44,58-63] (Table 3). Notably, DJL most commonly reported among patients with organic psychosis; however other DD, alcoholism, schizophrenia-like psychosis, mood disorders and neurotic disorders also occur among patients with organic brain disorders. In alcohol addiction, males preferentially suffer from delusional jealousy. In general, 7% to 23% of males with morbid jealousy commit murders either of their wives (14%) or their paramours (2%) while 3% of females with jealousy do so, either kill their husbands (20%), paramours (15%) or the co-wife (5%) [19]. In a retrospective study, Soyka and Schmidt reviewed the records of psychiatric inpatients [n=14,309] with the Manual for the Assessment and Documentation of Psychopathology (AMDP) system and found 72 cases of delusional jealousy (0.5%) which were associated mostly with schizophrenia and other psychoses (1.3%), males were predominant (43/72, 59.7%) and most of them manifested aggressive behavior at admission (15/72, 20.8%) [64]. Jealousy has intrigue connectivity with Othello who developed reactive jealousy because the idea of unfaithfulness against his wife was implanted in his mind by his fellow enemies. Ultimately, Othello killed his wife, Desdemona, by strangulation and later committed suicide, a pathetic end in Shakespeare's play.

1.8 Pharmacotherapy

Psychopharmacology relates to psychotherapy and pharmacotherapy of any mental disorder. Literature suggests that antipsychotic medications such as haloperidol, trifluoperazine, pimozide, risperidone, olanzapine, quetiapine, clozapine, ziprasidone, and aripiprazole as well as long-acting risperidone and paliperidone (in DD with non-prominent hallucinations) are used effectively in DD irrespective of predominant single theme [3-5,9,11,12,33,34,59,60,62,65]. Rather psychopathological complexity and dimensions such as cognitive, affective, paranoid

Table 2. Type of DD based on the predominant delusional theme

Delusion type	Definition	Remark
Jealous	Delusion that spouse is unfaithful	Most common types of delusions reported in studies are persecutory and somatic types. Delusional Jealousy is third in line. These disorders have sex predilection such as jealousy type is more common among men than women while somatic delusions are common among females. These disorders respond to atypical and typical antipsychotic drugs irrespective of delusional theme. Additional psychotherapy further improves outcome and quality of life of patients with DD.
Erotomanic	Delusion that another person of higher status is in love with the individual	
Grandiose	Delusion of inflated worth, power, knowledge, identity, or special relationship to a deity or famous person	
Persecutory	Delusion that the person, or someone to whom the person is close, is being malevolently treated in some way.	
Somatic	Delusion that the person has some physical defect or general medical condition	
Mixed	Delusion characteristics of more than one of the above types but no one theme predominates	
Unspecified	Meeting none of the criteria such as morbid infatuations	

and schizoid of DD should be considered for deciding a proper line of treatment for DD [18,66]. Clomipramine and SSRIs are reported to effect substantial improvement in somatic delusional disorder [5-12,15,58-62]. Some reports suggest a role of Pimavanserin (ACP - 103) – a highly selective inverse agonist drug of the 5-HT2A-receptors in the treatment of patients with PD manifesting DJL, the symptoms of the latter condition also improve [67]. Clozapine is used in resistant cases of DD with some good effects [62]. Nonetheless, there is presently no better medication for the resistant cases of DD. Clozapine requires continuous blood monitoring as it causes serious side-effects including metabolic syndrome, agranulocytosis and seizures [68]. Electroconvulsive therapy may be used in cases of DD which do not respond to pharmacotherapy [9,12,33,34]. There are scattered case reports of patients with DD who respond to differently to drug interventions. Patients with stroke who develop hypersexuality and delusional jealousy are reported to respond to atypical antipsychotic quetiapine [60]. The use of clozapine successfully managed polydipsia, water intoxication and delusional jealousy in a patient with alcohol addiction [62]. In an overview, patients with DD were reported to improve with other medications including risperidone, ziprasidone pimozide, haloperidol and clozapine [17]. In a review of literature on case series of DD since 2004, Mews and Quante found six cases of DD, reviewed their records retrospectively and reported moderate prognosis attributed to adequate treatment by antipsychotics and psychotherapy and poor adherence to treatment was the main predictor of poor outcome among patients with DD [69]. Notably, SSRIs and clomipramine are more effective in somatic DD compared to antipsychotic medications [5-12,59-62]. In a systematic review of treatments for delusional disorders, Skelton and colleagues evaluated the effectiveness of antipsychotic drugs, antidepressants, mood stabilizers and psychotherapy (supportive and cognitive behavior therapy) in comparison with placebo in delusional disorders and found only one RCT with multiple limitations and no definite results regarding psychotherapy. The paucity of level 1 evidence for medication interventions in delusional disorders suggests that RCTs need to be conducted for gathering data on therapeutic efficacy of aforesaid drugs and psychotherapies commonly used in this patient population [70].

1.9 Psychotherapy

Several reviews of the topic under consideration have suggested the benefits of combining psychotherapy with medication interventions among patients with delusional disorders. Psychotherapies which are used in DD in general include; psychodynamic psychotherapy, supportive psychotherapy, brief psychotherapy, couple therapy, family therapy, marital therapy, educational psychotherapy, mindfulness therapy, cognitive behavior therapy, motivational interviewing, cognitive analytical therapy, cognitive remediation therapy, and social therapy [5,6,8-10,17,33,34, 42,59,71]. In one study with a single-case experimental design, CBT was less effective than cognitive analytical therapy in two patients with morbid jealousy [71]. Each psychotherapy needs to be selected that should target a particular concern of individual patients. For those patients who do not respond to medication and psychotherapy, a search should be made for identifying the following factors; failure to take medication, inadequate dosing, and a missed diagnosis of a substance disorder, medical condition, or even another psychiatric disorder. Patients with DJL may additionally present with depressive and anxiety symptoms, which should be managed by appropriate antidepressants and psychotherapy [12]. Overall, combining pharmacotherapy with one of the psychosocial therapies results in better outcome among patients with DJL.

1.10 Special note on Complementary and Alternative Medicine (CAM)

Psychosocial therapies considered CAM modalities are used in delusional jealousy with effectiveness. When these therapies are integrated with pharmacotherapy, the results in pure DJL are much better compared to standalone pharmacotherapy or CAM therapies. Other than psychosocial therapies, CAM modality is rarely reported to be used in pure DJL [72]. However, a variety of CAM modalities such as dietary and nutritional, yoga, chelation, exercise, acupuncture, physical, Tai chi, and dance and music therapy and others as complementary therapy are used in the management of psychiatric disorders and physical diseases that co-occur with delusional jealousy [73-77].

Table 3. Aetiologies, theories of and interventions used in delusional jealousy

Aetiologies	Theories and dimensions	Interventions	Remark
Medical diseases Endocrine disturbances, cerebral tumour, Huntington' chorea, Tertiary syphilis, HIV, Vitamin deficiency, medications- anabolic steroids, corticosteroids, toxins- mercury, arsenic and manganese.	Psychodynamic – projected latent homosexuality, Oedipus complex, attachment issues such as insecurity in intimate relationships.	Psychosocial therapies- Supportive therapy, CBT, couple therapy, marital therapy, family therapy, dynamic therapy, social	To qualify for delusional jealousy, each person must have a clear unshakable, fixed, and ego syntonic thought not compatible with
Dementias, Parkinson's disease, Frontal lobe syndrome, cerebral injuries or insults, right and left hemisphere/ frontal activity disturbances, metabolic disorders, subarachnoid haemorrhage,	Cognitive – cognitive decline, a sense of inadequacy, oversensitivity and insecurity, inferiority, distortions in perceptions and interpretations of social signals, and extramarital activities of mother.	therapy, educational therapy, and motivational interviewing, Drug treatments -Typical and atypical antipsychotics,	sociocultural belief. The delusion should be differentiated from overvalued ideas, which are amenable to reason and not
Psychiatric disorders	Sociocultural views – unfaithful partners in conservative cultures, mental disorder in patient's partner, economic depression, and misinterpretations of social ideations and social cognitive deficits (theory of mind), attentional, reasoning and attribution biases, all supported by imaging studies	SSRIs, Clozapine, electroconvulsive therapy, Other treatments- creative psycho- pharmacotherapy, partial hospitalization, day treatment programs, hospital admission for highly suicidal/ homicidal	fixed, not resisted, and ego syntonic, and obsessional ideas which are egodystonic, usually resisted and acknowledged to be silly and senseless. Delusion is circumscribed.
Schizophrenia, late onset schizophrenia	Pathological dimensions– depressive, paranoid, obsessive, separation-anxiety, and interpersonal sensitive.	tendencies, geographical separation of the partners, collaborative interventions, Outcome - 50% to 60% of	The psychopathology in morbid jealousy includes delusions, obsession and overvalued ideas. Insecure attachment and dismissive
Affective disorders	Alteration in serotonergic system–low density of the platelet serotonin transporter	patients and even more in some reports (80%) show	styles predominate in jealousy. Many cases of
Major depressive disorder	Alteration in dopaminergic system -Altered dopaminergic frontostriatal circuits, ventromedial prefrontal cortex, and insula	good improvement to a variety of therapies either standalone or combined.	delusional jealousy are linked with forensic dilemmas due to violent
Alcohol addiction			attacks, emotional and
Amphetamine abuse			sexual abuse, suicide
Cocaine addiction, cannabis use, and personality disorders			attempts, suicide, and homicide.

2. CASE HISTORY

One of the authors (NAQ) tactfully interviewed wife and husband first separately and then together. In the first month, both of them were interviewed and counselled 6 times and emerging information was recorded. The husband appeared to have features of minor anxiety and is presently stable. However, his 31-year-old wife with three minor children expressed irritably unshakable false belief that her husband has intimate, romantic relationship with another woman. However no genuine evidence of infidelity was reported. Her problem started gradually over the past 3 to 4 years. She believed that her husband frequently visits another woman for sexual enjoyment and also intends to marry her. She also expressed that for the last 5 years he had stopped loving her. Due to this belief she had frequent verbal and physical fights with her husband. On the other hand the husband bluntly refused all her allegations and stated that there was no other woman in his life. He felt sad that he was unable to convince his wife of his faithfulness and love for her. He also emphasized that he loved his wife dearly and could not live without her. The wife consulted some faith healers and palmists and also made telephone calls to close family friends in her country, as well as in Jeddah, about her husband's infidelity, and most of them strengthened her infidel belief and advised her to perform some rituals such as reading some verses from holy Quran to bring him back on track. According to husband, marital relationship and the overall quality of life had begun to deteriorate slowly. During interview, the patient often reported that "we live like two dead persons in the house. We share and sleep on one bed but there is no love making, our backs face each other". The patient declared tauntingly that she lives only for her 3 kids.

At the outset, the patient became suspicious and developed doubts regarding husband's fidelity and subsequently began to engage in multipronged confirmatory behaviors. She enquired repeatedly about her partner's assumed intimate relationship, with the grownup daughter of a teacher who used to come and teach her children at their house. Her husband used to pick up this teacher from his house and drop him back daily. The patient expressed a desire to meet this girl but her husband refused. This further strengthened her suspicion and finally she forced him to take her to the teacher's house where she met the girl in the presence of her parents. She openly accused her of having intimate relations with her husband. The girl was taken aback and blurted out "Oh no never, are you crazy?"The parents were also quite surprised by her behaviour and became very angry. She fought with them. She shouted and said "my husband denies this romantic relationship and you are also denying it but both of you are big liars. I am mentally sound, you bitch you want to destroy my family life". To prevent the situation from going out of hand, the girl's parents angrily informed her to leave their house. The husband had to take her out of their house by force. Both of them argued violently in the car but reached home safely. Subsequently, the tutor stopped teaching their kids. However, the patient continued to repeatedly threaten the girl and her parents with dire consequences. The girl and her parents informed her husband that she is abnormal and needs psychiatric help.

2.1 Stalking and Internet

Subsequently, she began to make telephone calls to his office and enquired from his colleagues about his whereabouts whenever he did not respond to a call from her. He tried to convince her that he was in the meeting but in vain. His office colleagues began to make fun of him as to why his wife was so inquisitive about his day to day affairs. She was chasing him each of the 8 hours, when he was on duty, which we call *stalking through internet/mobile use*. She daily searched his clothes when he came back from office. Once, she found a greyish-brown spot on his underclothes. She showed it to him and asked from where this filthy mark came. She suspected it to be "shit" spot and attributed it to an anal sexual intercourse with his romantic partner– daughter of the teacher. A couple of times in the past, her husband had anal intercourse with her and on one occasion she had noticed a similar spot on his underclothes. He tried to tell her it is not a shit mark but she did not accept his explanation and abused and cursed him. She also scrutinized his mobile and laptop daily and also examined bed linens and genitalia for evidence of sexual activity, but never found anything to support her confounding behavior. She used verbal violence many times to extract a confession from her partner. Accused partner would swear by Allah almost every day to prove his innocence but of no avail. Once she asked him to swear by holy Quran. He pleaded her not to compel him to do so because he has neither read nor understood it entirely. She insisted and consequently he swore by Quran

but her conviction of partner's infidelity remained strong. She persisted with her false, fixed belief that he is in love with the daughter of that teacher. She continued to be irritable, hostile and aggressive with her partner at all times. She often complained of confusion and tiredness and many times had crying spells.

There was no history of excessive sexual demands on the partner. Unshakable belief of jealousy did not change to other psychiatric symptoms like self-references or hearing voices/seeing objects or other delusional symptom. No history of surprise visits to partner's office was forthcoming because she could not travel alone. Hence there is no history of stalking behavior, which is found in delusional jealousy [78]. However, repeated mobile calls to his office will represent stalking through internet, a modern stalking method in a conservative society and information technology age. There was no past history of taking any treatment. No history of drug abuse but heavy use of coffee and tea was reported. There was no history of suicidal or homicidal attempts in the past.

2.2 Injurious Behavior

The physical threat or suicide or homicide is not sanctioned in the local society, so these behaviors were not there initially at all. She knew the strict and deterrent laws of Saudi Arabia. She also believed that committing suicide is prohibited in Islam and those who commit suicide go to hell. She also knew that only almighty God has the right to take the life of an individual. But during her severe post-psychotic depression, she attempted suicide by ingesting 125mg diazepam. No history of major physical violence between the couple, except during heated arguments husband would shake her by shoulders and push her aside. Like shaken baby syndrome [79], we call it the *shaken adult syndrome*, though its consequences may be quite different. However, repeated denials of infidelity by her husband used to provoke extreme anger and severe verbal violence every day. Neither of them went to the court for social justice. The patient revealed no history of having romantic relationships with other male partner and the husband confirmed this.

2.3 Family Scenario

There was no history of direct child abuse; however children witnessed parental violence every day. She loved her children very much and was living just for them as she would tauntingly tell her counterpart. There was no history of jealous mother employing her kids to spy on their father. The patient's parents died of natural death. Her brother is married for the last ten years and yet to have a child. Her sister who is married to her husband's elder brother has one child with severe congenital disability and two other children are normal. These two issues were the source of constant stress to the patient as she told during interviews. No psychiatric illness revealed in either of the family.

2.4 Personality Organization

This patient clinically showed mixed traits of several personality disorders; borderline personality such as volatile mood, alienation, and fear of abandonment; dependent personality traits such as submissiveness, clinging behavior and fear of detachment; and paranoid personality traits such as oversensitivity and mistrust [20]. Notably, jealousy is related to several traits of personality dimension which include; dependency, aggression, mistrust, manipulativeness, self-harming behavior, enticement, exhibitionism, insecurity and impulsiveness. Persistence of these traits determines how an individual will experience and express jealousy. Attachment style, characterized by insecure and dismissing behavior has a fear of losing the partner, a key phenomenon in the genesis of jealousy [80,81].

2.5 Mental Status Examination

At index interview, she was cleanly dressed and well groomed. She showed normal psychomotor activity and speech was appropriate. No gross impairment in the behavior was observed. She was fully conscious and oriented to time, place and person. She was fully attentive, had good concentration and showed no evidence of any organic disease. Her mood was mildly irritable, depressed and anxious. No aggression or violent behavior was observed during mental status examination. According to Reid, DD patients have higher violent tendencies than those with other problems [82] and clinical wisdom suggest that such behaviors are visible even during interviews. There was no gross thought disorder or auditory/visual hallucinations. Delusion of jealousy was present. No obsessional or overvalued ideas about jealousy were observed. No suicidal or homicidal ideas were demonstrated. She lacked complete insight and

judgement was partially impaired. Clinically, she has average intelligence.

2.6 Management

She was diagnosed with delusional jealousy and was managed with aripiprazole 7.5 mg and brief psychotherapy. Within three months, most of her symptoms improved as she and her counterpart reported. This patient's response to treatment surprised her spouse who expressed that all daily verbal arguments and fighting are over and she no more entertains the ideas of infidelity. Indeed "I am much relieved, doc". Accordingly one study recommended that the assessment of outcome/improvement in patient with morbid jealousy should take the opinion of spouse [71]. However, she developed some fresh symptoms which were attributed to aripiprazole use, and characterized by inactiveness, severe insomnia, inability to do household chores including cooking, confusion, loss of interest in daily work, and suicidal talk. She reported that she wants to discontinue aripiprazole in order to return to her previous self. She discontinued aripiprazole for one day. Next day, she was given Aripiprazole 5mg in addition to Escitalopram 10 mg daily along with one hour counselling. Her husband consulted one private psychiatrist especially for disturbing insomnia who prescribed her diazepam 5mg at night (up to a maximum of 15 mg) and Mirtazapine 30 mg daily. Aripiprazole and Escitalopram were discontinued. Her insomnia and depression persisted, and next day she attempted suicide by swallowing 125 mg of Diazepam. She was rushed to the emergency services of a private hospital, stomach wash was done within half an hour in ICU and she recovered fully over a 5-day period. She was discharged from the private hospital on the following medications; quetiapine 200 mg, Mirtazapine 30 mg, and diazepam 5 mg on daily basis. However, her mental condition remained same with persistent lack of sleep and suicidal ideas. Over the next two days she was readmitted, this time to Al-Amal Mental Complex, Riyadh. A social reason for her admission was that her husband worked fulltime (8-hr duty daily) and in the absence of any other caregivers at home he was afraid, that she may attempt suicide again.

2.6.1 In-patient management and course

In emergency room during her first assessment, she showed acceptable grooming, guarded behaviour, lack of eye-to-eye contact, relevant and coherent thinking, low volume and low toned speech, depressed mood, suicide ideas but no immediate plan, no perceptual disturbances, partial judgement and lack of insight. Patient was put under continuous observation, and investigations including CBC, pregnancy test, drug screening and ECG and all were within normal limits. Physical and systemic examinations were normal. Quetiapine was increased to 400 mg, Escitalopram 10 mg was added along with Lorazepam 2 m at night. Nursing observations revealed that patient was cooperative, socially isolated due to language barrier, good personal care and hygiene, and no suicide or self-harm behavior; she spent most of the day lying on her bed and had a good appetite. After 1/52, patients still had lack of sleep, low mood and suicide ideas, so treating team decided to increase Mirtazapine to 45 mg and to added Trazadone 100 mg.Then 2/7 later, patient' sleep improved but continued to have low mood and suicide ideas, hence Escitalopram was increased to 20 mg per day and psychoeducation sessions were started. 1/52 later, patient showed absence of suicide ideas and her mood improved considerably. After 2/52, patient was having good mood, adequate sleep, and no suicidal tendency and was discharged from hospital on the following medications; quetiapine 400 mg, Escitalopram 20 mg, Mirtazapine 45 mg, Trazadone 100 mg, and Lorazepam 2 mg HS. Her husband was in consultation with attending team members and decided to send her and the children back to their country. A friendly followup call to her husband in Riyadh revealed that her condition was stable and she was enjoying the company of her family members back home. Currently, she is on the following medications: quetiapine 400 mg, Escitalopram 20 mg, Mirtazapine 45 mg, and Trazadone 100 mg.

2.7 Ethical Consideration

Both the patient and her husband gave verbal consent, after taking assurance that her name and nationality will not be disclosed.

3. DISCUSSION

This paper briefly reviews relevant literature on somatic delusions but its main focus is on delusional jealousy. Patients with somatic delusions mostly consult general physicians in different healthcare settings who often miss the diagnosis and patients continue to suffer with poor quality of life [2-7]. Overall, somatic

delusions are underreported, under diagnosed and undertreated as is evident in the literature [5, 6,8]. The implication of this observation is that general physicians should be aware of spectrum of somatic delusional disorder so that they could detect patients with somatic delusions early and intervene by using appropriate medications and psychotherapies [10-12]. Over one and half decade, literature on somatic delusional disorder has expanded. However, overall evidence level 1 is still low due to relative lack of randomized clinical trials, systematic reviews, meta-analysis and larger observational studies.

Delusional jealousy, the main theme of this review is a complex disorder determined not only by biological/organic factors but also psychosocial models [21-24,33-56]. DJL is clearly defined in accordance to DSM-V criteria [1,30] and has salient clinical features as evidenced in this patient. DJL is reported to have variable incidence and prevalence rate [1,30]. DJL can occur in all age group but most commonly in adult population. DJL is reported more commonly in males, especially in the divorced, illiterate and unemployed population and stress being the common denominator among most patients with DJL. This patient partially fits into these criteria. Notably, a number of diagnoses including obsessive and over-valued ideas of jealousy need to be excluded before making the diagnosis of DJL, which is a diagnosis of exclusion [32,33]. DJL is reported to coexist with a variety of psychiatric disorders and physical diseases [19,32,35,36,44,58-64], each disorder needs to be addressed and excluded by relevant investigations. This patient did not present with any co-morbidity except some mixed traits of certain personality disorders [20]. The prescribed interventions for DJL are mainly antipsychotic medications and psychotherapy. This patient also responded to low doses of aripiprazole and brief psychotherapy plus psychoeducation. Low doses of antipsychotic medications are reported to benefit patients with DJL [32,33], however some patient require higher doses of atypical antipsychotics. Traditional tricyclic antidepressants and SSRIs are recommended for obsessive and somatic delusions [5,10-12]. Approximately up to 60% to 80% patients with these disorders tend to show good improvement with medications and psychosocial options, the latter are used as adjunct treatment for delusional jealousy [7,8,33]. When a parent with DJL is potentially dangerous, children should be protected through court proceedings [34] but such was not the scenario in the present case. Patients with DJL may require admission to hospital in case of potential suicidal risk, no response to out-patient treatment and considerable psychological/physical distress [34,48,64]. This patient developed post-psychotic depression [83,84] and some obvious explanations in terms of depressive stressful daily life events, lack of social supports, negative appraisals of economic difficulties, long duration of DJL, discontinuation of antipsychotic medications, and stigma of mental illness were found in this case which are consistent with other studies [83-85]. However, the use of aripiprazole is linked with new or worsening mental or mood problems including anxiety, depression, agitation, and irritability [86]. Furthermore, the relevant literature on post-psychotic depression suggests multiple causative factors including internal shame-based appraisals of psychosis, stigma of mental illness, entrapment, loss of control, guilt, social isolation and marginalization, stressful daily life events, and emotional dysregulation/ dysfunction. External shame-based appraisals cause post-psychotic trauma. CBT is one strategy to deal with emotional dysregulation and break-through psychotic symptoms [85]. Some studies suggest geographical separation of the partners, when DJL is refractory to pharmacotherapy and psychosocial interventions [34] and this therapeutic strategy may also contribute to her stable status as she is separated from her husband for time being. Since the introduction of second generation of atypical antipsychotics and SSRIs, the prognosis of DJL has not changed much but considerable impact on quality of life and reduction in side-effect profile has been observed. DJL is a complex condition and a variety of factors in terms of co-morbid mental and physical disorders, chronicity and severity of symptoms, poor adherence to therapy, and persistent stress determine the outcome in DJL disorder. The important message is that each individual with DJL is unique in presentation and treatment interventions must target needs of individual patient along with long-term followup and continuous monitoring for preventing recurrences of homicide and suicide behavior after discharge from hospital.

3.1 Sociocultural Issues

Expatriate unemployed housewives like the present patient tend to face a variety of social difficulties in case they develop psychiatric major problems; access to psychiatric services, expense of treatment, language barrier, travel

restrictions, deterrent laws, inequality, near lack of neighbourhood and living alone with husband and minor kids without extended family support. This type of habitat is associated with constant stress, poor quality of life, less enjoyment, hopelessness, chance of suicide attempts, and lack of freedom as expressed by this patient [87-90].The problems of nuclear family became evident when she developed post-psychotic depression linked with suicide communication and suicide attempt. Such problems are not faced in traditional joint families, which, interalia, promote mental health and absorb stresses of life protecting members from developing mental health problems [91]. Another problem reported in such patients post-discharge is repeated suicide attempt [92] and her husband was informed of such possibility and its preventive strategies including restrictions in access to prescribed medications and other more dangerous means for suicide [93]. Most of these patients who disturb the dynamic functioning of family and family members, and face relationship dissolutions, spousal abuse and homicide, unobserved in this case, tend to commit/reattempt suicide immediately after discharge or within a year.

4. CONCLUSION

In conclusion, delusional jealousy is a complex clinically defined disorder, determined by biopsychosocial heterogeneous factors, co-morbid with a variety of physical and psychiatric disorders and multiple psychotherapies and psychotropic medications are used in its management with good outcome. The reported case of an expatriate housewife with delusional jealousy complicated by post-psychotic depression and suicidal attempt raised a number of important psychosocial issues which mental health professionals should address when they encounter a patient with delusional jealousy.

Jealousy is portrayed in Shakespeare's Play as:
But jealous souls will not be answer'd so;
They are not ever jealous for the cause,
But jealous for they are jealous.
'Tis a monster
Begot upon itself, born on itself.
(Othello, III, IV, 160)

CONSENT

Both the patient and her husband gave conditional oral consent.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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