

Delusional infestation: an interface with psychiatry

ARTICLE

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SUMMARY

Delusional infestation (delusional parasitosis) is a relatively rare condition but it has been of interest to a wide range of professionals, including entomologists, zoologists and dermatologists, as patients predominantly seek help from specialties other than psychiatrists. The illness requires a multidisciplinary approach and a strong bond of trust between the treating clinician and the patient to ensure the best possible outcome. This article discusses how clinicians in all specialties should approach patients presenting with the disorder and outlines differential diagnosis and associated laboratory tests. It considers the evidence base for treatment and the success of psychodermatology clinics that provide a 'neutral setting' for consultation to address the problem of patients' non-engagement. Such clinics are few, and there is a need to develop disease-specific pathways in primary care and hospital settings to improve prognosis.

LEARNING OBJECTIVES

After reading this article you will be able to:

- demonstrate an understanding of delusional infestation and the interface with different specialties
- understand the approach to take with patients with delusional infestation
- demonstrate knowledge of available treatment options.

KEYWORDS

Delusional; infestation; parasitosis; psychotic disorders; antipsychotics.

1995) and dermatologists (Lyell 1983; Bewley 2010). The reluctance of people with delusional infestation to see psychiatrists, owing to various factors, including stigma of mental illness and lack of insight, is widely reported in the literature (Freudenmann 2009). Psychodermatology clinics aim to provide neutral settings for consultation to address the problem of non-engagement among people with delusional infestation (Aguilar-Duran 2014), but there is a need to develop disease-specific pathways in primary care and hospital settings, where the majority of patients seek help.

Scope of the problem

Delusional infestation is considered to be a rare disorder, particularly by psychiatrists (Freudenmann 2009). A population-based study in Minnesota, USA, reported an incidence of delusional infestation of 1.9 per 100 000 person-years (Bailey 2014). The incidence increases with age, with the highest incidence between 50 and 80 years of age (Lyell 1983; Trabert 1995). The female:male ratio is estimated to be 1:1 until the age of 50 and 3:1 for people over 50 (Lyell 1983). In Germany, Trabert (1993) (cited in Freudenmann 2009) reported a prevalence of 5.58 per million population based on cases reported to hospitals and public health services and a much higher prevalence, of 83.23 per million, based on a survey of private practices. A survey of entomologists in the USA estimated that around 100 000–250 000 Americans had delusional infestation (Hinkle 2011). Point prevalence in a UK dermatology clinic was reported at 1.48 per million (Lepping 2010).

Individuals cause great suffering to themselves and their families because of their preoccupation with symptoms and the obsessionality of the condition (Freudenmann 2009). Multiple medical consultations and use of several laboratory, microbiology and diagnostic services add to the significant costs and economic burden for healthcare services (Boggild 2010). It is estimated that 8–14% of people with delusional infestation have a family member or close friend affected with similar symptoms, which has been termed shared psychotic disorder (Freudenmann 2009).

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Most human beings have a fear of infestation and parasites, in large part because they are associated with uncleanliness and shame. In some individuals, this fear persists despite the lack of objective evidence of infestation. The belief may be sustained with a variable degree of conviction, spanning from non-delusional (obsessional thoughts) to delusional thinking, and it is termed delusional parasitosis or delusional infestation (Freudenmann 2009). Delusional infestation has been of interest to a range of professionals, including entomologists (Hinkle 2011; Pradhan 2019), zoologists (Trabert

Diagnostic considerations

The majority of people with delusional infestation do not present to psychiatrists (Foster 2012). Instead, they present to general practitioners, dermatologists, physicians, otolaryngologists and/or ophthalmologists with complaints of infestation of the skin and/or different parts of the body, including the ear, eye and gastrointestinal tract, wanting the alleged organisms to be identified and eliminated (Moriarty 2019). When tests proved negative, patients continue to demand more investigations to validate their beliefs. Patients' reluctance to accept the lack of infestation should alert professionals to the possibility of delusional infestation.

Freudenmann & Lepping (2009) proposed two criteria for the diagnosis of delusional infestation: (a) patients have the conviction of being infested by animate or inanimate pathogens without any medical or microbiological evidence of a true infestation; and (b) they have abnormal cutaneous sensations explained by the first criterion. Delusional infestation is included in ICD-11 (World Health Organization 2018) and DSM-5 (American Psychiatric Association 2013) as a delusional disorder with a fixed, false belief that persists for at least 3 and 1 month, respectively. The delusion of infestation is encapsulated without extension of delusional beliefs into other areas of life. The patient may have tactile, visual or auditory hallucinations related to the delusion itself but does not have other psychotic features meeting the criteria for schizophrenia (DSM-5).

Box 1 outlines the diagnostic steps and possible investigations to undertake with patients presenting with suspected delusional infestation.

Physical and psychiatric comorbidities

It has been estimated that around 60% of people with delusional infestation have an underlying organic or psychiatric condition (Trabert 1995), termed secondary organic delusional infestation or secondary functional delusional infestation (Freudenmann 2009). Predisposing factors are shown in Box 2 and conditions associated with secondary organic or functional delusional infestation are listed in Table 1.

Substance misuse is more common in younger patients with delusional infestation, who might use substances to relieve the distress associated with their condition. An international study of the prevalence of substance use in delusional infestation reported that 30% of people with delusional infestation in specialised psychodermatology clinics tested positive for hard or soft drugs, most commonly amphetamines and cannabis (Lepping 2017).

Delusional infestation has a significant impact on quality of life, with increased distress, frustration and comorbid depression; it is also associated with increased suicide risk, which necessitates a thorough risk assessment on an individual basis (Freudenmann 2009). A study of psychiatric comorbidity in 134 people with delusional infestation at a psychodermatology clinic in England found that 52% patients had anxiety, 41.6% depression and 49% appearance-related concerns (Shah 2017). A retrospective study of patients with delusional infestation in a tertiary care academic medical centre in Minnesota demonstrated depressive disorders in 24%, anxiety disorders in 19%, drug use disorders in 19% and personality disorders in 4% (Foster 2012).

Interface between psychiatrists and other professionals

The most commonly reported area of infestation is the skin on the hands, arms, lower legs and feet, although other parts of the body can be affected. Patients commonly see dermatologists because of

BOX 1 Diagnosis and possible investigations in suspected delusional infestation

- Rule out true infestations (liaise with entomologists, dermatologists)
 - Rule out systemic disease
 - Review systems by thorough physical and neurological examination
 - Take a thorough history of drug use, with toxicology screening and urine drug screening if indicated
 - Discontinue any contributory medications
 - Blood tests:
 - full blood count
 - full biochemical profile
 - thyroid function test
 - blood sugar
 - vitamin B₁₂ and vitamin B₉ (folate)
 - C-reactive protein, erythrocyte sedimentation rate (ESR)
 - HIV, syphilis and hepatitis (if indicated by history)
 - X-ray and electrocardiogram (ECG) (if indicated)
 - Microbiological/parasitological testing of 'specimens' brought in by patient, to rule out presence of arthropods/parasites/organisms (if clinically indicated – unnecessary testing should be avoided)
 - Computed tomography or magnetic resonance imaging (MRI) to rule out organic cause
 - Polymerase chain reaction (PCR) test to rule out scabies
 - Skin biopsy (if indicated and to be done once only) (Hylwa 2011)
 - Allergy testing (if indicated)
- (Adapted from: Freudenmann 2009; Lepping 2015; Moriarty 2019)

BOX 2 Predisposing factors in delusional infestation

- Reduced visual acuity
- Reduced auditory acuity
- Social isolation
- Recent traumatic event

TABLE 1 Conditions associated with delusional infestation

| | |
|---|--|
| Secondary organic delusional infestation: possible causes | |
| Neurological | Central nervous system tumours Cerebrovascular disease Neurodegenerative diseases Huntingdon disease Parkinson disease Vascular encephalopathy Multiple sclerosis Head trauma |
| Nutritional deficiencies | Vitamin B ₁₂ deficiency Pellagra Folate deficiency |
| Substance use/misuse | Alcohol Amphetamines Cocaine Methylphenidate Cannabis Ecstasy Opiates |
| Cardiovascular disorders | Arrhythmias Congestive heart failure |
| Renal disease | Chronic renal failure Renal dialysis |
| Liver disease | Hepatitis/hepatic disease Hepatic failure |
| Endocrine diseases | Diabetes mellitus Hyperthyroidism Hypothyroidism Panhypopituitarism Acromegaly |
| Malignancy | Lymphoma Breast cancer Lung cancer Colon cancer Chronic lymphocytic leukaemia |
| Infection | Syphilis Tuberculosis HIV/AIDS Leprosy History of scabies History of lice infestation |
| Medications | Phenelzine Pargyline Corticosteroids Ciprofloxacin Dopaminergic medications (pramipexole, ropinirole) Mefloquine Pemoline Ketoconazole Fluoroquinolones Topiramate |
| Miscellaneous haematological disorders | Systematic rheumatic illness Hypernatraemia Vitiligo Peripheral neuropathy Anaemia Post-herpetic neuralgia Polycythaemia vera Chronic lymphocytic leukaemia |
| Secondary functional delusional infestation (possible causes) | |
| Psychiatric | Psychotic depression Schizophrenia Dementia Anorexia nervosa Anxiety disorder Borderline personality disorder Intellectual disability |

Source: adapted from Al-Imam & Al-Shalchi (2019), Driscoll et al (1993), Freudenmann & Lepping (2009), Pradhan et al (2019) and Moriarty et al (2019).

their preoccupation with their skin complaints, but many dermatologists are not fully prepared to identify and treat this condition (Szepietowski 2007). The primary role of dermatologists is to exclude organic skin disease and treat any skin lesions arising as a result of self-treatment (e.g. dermatitis due to the use of chemicals) but it is not to offer psychiatric treatment.

Patients with delusional infestation can be a challenge for dermatologists, given that no infestation is found, even after repeated or specialised investigations and negative skin biopsies (Hylwa 2011). Patients often refuse a psychiatric referral or any psychiatric treatment, but some dermatologists might be comfortable initiating treatment with psychotropic drugs, to avoid continued suffering for the patient (Winsten 1997). In a survey of 172 dermatologists in Poland, about 15% said they would prescribe medication such as anxiolytics or even antipsychotics for delusional infestation (Szepietowski 2007).

Up to a quarter of people with delusional infestation describe infestation with non-living pathogens (e.g. 'fibres', 'filaments') (Freudenmann 2010; Lepping 2015). Apart from the skin, body orifices such as the nose, ear, mouth and anus may be affected, termed 'orificial delusional infestation' (Al-Imam 2019). In some elderly patients, the whole gastrointestinal tract can be implicated (Freudenmann 2009). Patients may report worms travelling in their gastrointestinal tract or through different orifices and seek help from a general physician or demand an endoscopy.

Most patients attempt to treat the infestation themselves, and some of these eradication attempts result in serious complications (Foster 2012). Emergency physicians might be called to treat self-mutilation attempts by razor blades, nail-biting and purification rituals, such as applying insecticides that result in skin burns (Aw 2004; Park 2018). Presentation to other specialties has been reported in the literature, such as otolaryngology with self-inflicted trauma to the ear (Spariosu 2015), ophthalmology with corneal damage (Meraj 2011) and urology with repeated urethral self-instrumentation and foreign body insertion, resulting in stricture formation (Ismail 2015). Some people with delusional infestation approach entomologists directly to investigate suspected organisms and a few demand frequent insecticide treatment of their homes by pest control organisations (Pradhan 2019).

Psychodermatology clinics

As mentioned above, treatment of delusional infestation (of the symptoms of the delusion) is

challenging for dermatologists, particularly owing to patients' reluctance to engage and accept the presence of a psychiatric or non-skin disorder (Ahmed 2013). Liaison between psychiatry and dermatology as a forum for exchange of insight and experience was identified almost a quarter of a century ago as a way forward for treating patients with this difficult and complex disorder (Winsten 1997). There are models proposed of psychodermatology clinics with access to a psychiatrist (Aguilar-Duran 2014) to treat people with delusional infestation. A psychodermatology clinic in the UK reported that over 70% of patients with delusional infestation were successfully treated by psychiatrists, dermatologists and psychologists working in collaboration (Healy 2009). A similar positive outcome (82% adherence to treatment) has been reported for people with delusional infestation treated in specialised multidisciplinary clinics in England, Italy and Russia (Romanov 2018). Early intervention models have been proposed, as longer duration of untreated psychosis is associated with significantly less favourable clinical outcomes (Romanov 2018).

Psychiatric management

Mental health professionals often have the challenging task of engaging with people with delusional infestation in non-psychiatric settings, as they are likely to refuse engagement in psychiatric clinics. Furthermore, despite the obvious presence of psychosis and the significant subjective distress, delusional infestation may not be classed as a severe and enduring mental illness and patients often do not meet the criteria for detention under the Mental Health Act 1983 to enforce any treatment (Freudenmann 2009). However, in certain severe cases, where legally possible, detention under the Mental Health Act should be considered and attempts should be made to engage and educate patients about their condition and to discourage harmful self-treatments.

An integrative holistic approach with psychotropic medications, psychotherapeutic and sociotherapeutic methods may benefit up to two-thirds of patients, with improvements in delusional symptomatology (Sadock 2017). A meta-analysis of 1223 cases conducted by Trabert (1995) reported that about half of the patients attained full remission with psychopharmacological treatment. No particular strategy has been found to be superior to others and hence a consistent multidisciplinary approach is needed, with a combination of medications and psychological treatment.

Engagement

Non-engagement remains one of the major challenges, as a meaningful therapeutic alliance is often

not established owing to the patient's conviction about the somatic nature of the illness (Lepping 2007). This failure of the therapeutic alliance results from the obvious discrepancy between the patient's belief system and the clinician's 'illness model'. Patients are reluctant to accept the mind-body link, focusing either on skin complaints or 'infestation' of the body. Professionals should focus on engagement, taking a non-judgemental attitude and conveying to the patient that their problems are being taken seriously (Koo 2001). Clinicians should give the patient time to talk about their experiences, listening to their detailed stories and explanations about the alleged infestation (Sadock 2017). Clinicians should be empathetic and acknowledge that the patient's symptoms are real; they should explore with the patient how the symptoms affect their lives, for example the associated social withdrawal and reduced activity (Freeman 2013). Clinicians should not challenge or confirm the patient's view about the cause of the symptoms early in the course of engagement (Silva 2003).

Clinicians should find about the patient's expectations and agree realistic therapeutic goals in collaborative discussion (Freudenmann 2009). Examples of goals could include reducing the distress associated with the delusions and improving quality of life; reducing skin lesions; reducing delusional conviction to a degree that enables normal social contact; increasing confidence; and re-engaging in activities (Freudenmann 2009; Freeman 2013).

A Cochrane review on treatment for delusional infestation was unable to draw conclusions regarding the efficacy of any treatment (pharmacological or non-pharmacological) owing to the lack of evidence from randomised controlled trials (RCTs) comparing interventions with placebo (Assalman 2019). Antipsychotics are the most commonly used medications for the disorder and most of the literature focuses on case series. A systematic review by Lepping et al (2007) of 16 trials and case reports demonstrated 60–100% partial or full remission rates with typical antipsychotics for primary delusional infestation, and rates did not differ significantly between typical and atypical antipsychotics. A further review by Freudenmann & Lepping (2009) recommended amisulpride, risperidone or olanzapine as first-line treatment and aripiprazole, quetiapine or haloperidol as second-line; however, the evidence of one agent being superior to another has come mainly from case series rather than RCTs. Ahmed & Bewley (2013) studied adherence to treatment for delusional infestation in a psychodermatology clinic in the UK and concluded that patients' adherence to physical health medications or skin treatment was high as they are convinced

about the physical nature of the infestation, but adherence to psychotropic medications was low as they did not accept the presence of a mental illness.

Challenges for clinicians

Patients continue to demand evidence of infestation even though repeated investigations are negative. This must be dealt with appropriately and tactfully, with empathy and a consistent approach by clinicians in primary and secondary care. Anger and resentment towards professionals are common (Hinkle 2011) and some accuse their doctors of incompetence when they fail to identify the parasites or pathogens that the patient believes are present. Most patients move between practitioners/specialists (doctor shopping) (Moriarty 2019) and are eventually lost to follow-up as they become increasingly frustrated and subsequently lose faith in the healthcare system.

People with delusional infestation are resistant and difficult to treat, leading to frustration for both patient and clinician (Winsten 1997). Clinicians might feel helpless and it is important to acknowledge the transference and feed back to the patient.

Cognitive-behavioural therapy can be used to challenge delusions to shift the belief, focusing on re-evaluating fearful thoughts of the infestation and work on fostering feelings of hope, control and self-worth (Freeman 2013). The clinician may work on limiting the time spent worrying about the infestation, improving sleep and increasing engagement in positive activities (Freeman 2013). It is important to be careful while addressing the unrealistic nature of the delusions, as attempting to persuade an individual that the delusion is incorrect can be self-defeating (Beck 2007). Acceptance and mindfulness-based interventions may help to manage comorbid anxiety and depression and reduce associated distress of delusional beliefs (Louise 2017; Shah 2017). A paper by Lepping et al (2015) and its accompanying podcast give practical advice to clinicians regarding treatment for delusional infestation.

Dealing with patients who do not engage

A high percentage of people with delusional infestation continue to refuse help and will not engage in any therapeutic work. In these cases, a 'do no further harm' principal should be followed. Palliative interventions to alleviate symptoms, such as sedating or non-sedating antihistamines for sleep disturbances or pruritus, topical steroids and emollients, can be offered even though they do not alter the course of the disease (Moriarty 2019). Use of unnecessary medications such as antimicrobial agents and anthelmintic treatment is

discouraged and unnecessary repeated testing should be avoided as this does not usually add clinical value (Hylwa 2011).

Conclusions and future research

Delusional infestation is a complex and difficult illness to treat, but the patient's experiences should be taken seriously and some patients can be helped to make their experiences less threatening, less interfering in their lives and more controllable. Delusional infestation has an interface with different professionals, including dermatologists, physicians and entomologists. Multidisciplinary robust RCTs involving dermatologists, medical entomologists and psychiatrists are needed to study different treatment approaches and more research is needed to look for new pathways for treatment settings/delivery, as the number of psychodermatology clinics is limited.

Author contributions

All authors contributed equally to this article.

Declaration of interest

None.

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References

- Aguilar-Duran S, Ahmed A, Taylor R, et al (2014) How to set up a psychodermatology clinic. *Clinical and Experimental Dermatology*, **39**: 577–82.
- Ahmed A, Bewley A (2013) Delusional infestation and patient adherence to treatment: an observational study. *British Journal of Dermatology*, **169**: 607–10.
- Al-Imam A, Al-Shalchi A (2019) Ekbom's delusional parasitosis: a systematic review. *Egyptian Journal of Dermatology and Venereology*, **39**: 5–13.
- American Psychiatric Association (2013) *Diagnostic and Statistical Manual of Mental Disorders* (5th edn) (DSM-5). American Psychiatric Association.
- Assalman I, Ahmed A, Alhajjar R, et al (2019) Treatments for primary delusional infestation. *Cochrane Database of Systematic Reviews*, **12**: CD011326.
- Aw D, Thong J, Chan H (2004) Delusional parasitosis: case series of 8 patients and review of the literature. *Annals Academy of Medicine Singapore*, **33**: 89–94.
- Bailey C, Anderson L, Lowe G, et al (2014) A population-based study of incidence of delusional infestation in Olmsted County, Minnesota, 1976–2010. *British Journal of Dermatology*, **170**: 1130–5.
- Beck A (2007) *Using Cognitive Therapy to Treat Delusions*. Beck Psychopathology Research Center. Beck Institute (<https://beckinstitute.org/using-cognitive-therapy-to-treat-delusions>). Accessed 1 Jun 2020.
- Bewley A, Lepping P, Freudenmann R, et al (2010) Delusional parasitosis: time to call it delusional infestation. *British Journal of Dermatology*, **163**: 1–2.
- Boggild A, Nicks B, Yen L, et al (2010) Delusional parasitosis: six-year experience with 23 consecutive cases at an academic medical center. *International Journal of Infectious Diseases*, **14**: e317–21.
- Driscoll M, Rothe M, Grant-Kels J, et al (1993) Delusional parasitosis: a dermatologic, psychiatric, and pharmacologic approach. *Journal of the American Academy of Dermatology*, **29**: 1023–33.

MCQ answers

1 b 2 e 3 a 4 e 5 d

- Foster A, Hylwa S, Bury J, et al (2012) Delusional infestation: clinical presentation in 147 patients seen at Mayo Clinic. *Journal of the American Academy of Dermatology*, **67**: 673.e1–10.
- Freeman D (2013) Cognitive-behavioral therapy for psychotic disorders. *Psychiatric Times*, **30**: 11 Dec (<https://www.psychiatrictimes.com/special-reports/cognitive-behavioral-therapy-psychotic-disorders>). Accessed 1 Jun 2020.
- Freudenmann R, Lepping P (2009) Delusional infestation. *Clinical Microbiology Reviews*, **22**: 690–732.
- Freudenmann R, Kölle M, Schönfeldt-lecuona C, et al (2010) Delusional parasitosis and the matchbox sign revisited: the international perspective. *Acta Dermato-Venereologica*, **90**: 517–9.
- Healy R, Taylor R, Dhoat S, et al (2009) Management of patients with delusional parasitosis in a joint dermatology/liaison psychiatry clinic. *British Journal of Dermatology*, **161**: 197–9.
- Hinkle N (2011) Ekbohm syndrome: a delusional condition of 'bugs in the skin'. *Current Psychiatry Reports*, **13**: 178–86.
- Hylwa S, Bury J, Davis M, et al (2011) Delusional infestation, including delusions of parasitosis: results of histologic examination of skin biopsy and patient-provided skin specimens. *Archives of Dermatology*, **147**: 1041–5.
- Ismail M, Cassidy E (2015) Urethral stricture secondary to self-instrumentation due to delusional parasitosis: a case report. *Journal of Medical Case Reports*, **9**: 197.
- Koo J, Lee C (2001) Delusions of parasitosis: a dermatologist's guide to diagnosis and treatment. *American Journal of Clinical Dermatology*, **2**: 285–90.
- Lepping P, Russell I, Freudenmann RW (2007) Antipsychotic treatment of primary delusional parasitosis: systematic review. *British Journal of Psychiatry*, **191**: 198–205.
- Lepping P, Baker C, Freudenmann R (2010) Delusional infestation in dermatology in the UK: prevalence, treatment strategies, and feasibility of a randomized controlled trial. *Clinical and Experimental Dermatology*, **35**: 841–4.
- Lepping P, Huber M, Freudenmann R (2015) How to approach delusional infestation. *BMJ*, **350**: h1328.
- Lepping P, Noorthoorn E, Kemperman P, et al (2017) An international study of the prevalence of substance use in patients with delusional infestation. *Journal of the American Academy of Dermatology*, **77**: 778–9.
- Louise S, Fitzpatrick M, Strauss C, et al (2017) Mindfulness- and acceptance-based interventions for psychosis: our current understanding and a meta-analysis. *Schizophrenia Research*, **192**: 57–63.
- Lyell A (1983) The Michelson lecture. Delusions of parasitosis. *British Journal of Dermatology*, **108**: 485–99.
- Meraj A, Din A, Larsen L, et al (2011) Self-inflicted corneal abrasions due to delusional parasitosis. *BMJ Case Reports*, **2011**: bcr04201114106.
- Moriarty N, Alam M, Kalus A, et al (2019) Current understanding and approach to delusional infestation. *American Journal of Medicine*, **132**: 1401–9.
- Park R, Myers P, Punekar I, et al (2018) Delusional parasitosis: an unusual yet dangerous diagnosis in self-inflicted burn injury. *Journal of Burn Care and Research*, **39**: S228–9.
- Pradhan P, Saikia D, Borkakati R (2019) A review on Ekbohm syndrome. *Journal of Entomology and Zoology Studies*, **7**: 894–900.
- Romanov D, Lepping P, Bewley A, et al (2018) Longer duration of untreated psychosis is associated with poorer outcomes for patients with delusional infestation. *Acta Dermato-Venereologica*, **98**: 848–54.
- Sadock B, Sadock V, Ruiz P (2017) *Kaplan & Sadock's Comprehensive Textbook of Psychiatry* (10th edn). Wolters Kluwer.
- Shah R, Taylor R, Bewley A (2017) Exploring the psychological profile of patients with delusional infestation. *Acta Dermato-Venereologica*, **97**: 98–101.
- Silva S, Kim C, Hofmann S, et al (2003) To believe or not to believe: cognitive and psychodynamic approaches to delusional disorder. *Harvard Review of Psychiatry*, **11**: 20–9. Available from: <https://doi.org/10.1080/106732203003938> [Accessed: 13/05/2020].
- Spariosu M, Coira D (2015) 'I tried to get a bug out of my ear': a case report of a patient with delusions of parasitic infestation and the review of relevant literature. *European Psychiatry*, **30**: 28–31.
- Szepietowski J, Salomon J, Hrehorów E, et al (2007) Delusional parasitosis in dermatological practice. *Journal of European Academy of Dermatology and Venerology*, **21**: 462–5.
- Trabert W (1993) *Delusional parasitosis. Studies on frequency, classification and prognosis* [in German]. Dissertation. Universität des Saarlandes.
- Trabert W (1995) 100 years of delusional parasitosis: meta-analysis of 1,223 case reports. *Psychopathology*, **28**: 238–46.
- Winsten M (1997) Delusional parasitosis: a practical guide for the family practitioner in evaluation and treatment strategies. *Journal of the American Osteopathic Association*, **97**: 95–9.
- World Health Organization (2018) *ICD-11. International Classification of Diseases- 11th revision*. WHO (<https://icd.who.int/en>).

MCQs

Select the single best option for each question stem

1 Current research suggests that the female:male ratio of delusional infestation in people over the age of 50 is:

- a 1:5
- b 3:1
- c 2:3
- d 1:3
- e 3:5.

2 People with delusional infestation are particularly at risk of developing:

- a depressive disorders
- b anxiety disorders
- c substance misuse
- d somatoform disorders
- e all the above.

3 The proportion of patients found to benefit from the treatment of delusional infestation in a joint psychodermatology clinic was:

- a 70%
- b 50%
- c 25%
- d 80%
- e 100%.

4 People with delusional infestation are likely to seek treatment from:

- a dermatologists
- b parasitologists
- c otolaryngologists
- d general practitioners
- e all the above.

5 The highest incidence of delusional infestation is in the age range:

- a 0–10 years
- b 20–40 years
- c 20–25 years
- d 50–80 years
- e 30–50 years.