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Short research communication

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Abstract

Background: Bedbug infestation has been reported globally, but there are few reports about this parasite of public health importance in Pakistan. This is the first study on bedbug infestation in a healthcare setting in Lahore, Pakistan.

Aims: To study bedbug infestation in public sector hospitals in Lahore, Pakistan.

Methods: This cross-sectional study was conducted in 86 wards of 2 tertiary care hospitals in Lahore during October and November 2019, using nonprobability sampling technique. Ward supervisors were interviewed using a self-developed structured questionnaire and wards were examined for bedbugs or their markers.

Results: Evidence of bedbug infestation was found in 72.1% of the wards. There was no significant difference in infestation rate between the 2 hospitals but there was a significantly lower incidence of infestation in wards that implemented control measures (25.8% vs 74.2%). No control measures were implemented in 53.4% of the wards sampled.

Conclusion: Bedbug infestation was rife in the 2 hospitals studied and knowledge about identification and eradication of the pest among ward supervisors was inadequate. Control measures, where applied, were substandard and not evidence-based.

Keywords: bedbugs, infestation, Cimex lectularius, public hospitals, Lahore, Pakistan

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Introduction

Bedbugs are wingless obligate ectoparasites from the insect family Cimicidae, which feed on mammals and birds (1). Bedbugs can tolerate a wide range of temperatures and their reproductive cycle is rapid (each female produces 5–8 eggs/week for 18 weeks) (2). They remain hidden in crevices and furnishings and emerge only to feed on their host (3). After feeding, they defecate and leave behind dark brown spots that are typical signs of bedbug infestation (1).

Cutaneous responses such as papules, pruritus, and blisters from bedbug bites are self-limiting, usually resolving within 1–2 weeks without intervention. Symptomatic treatment may be acceptable for patients (1) but there may be continued presence and multiplication of bedbugs in homes where pesticide treatment is not applied (4,5). There is a considerable psychological impact from sleep disturbance and anxiety associated with the discomfort of repeated bites (6). Bedbugs are notoriously difficult to eliminate (7), and control of infestation requires chemical pesticides, such as pyrethroid compounds, silicates, neonicatinoids, and arylpyrroles, under supervision of qualified pest control experts (2,3).

There have been no published studies on bedbug infestation in hospitals in Pakistan, although visitors and patients to hospitals frequently complain about it. Data on bedbug infestation from neighbouring countries in the region are also scarce. This study measured bedbug infestation and its causative factors in 2 hospitals in Lahore, Pakistan.

Methods

Study design and setting

This cross-sectional study was carried out in 86 wards of 2 public sector hospitals in Lahore, Pakistan, using a nonprobability sampling technique. There were 32 wards in hospital A and 54 in hospital B. Data collection took place during 8 weeks between October and November 2019. Ethical approval for this study was granted by the institutional ethical review committee of each hospital.

Data collection

After receiving permission from the hospital authorities the wards were systematically searched for live bedbugs, faecal spots, shed skin, bedbug eggs, and evidence of bedbug bites and blood spots on bed sheets. Wards were categorized as infested with bedbugs if any of these markers were found. Live specimens were identified by an entomologist as Cimex lectularius at the Institute of Public Health, Lahore. Data were recorded in a self-developed checklist and the ward head nurse was interviewed using a self-developed structured questionnaire. In wards where the head nurse was not available the nurse in charge was interviewed.

Data analysis

Data were analysed using SPSS version 20.0 (Chicago, IL, USA). The outcome variable was bedbug infestation and all 6 infestation markers were explanatory variables. The $\chi 2$ test was used to analyse the association between the outcome and explanatory variables. $P \leq 0.05$ was considered significant.

Results

We checked 86 wards in 2 hospitals, and 62 (72.1%) were positive for bedbug infestation. Live bedbugs were identified and collected from 55 (64%) wards. Bedbug faecal matter was observed in 23 (26.7%) wards. Blood spots were seen on the bed sheets in 36 (41.9%) wards. Bedbug bites were observed on various body areas of patients in 64 (72.4%) wards.

Bedbug infestation was 10% higher in hospital B (75.9%) than in hospital A (65.6%), although

this difference was not significant (P = 0.303) (Figure 1). There were nonsignificant differences in infestations between surgical and medical wards (66% vs 81.8%) as well as male, female, and mixed wards (81.8%, 68.4%, and 69.2%)

(P > 0.05).

We included a questionnaire to assess whether the ward in-charges knew how to identify the various markers of bedbug infestation (Table 1). The ward in-charges able to identify the various markers of infestation answered yes, while those unable to recognize the markers answered no.

Table 2 lists the control measures taken in the wards, which had varying efficacy, and only 10% cypermethrin/chlorine bleach and kerosene oil significantly reduced bedbug infestations. Furniture items infested with bedbugs were discarded in 5 (5.8%) wards but not in 79 (91.9%) wards. Special laundering of bed linen with warm water (40°C) was practiced in all wards; weekly in 68 (79.1%) but only monthly in 18 (20.9%) wards. There was no vacuum cleaning in any of the wards. Only 40 (46.5%) ward in-charges expressed their satisfaction with current pest control services. No pest control professional ever visited the wards for bedbug or other pest control. All respondents were concerned about the presence of bedbugs in their wards.

Discussion

Our study showed that > 70% of the wards at 2 large public sector hospitals in Lahore had evidence of bedbugs infestation, and some of the trained staff in the wards were unable to identify signs of bedbug infestation. We observed a lack of evidence-based protocols for bedbug elimination and control.

Interest in and knowledge about C. lectularius have seen a resurgence in recent decades, as their worldwide numbers have increased since the late 1990s (8) in developed and developing countries (9). This has been fuelled by rapid urbanization, climate change (8), population growth, poor individual cleanliness, ignorance, increased global travel, insect resistance, and low quality housing (2,6). Infestation reports increased by 100% in a 6-month period in Toronto, Canada (3) and in the United States of America (USA) (10). An overall infestation rate of 2.8% was reported in community settings in the Islamic Republic of Iran (11).

The US Environmental Protection Agency has declared bedbugs to be pests of significant health importance (1). It is unclear who is ultimately accountable, especially in the context of developing new strategies to combat pesticide resistance (12). We found that no steps were taken to get rid of bedbug infestation in over half (46/86) of the wards examined. Where attempts were made, they were not based on evidence, and in 43.5% of the infested wards, kerosene was used to control the infestation.

Bedbugs can transmit disease, and they were found to be positive for 45 pathogens in laboratory trials (1). Jupp et al. demonstrated that crushed bedbugs could mechanically transmit hepatitis B virus from insects to humans (13). Bedbugs are capable of completing the natural transmission cycle of Trypanosoma cruzi and Bartonella quintana (2,14). Only a few studies have used modern methods such as polymerase chain reaction and molecular techniques for the detection of pathogens in bedbugs, indicating a gap in knowledge (15).

The prevalence of bedbug infestation and its public health impact are not well known, and information on public and professional knowledge and containment practices is limited (9). Thirty-one (36%) of the nurses in our 2 hospitals were unable to identify a live bedbug. Healthcare workers' knowledge of prevention and control of bedbug infestation was poor in other studies (16,17). Alizadeh et al. (18) found that only 72% of medical students and 33% of pharmacy students in the Islamic Republic of Iran knew the correct control measures for bedbug infestations.

Bedbug infestations are especially rampant in healthcare settings, as reported in Canada (doctors' offices) (16) and the USA (nursing homes) (19). We found that the 2 public sector hospitals studied in Lahore were heavily infested, which was similar to the findings by Mehwish et al., that 70.14% of patients reported finding bedbugs in hospitals in Karachi (20). These results suggest that bedbug infestation needs to be studied in other hospitals in Pakistan.

Hospitals in developing countries are overburdened, and many structures and equipment are old and well used, and are potential hiding places for bedbugs to breed and multiply. The host-seeking behaviour of bedbugs is initiated by human body odour. Hentley et al. showed that dirty linen or clothing attracts bedbugs (21). Therefore, in warm climates such as in tropical and subtropical countries, bed sheets soaked with sweat and body odour can attract bedbugs.

This study should make relevant stakeholders to acknowledge bedbug infestation as a public health concern, thus paving the way for efforts to detect, prevent, and control bedbug

infestations using cost-effective, sustainable management/containment strategies. It highlights the need to develop tools for surveillance, monitoring, management, and control of bedbugs at health facilities by prioritizing the issue and implementing comprehensive and regular pest control strategies. Although the potential for transmission of infection via bedbug bites has not been fully established, the physical discomfort, pain, and secondary infections caused by the bites are additional stress for already sick patients. Future research should focus on patients' experiences and the mental health effects of bedbug infestation in healthcare and community settings.

Our study had some limitations. First, it assessed the knowledge of healthcare staff about bedbug infestation and did not explore the knowledge and experience of patients. Second, we did not investigate the reasons for the lack of evidence-based input into bedbug eradication efforts undertaken by the hospital wards.

Conclusion

The majority of the hospital wards in this study were infested with bedbugs, and staff knowledge of infestation and eradication practices were below standard.

Funding: None.

Competing interests: None declared.

Infestation de punaises de lit dans des hôpitaux de Lahore

Résumé

Contexte : Des infestations de punaises de lit ont été signalées dans le monde entier, mais peu de rapports font état de ce parasite important du point de vue de la santé publique au Pakistan. Il s'agit de la première étude sur l'infestation de punaises de lit dans un établissement de santé à Lahore, au Pakistan.

Objectifs : Étudier l'infestation de punaises de lit dans des hôpitaux du secteur public à

Lahore, au Pakistan.

Méthodes : La présente étude transversale a été menée dans 86 services de deux hôpitaux de soins tertiaires à Lahore en octobre et novembre 2019, en utilisant une technique d'échantillonnage non probabiliste. Les responsables des services ont été interrogés au moyen d'un questionnaire structuré auto-développé et les services ont été examinés à la recherche de punaises de lit ou de leurs marqueurs.

Résultats : Des signes d'infestation de punaises de lit ont été trouvés dans 72,1 % des services. Il n'y avait pas de différence significative dans le taux d'infestation entre les deux hôpitaux, mais l'incidence de l'infestation dans les services qui avaient mis en œuvre des mesures de lutte était considérablement plus faible (25,8 % contre 74,2 %). Aucune mesure de lutte appliquée dans 53,4 % des services échantillonnés.

Conclusion : L'infestation de punaises de lit était répandue dans les deux hôpitaux ayant fait l'objet de l'étude et les connaissances sur l'identification et l'éradication de ce parasite parmi les directeurs des services étaient insuffisantes. Les mesures de lutte, lorsqu'elles étaient appliquées, étaient de qualité insuffisante et ne reposaient sur aucune base factuelle.

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WHO EMRO | Bedbug infestation in Lahore hospitals

لاهور خلال شهري أكتوبر / تشرين الأول ونوفمبر / تشرين الثاني 2019 ، باستخدام أسلوب أخذ العينات غير الاحتمالية . وأُجريَت مقابلات مع مشرفي العنابر باستخدام استبيان مُنظَّم يملؤه المجيبون بأنفسهم، وفُحصت العنابر بحثًا عن بقِّ الفراش أو علاماته .

: وُجدت أدلة على وجود عدوى ببق الفراش في 72.1% من العنابر . ولم يكن ثمة اختلافالنتائ ج كبير في معدل الإصابة بالعدوى بين المستشفيين، ولكن كان ثمة انخفاض كبير في معدل الإصابة بالعدوى في العنابر التي نفذت تدابير المكافحة (25.8% مقابل 74.2%). ولم تُنفَّذ أي تدابير مكافحة في 53.4% من العنابر التي أُخذت عينات منها .

: كانت العدوى ببقِّ الفراش منتشرة في المستشفيين الخاضعين للدراسة، ولمالاستنتاجات يكن مشرفو العنابر يتحلون بالمعرفة الكافية فيما يتعلق بالكشف عن هذه الآفة والقضاء عليها . وكانت تدابير المكافحة، حيثما طُبقت، دون المستوى المطلوب وليست مسنَدة بالدلائل .

References

1. Lai O, Ho D, Glick S, Jagdeo J. Bed bugs and possible transmission of human pathogens: a systematic review. Arch Dermatol Res. 2016 Oct;308(8):531–8. https://doi.org/10.1007/s00403-016-1661-8 PMID:27295087

2. Munoz-Price LS, Safdar N, Beier JC, Doggett SL. Bed bugs in healthcare settings. Infect Control Hosp Epidemiol. 2012 Nov;33(11):1137–42. https://doi.org/10.1086/668029 PMID:23041813

3. Hwang SW, Svoboda TJ, De Jong IJ, Kabasele KJ, Gogosis E. Bed bug infestations in an urban environment. Emerg Infect Dis. 2005 Apr;11(4):533–8. https://doi.org/10.3201/eid1104.041126 PMID:15829190

4. Ling J, Persson Vinnersten T, Hesson JC, Bohlin J, Roligheten E, Holmes EC, et al. Identification of hepatitis C virus in the common bed bug–a potential, but uncommon route for HCV infection? Emerg Microbes Infect. 2020 Dec;9(1):1429–31. https://doi.org/10.1080/22221751.2020.1780950 PMID:32525459

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5. Monroe J. Atypical linear configuration of bedbug bites in an eight-year-old boy: a case report and overview of cimicosis. J Clin Aesthet Dermatol. 2020 Jun;13(6 Suppl):26–9. PMID:33282107

6. Aultman JM. Don’t let the bedbugs bite: the Cimicidae debacle and the denial of healthcare and social justice. Med Health Care Philos. 2013 Aug;16(3):417–27. https://doi.org/10.1007/s11019-012-9404-x PMID:22422134

7. Bed bug facts & statistics [website]. National Pest Management Association; 2018 (http://www.pestworld.org/all-things-bed-bugs/history-of-bed-bugs/bed-bug-facts-statistics/, accessed 11 January 2023).

8. Scarpino SV, Althouse BM. Uncovering the hidden cost of bed bugs. Proc Natl Acad Sci U S A.. 2019 Apr 9;116(15):7160–2. https://doi.org/10.1073/pnas.1902404116 PMID:30902893

9. Kuhn C, Vander Pan A. [The worldwide expansion of bed bugs also constitutes a problem in Germany]. Bundesgesundheitsblatt Gesundheitsforschung Gesundheitsschutz. 2014 May;57(5):524–30 (in German). https://doi.org/10.1007/s00103-013-1922-z PMID:24781909

10. Wang C, Singh N, Zha C, Cooper R. Bed bugs: Prevalence in low-income communities, resident’s reactions, and implementation of a low-cost inspection protocol. J Med Entomol. 2016;53(3):639-46. https://doi.org/10.1093/jme/tjw018 PMID:27049026

11. Haghi SFM, Behbodi M, Hajati H, Shafaroudi MM. Prevalence of bed bug (Cimex lectularius) in human settlement area of Bahnamir, Iran. Asian Pacific J Trop Dis. 2014 Sep;4(Suppl 2):S786–S9. https://doi.org/10.1016/S2222-1808(14)60727-1

12. Brooks BW, Gerding JA, Landeen E, Bradley E, Callahan T, Cushing S, et al. Environmental health practice challenges and research needs for US health departments. Environ Health Perspect. 2019 Dec;127(12):125001. https://doi.org/10.1289/EHP5161 PMID:31799881

13. Jupp P, McElligott, SE, Lecatsas G. The mechanical transmission of hepatitis B virus by the common bedbug (Cimex lectularius L.) in South Africa. S Afr Med J. 1983 Jan 15;63(3):77–81. PMID:6849170

14. Xie S, Hill AL, Rehmann CR, Levy MZ. Dynamics of bed bug infestations and control under disclosure policies. Proc Natl Acad Sci U S A.. 2019 Mar 26;116(13):6473–81. https://doi.org/10.1073/pnas.1814647116 PMID:30833386

15. Potts R, Molina I, Sheele J, Pietri J. Molecular detection of Rickettsia infection in field-collected bed bugs. New Microbes New Infect. 2020 Jan 7;34:100646. https://doi.org/10.1016/j.nmni.2019.100646 PMID:32025311

16. Williams J. Bed bugs in hospitals: more than just a nuisance. CMAJ. 2013 Aug 6;185(11):E524. https://doi.org/10.1503/cmaj.109-4491 PMID:23775615

17. Hill CA, Whitford F, MacDonald JF. Assessing and responding to public health entomology needs in Indiana. Am Entomologist. 2009;55(2):114–21.

18. Alizadeh I, Sharififard M, Jahanifard E, Rajaei F, Mousavian G, Mehraghaei M. Identification, knowledge, and awareness of people regarding public health nuisance insect (cimex lectularius) in Southwest of Iran. Jundishapur J Health Sci. 2018;10(3):e81133. https://doi.org/10.5812/jjhs.81133

19. Hemingway J, Field L, Vontas J. An overview of insecticide resistance. Science. 2002 Oct 4;298(5591):96–7. https://doi.org/10.1126/science.1078052 PMID:12364782

20. Hussain M, Khan MS, Wasim A, Sabih S, Saleem S, Mushtaq A. Inpatient satisfaction at tertiary care public hospitals of a metropolitan city of Pakistan. J Pak Med Assoc. 2014 Dec;64(12):1392–7. PMID:25842585

21. Hentley WT, Webster B, Evison SE, Siva-Jothy MT. Bed bug aggregation on dirty laundry: a mechanism for passive dispersal. Sci Rep. 2017 Sep 28;7(1):1–5. https://doi.org/10.1038/s41598-017-11850-5 PMID:28959030

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