

Two Scabies Outbreaks at a Tertiary Care Hospital in Portugal

Dois Surtos de Escabiose num Hospital Terciário em Portugal



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ABSTRACT

Introduction: Scabies outbreaks in healthcare institutions are an emerging problem. To determine the best management strategy is a topical matter. We analyzed two hospital scabies outbreaks and reviewed the management strategy of institutional scabies outbreaks.

Material and Methods: We performed an observational retrospective study of two independent scabies outbreaks that occurred in a Portuguese tertiary hospital in 2018. Following the identification of the index cases, scabies cases and exposed individuals, we calculated the attack rate in patients and professionals. We also evaluated the treatment and infection control measures, as well as the global cost of each outbreak.

Results: The hospital outbreaks of scabies occurred in two wards of Internal Medicine. Both had as index cases institutionalized patients with dermatosis at the time of admission. In the Ward 1, there have been identified 409 exposed individuals, 14 cases of scabies and the attack rate was 3.4%. In the Ward 2, there have been identified 254 exposed individuals, 17 cases and the attack rate was 6.7%. Topical treatment was prescribed to the cases and environmental measures were implemented.

Discussion: In our analysis, both outbreaks had as index cases institutionalized patients and had a significant impact, with hundreds of exposed individuals and considerable costs. The analysis of hospital scabies outbreaks is mostly retrospective and represents an opportunity to review its best management strategy.

Conclusion: Implementation of guidelines on tackling scabies outbreaks in institutional settings is urgent.

Keywords: Disease Outbreaks; Portugal; Scabies

RESUMO

Introdução: Os surtos de escabiose em instituições são um problema emergente. Determinar a melhor estratégia para o seu controlo é uma questão atual. Analisámos dois surtos hospitalares de escabiose e revimos a abordagem de surtos institucionais de escabiose.

Material e Métodos: Realizámos um estudo observacional retrospectivo de dois surtos independentes de escabiose que ocorreram num hospital terciário português em 2018. Após a identificação dos casos-índice, dos casos de escabiose e dos indivíduos expostos, calculámos a taxa de ataque em doentes e em profissionais de saúde. Avaliámos ainda o tratamento e medidas de controlo de infeção, bem como o custo global de cada surto.

Resultados: Os surtos de escabiose ocorreram em duas enfermarias de Medicina Interna. Ambos tiveram como caso-índice doentes institucionalizados e com dermatose no momento do internamento. Na enfermaria 1 foram identificados 409 indivíduos expostos, 14 casos de escabiose e a taxa de ataque foi 3,4%. Na enfermaria 2 foram identificados 254 indivíduos expostos, 17 casos e a taxa de ataque foi 6,7%. Foi realizado o tratamento tópico dos casos e foram implementados cuidados ambientais.

Discussão: Na nossa análise, ambos os surtos tiveram como caso-índice doentes previamente institucionalizados e tiveram um impacto significativo, com centenas de indivíduos expostos e custos consideráveis. A análise de surtos hospitalares de escabiose é fundamentalmente retrospectiva e representa uma oportunidade para rever a estratégia da sua abordagem.

Conclusão: É premente a implementação de linhas de orientação sobre a abordagem de surtos institucionais de escabiose.

Palavras-chave: Escabiose; Portugal; Surtos de Doença

INTRODUCTION

Scabies is a common parasitic infection caused by the *Sarcoptes scabiei* variant *hominis* mite. Both genders, all ages, ethnic groups and socioeconomic levels are affected. A global annual prevalence of 300 million cases is estimated.¹ An estimated prevalence of less than 1% has been found in Western Europe.² The diagnosis is clinical and is characterised by the triad of pruritic inflammatory papules that appear mainly in the interdigital folds, wrists, axillae, nipples and anogenital region in adults with a positive epidemiological context. However, atypical presentations may be found in elderly patients and immunocompromised adults.^{1,2} Microscopic examination of a skin scraping and

dermoscopy are recommended to confirm the clinical diagnosis.^{1,3}

In classical scabies, about five to 15 female mites inhabit the infected host; however, this number can reach hundreds or thousands of mites in crusted scabies, an extremely contagious form. The incubation period ranges from three to six weeks after primary infection and transmission can be direct (skin-to-skin contact) or indirect (contaminated clothing or objects). Since diagnosis is clinical, this is frequently delayed and patients are frequently misdiagnosed. For effective treatment, both topical and/or oral drugs and environmental prevention measures are crucial.¹

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Scabies outbreaks are an emerging problem in developed societies.⁴ However, these outbreaks are often underestimated and with a delayed diagnosis. The risk of outbreaks is particularly high in institutions such as hospitals, nursing homes, prisons and tourist accommodation sites. Extensive outbreaks can happen within this context, due to the characteristics of the parasite and the clinical course of the disease. Factors such as a long incubation period, nonspecific clinic, the absence of a biomarker, frequent reinfestation associated with a shorter incubation period and/or complications from topical treatments that simulate reinfestation are factors that favour outbreaks.

The approach to institutional outbreaks of scabies is not well defined and following the best approach is crucial to develop and to standardise institutional protocols. The emergence of institutional outbreaks over the last decade has led to a review of what is known about scabies and an awareness of the multiple unsolved questions about the best approach to these outbreaks. Some authors advocate mass prophylaxis of all those exposed²; others advocate a strategy based on mass information.⁵ This was a retrospective observational study of two independent scabies outbreaks that occurred in a Portuguese tertiary care hospital in 2018. As a secondary objective, a literature review has been proposed, in addition to an approach to institutional scabies outbreaks in Portugal.

MATERIAL AND METHODS

This was a retrospective observational study of two scabies outbreaks that occurred in April 2018 in two internal medicine wards (ward 1 and ward 2) at the *Centro Hospitalar Universitário São João* (CHUSJ), Porto.

Index cases (IC) were precisely identified, based on the review of clinical files and meetings with the medical and nursing teams of both wards. All the exposed staff and patients admitted to the same ward as the IC were identified by reviewing patients' clinical records, work schedules and professionals' clinical records.

The following parameters were assessed, including the outbreak duration, the number of exposed inpatients and staff, the number of cases of scabies, the recommended treatment and infection control measures and the approach to cohabitants.

Due to the incubation period of the aetiological agent,¹ a study time from six-week prior to the date when IC were diagnosed up to six weeks after the last diagnosed case, when the outbreaks were declared as recovered, has been considered.^{6,7}

An analysis of the overall cost of scabies outbreaks was carried out, including the treatment costs, employee absenteeism, medical consultations and contact precautions. A survey carried out in several community pharmacies within the Greater Porto region was used to analyse treatment costs of anti-scabies medications that are available in Portugal.

Finally, the ICs' institutions of residence / origin (one IC was institutionalised in a psychiatric hospital and one IC in

a nursing home) were visited.

Definitions

Inpatients or staff diagnosed with scabies in the context of the outbreak and with a diagnosis that was confirmed by a dermatologist (supported by scraping / dermoscopy, when necessary) were considered as scabies 'cases'.

Inpatients admitted to the same ward as ICs or staff working there during the outbreak were considered as 'Exposed' to scabies. The patients admitted to the same room as the ICs or staff having provided direct care to these patients were referred to as 'directly exposed'.

The 'attack rate' for staff and inpatients was obtained by dividing the number of cases of scabies by the total number of staff or patients exposed.

All healthcare professionals, including doctors, nurses, operational assistants and cleaning staff, who were epidemiologically involved in the outbreak were considered as 'staff'.

This study was approved by the Ethics Committee of the *Centro Hospitalar de São João/ Faculdade de Medicina da Universidade do Porto*. All procedures complied with the ethical principles and data confidentiality was ensured in the context of a retrospective analysis.

RESULTS

Two independent scabies outbreaks affecting two internal medicine wards of the CHUSJ (wards 1 – 116 beds and 2 – 100 beds), located on different floors of the hospital, with independent staffs, have occurred in April 2018.

The IC regarding the outbreak in ward 1 was a 32-year-old man who was admitted to hospital and stayed between April 2 and 23 due to a respiratory infection. This patient had a history of mental impairment and epilepsy (related to meningitis) and had been institutionalised in a psychiatric hospital for several years, where outbreaks of scabies were recorded in early 2018. At the time of admission to the ward, the patient presented with pruritic dermatosis and was only diagnosed with scabies about 15 days later (Fig. 1). A total of 409 individuals were exposed to the infection (243 inpatients and 166 staff members), 14 of whom were diagnosed with scabies. All cases occurred in staff, 13 of whom were nurses. An 8.4% overall attack rate has been found in staff (Table 1).

The IC regarding the outbreak in ward 2 was an 83-year-old woman who was admitted to hospital and stayed between April 19 and 24 due to a haemorrhagic stroke. This patient had a history of dementia and type-2 diabetes mellitus and was institutionalised in a nursing home. One month before admission to hospital she had been diagnosed with scabies at the CHUSJ Emergency Department. On admission to the ward, the dermatosis was identified and the patients was diagnosed with scabies upon 4 days of hospitalisation (Fig. 1). A group of 254 individuals were exposed (106 inpatients and 148 staff members), 17 of whom were diagnosed with scabies (two inpatients and 15 staff), 13 of whom were nurses. A 10.1% overall attack rate has been

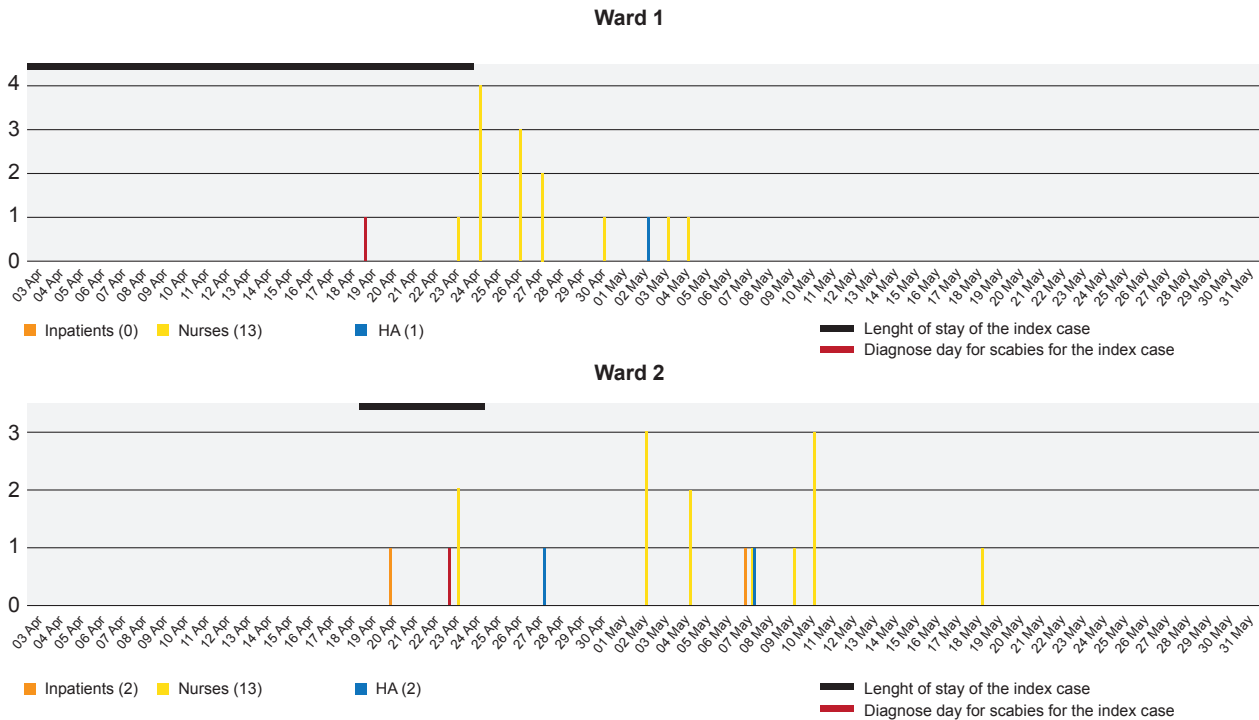


Figure 1 – Time evolution of the two scabies outbreaks that took place at the CHUSJ in 2018

HA: healthcare assistants

found in staff and 1.9% in inpatients (Table 1).

The index cases and the two inpatients diagnosed with scabies were treated with 8% topical sulphur for three consecutive days, with a repeated treatment the following week. None of these patients had new symptoms/signs of scabies after the treatment. The patients remained in contact isolation for at least 24 hours after the first application of the treatment. Immediate infection control measures included washing bed linen and clothing at a temperature of 60°C. In none of the outbreaks was there a need to close ward rooms or delayed clinical discharge.

The 29 staff members that were diagnosed with scabies were examined at the occupational health department and were treated with 6 to 10% topical sulphur (26 cases) or benzyl benzoate (three cases). The same treatment was also prescribed to all cohabitants. The professionals were informed about the environmental precautions to be adopt-

ed. A temporary absolute disability was declared to each of the professionals, with a period of 24 hours after the treatment was started.

The strategy of the outbreak approach team including dermatologists and occupational health physicians was based on the information given to professionals and patients of the wards involved. The treatment of scabies was recommended to cases and their cohabitants.

Employee absenteeism costs were assessed (€1,100), as well as the costs of the topical treatment of scabies cases with sulphur or benzyl benzoate (€1,100) and medical consultations (€350). The estimated overall costs of both outbreaks, considering those variables, reached a total of around €2,350 (Table 2).

When analysing the costs of scabies treatments available in Portugal, we found that oral ivermectin (compounded at community pharmacies) and topical benzyl benzoate

Table 1 – Characteristics of the two scabies outbreaks that took place at the CHUSJ in 2018

Outbreak	Individuals	Inpatients	Staff	Total
Ward 1	Exposed	243	166	409
	Directly exposed	8	38	46
	Cases	0	14	14
	Attack rate	0%	8.4%	3.4%
Ward 2	Exposed	106	148	254
	Directly exposed	7	26	33
	Cases	2	15	17
	Attack rate	1.9%	10.1%	6.7%

were the least expensive drugs (Table 3).

The characteristics of the most recently published scabies outbreaks are shown in Table 4.^{5,7-14}

The follow-up included a visit to the institutions of origin of the ICs, where it was found that there was a history of scabies in several institutionalised patients, with topical treatment (benzyl benzoate) carried out at different times, in addition to the presence of relevant constraints regarding the compliance with the environmental measures of avoidance and screening of cohabitants and visitors.

DISCUSSION

Both hospital outbreaks have had some characteristics that differentiate them from other outbreaks that were described. The duration of our outbreaks was much shorter than that of most published outbreaks, which may be explained by the increasing diagnostic suspicion and alarm of healthcare professionals following the diagnosis of the IC in ward 1, which allowed for an early identification of the outbreak in ward 2. On the other hand, ICs 1 and 2, despite having probably been affected by scabies for some months before admission, were not diagnosed with crusted scabies and therefore had a lower infective load. On the contrary, six of the nine published outbreaks corresponded to ICs diagnosed with crusted scabies.

This was an observational study showing higher attack rates for staff when compared to inpatients, which is in line with what has been described and is mainly explained by the rotation of staff among several inpatients within the same ward. Our approach to outbreaks was focused on providing information to patients and staff and treating scabies cases confirmed by a dermatologist, as well as prescribing

treatment to cohabitants. However, mass prophylaxis of all contacts is recommended by many authors.

The overall attack rates (3.4% and 6.7%) are also lower than most published outbreaks. In a review of 84 institutional outbreaks of scabies, 33 of which were hospital outbreaks,⁶ the outbreaks remained for three months and a 38% mean attack rate had been found; the ICs were diagnosed with crusted scabies in 83% of the cases.⁶ As described, the fact that ICs in our study had a lower infective load when compared to patients with crusted scabies may have contributed to their effective control even with no mass prophylaxis. In addition, both ICs were previously treated at the institutions of origin. Contact isolation measures and information to patients, staff and contacts were certainly essential. Even though a 2014 Cochrane review¹⁵ did not find that contact prophylaxis is an effective measure to prevent the spread of scabies, we believe that this measure was also central to the control of the outbreak. Topical sulphur was mostly used, mainly due to its efficacy and accumulated experience.³ However, the logistical limitations of topical treatments for scabies and the constraints regarding a synchronous treatment of all cases were recognised and could have been observed, both in the psychiatric institution as in the day-care home that we visited.

In any type of outbreak, the difficult diagnosis of ICs should be taken into account.^{16,17} These patients, in line with our ICs, have usually been diagnosed with dementia or cognitive impairment and with lower ability to express their own symptoms.¹⁷

None of the nine articles that were included in the review^{5,7-14} regarded the Portuguese reality, even though six of these regarded European countries. The analysis of

Table 2 – Costs

Variable	Staff	Inpatients	Costs
Employee absenteeism	26 x €40 (nurses) 3 x €20 (healthcare assistants)	-	€1,100
Compounded sulphur ointment	€18.13/100 g therefore, 18.13 x 2 x 26	€18.13/100 g therefore, 18.13 x 2 x 4	€1,087
Benzyl benzoate	€4.45/200 mL therefore, 4.45 x 3	-	€13
Medical consultations	€203	€147	€350
Total costs	€2,056	€292	€2,348

Table 3 – Estimated costs of topical and oral anti scabies medications in Portugal

	8% Topical sulphur	5% Topical permethrin	1% Topical ivermectin	Topical benzyl benzoate	Oral ivermectin
Drug partial cost (rounded up to two decimal places)	€25.02 (100 g)	€26.61 (100 g)	€80.92 (100 g)	€8.98 (200 mL)	€9.04 (14 mg – 200 µg/kg for a 70 kg patient)
Total treatment cost (rounded to the nearest unit)	€50.00	€53.00	€162.00	€18.00	€18.00

Table 4 – Characteristics of the hospital scabies outbreaks in adults within the past 10 years

First author and year of publication	Country, year and outbreak duration	Outbreak location	Number of exposed individuals and cases	Attack rate	Approach to the outbreak
Buehlmann M, 2009 ⁸	Switzerland, 2007 6 months	ICU of tertiary hospital and rehabilitation centre	n (total exposed) = 1,659 n (total cases) = 19	Inpatients: 0% - 3% Staff: 27% - 32%	Mass prophylaxis (lindane days 1 - 3 and 8 - 10; followed by 5% topical permethrin on days 1 and 8 or oral ivermectin 200 µg/kg, days 1 and 14) to all the staff and family contacts.
Khan A, 2012 ⁷	Canada, 2010 9 weeks	Two wards of a tertiary hospital	n (exposed inpatients) = 294 n (cases - inpatients) = 2 n (cases - staff) = 5	Total inpatients: 7% Directly exposed inpatients: 22%	Mass prophylaxis (5% topical permethrin) to all those who have had a direct contact with the patient. An outbreak control team has been set up.
Capobussi M, 2014 ⁵	Italy, 2012	Four wards of a tertiary hospital (2 outbreaks)	n (total cases) = 12	Inpatients: 4.3% Staff: 2.3%	Prophylaxis of contacts (permethrin or benzyl benzoate, with resistance) (43 contacts). Mass information.
Jungbauer FH, 2015 ⁹	Netherlands, 2015 More than 2 months	Three ICU of tertiary hospital	n (exposed inpatients) = 460 n (exposed staff) = 185 n (cases - staff) = 42	Staff: 23%	Mass information – media interviews; information to all the staff; staff members with symptoms were referred to occupational health; information was delivered to all general practitioners within the area of the hospital. An outbreak control team has been set up.
Chuang S, 2015 ¹⁰	Taiwan, 2007-2009 17 months	Respiratory ICU	n (total cases) = 35 n (cases - inpatients) = 30 n (cases - staff) = 5	Not described.	A system-oriented event analysis, instead of a root cause analysis (which has failed on the two previous outbreaks) has been used on the third outbreak.
Belvisi V, 2015 ¹¹	Italy, 2015 12 weeks	Eight wards of a tertiary hospital	n (total exposed) = 695 n (total cases) = 57 n (cases - inpatients) = 18 n (cases - staff) = 28	Total: 8.2% Staff: 17.7% Family: 11.3% Inpatients: 4.1%	Mass prophylaxis (5% topical permethrin for 12 hours) to all contacts.
Furuya K, 2016 ¹²	Japan, 2014 4 months	Diabetes / collagen diseases ward in tertiary hospital	n (total cases) = 181 n (exposed inpatients) = 144 n (cases - inpatients) = 6 n (exposed staff) = 37	Patients: 4.1%	Prophylaxis of contacts (oral ivermectin 200 µg/kg, one dose) (35 contacts). Treatment (oral ivermectin 200 µg/kg in two weeks (two doses) + topical phenothrin) to six patients.
Leistner R, 2017 ¹³	Germany	Hospital ICU	n (exposed staff) = 37 n (cases - staff) = 13	Staff: 11.85%	Treatment (5% topical permethrin) to all the staff.
Boyer PH, 2018 ¹⁴	France, 2015 9 weeks	Oncology and haematology department of a tertiary hospital	n (total exposed) = 486 n (total cases) = 35 n (cases - inpatients) = 17 n (exposed - staff) = 181 n (cases - staff) = 18	Staff: 9.9% Inpatients: 5.5%	Treatment (oral ivermectin 200 µg/kg, two doses) to all cases. Prophylaxis (oral ivermectin 200 µg/kg, one dose) to contacts. An outbreak control team has been set up.

outbreaks is mostly retrospective, with selection bias and not only hospital outbreaks were analysed, as the associated rehabilitation units were frequently involved. The definitions used for 'exposed' and 'cases' are heterogeneous, as the diagnostic criteria for scabies, making any comparison much more difficult. In addition, heterogeneous designs have been found: some studies were purely observational, while others involved some intervention or the application of questionnaires to exposed individuals. The costs of the published outbreaks were mainly related to employee absenteeism, medical consultations and treatment.

Regarding scabies treatment, a recent Cochrane review¹⁸ described that oral ivermectin would be the preferential therapy in case of large groups of patients or when there were constraints regarding the compliance with instructions for topical application of anti-scabies medications. In Portugal, due to the lack of marketing of oral ivermectin in humans and 5% topical permethrin, topical benzyl benzoate is mostly used; sulphur is also widely used as a compounded ointment formulation due to its efficacy and safety.⁴

The specific approach to scabies outbreaks has gained increasing importance in treatment guidelines. The European Academy of Dermatology and Venereology recommends a mass treatment of large populations affected by an endemic disease, with a single dose of oral ivermectin and recommends that all exposed individuals should be treated regardless of whether they have symptoms.³ In Germany,^{2,19} a country where scabies is not a notifiable disease (as in Portugal), a scabies outbreak is an indication for replacing the treatment with topical permethrin by oral ivermectin, mainly for logistical reasons. In other European countries, such as in Italy, scabies is a notifiable disease.^{4,5} In this case, a strategy based on mass information could be effective. The availability of anti-scabies medications is also variable in European countries, making it more difficult to apply foreign guidelines nationally. However, some facts are unanimous, such as the simultaneous treatment of exposed cohabitants or the premise that post-scabies itching is not an indication for retreatment.^{3,19-21}

Some publications are specifically focused on the treatment of scabies outbreaks. The approach to scabies outbreaks in English care homes has been reviewed by White LC *et al.*²² and most guidelines were found as not adequately assessing the logistical challenges associated with mass treatment.^{22,23} On the other hand, environmental measures are essential in outbreak control, especially in hospital settings.²⁴ It is worth mentioning that unlike care home settings,²⁵ psychiatric institutions,²⁶ nurseries²⁷ or family settings,²⁸ hospitals have a constantly changing patient population, making the approach to outbreaks much more challenging.

The assessment of scabies outbreaks in developing countries is also very relevant. In fact, scabies is considered as a neglected tropical skin disease, despite being a global health issue.^{29,30} Therefore, low-cost diagnostic equipment may be crucial in the approach to outbreaks in this context.³¹⁻³⁴ In addition, mass drug administration of oral iver-

mectin appears to be effective and is widely adopted.^{29,35} However, resistance to anti-scabies treatments may be induced and should be monitored.²⁹ In the United States of America, clinical trials are planned with oral moxidectin, with a longer half-life than ivermectin, which may prove to be an attractive option in large-scale prophylaxis.²⁹

This study had different limitations, including its retrospective design. The simplistic view of including only doctors, nurses, healthcare assistants and cleaning staff as exposed staff is also questionable. Considering the mode of transmission of scabies, other professionals such as laundry personnel, radiologists or other technicians who came into contact with patients and/or their clothes could have been exposed. In addition, those who visited inpatients, who could have also been involved in the transmission of scabies, were not considered. Finally, the use of emollients or topical steroids in patients treated with benzyl benzoate (usually associated with eczematization reactions)² was not included in the cost analysis. The cost of isolation precautions was also added, as well as the prescribed treatment for cohabitants, corresponding to non-negligible additional costs.³⁶ Finally, all the professionals who attended the dermatology and occupational health appointments and were not diagnosed with scabies (the appointment was related to the general alarm caused by the outbreaks) were not analysed. This fact, together with the treatment of those diagnosed with post-scabies pruritus have certainly contributed to the costs.

After the recognition of a scabies outbreak, a multidisciplinary team should be urgently set up, including dermatologists, infectious disease specialists, occupational health and public health specialists, as well as members of the nursing team and the board of directors. This is the first step towards an effective approach to the outbreak.² Mass prophylaxis of all those exposed should only be considered in the case of a large outbreak or when the IC has been diagnosed with crusted scabies. In this case, due to the abovementioned results, namely due to the costs and logistic conditions, oral ivermectin seems to be a better option than topical permethrin. If mass prophylaxis is not adopted, a strategy based on mass information, environmental measures to prevent exposure and treatment only restricted to confirmed or highly suspicious cases should be preferred.

There are still different issues to be clarified in further scabies guidelines, namely the role of the dermatologist in diagnosis and treatment, the best prophylaxis and its target audience, the very definition of scabies outbreaks, the follow-up period required to declare the end of the outbreak and the allocation of the responsibility for the financial costs of the outbreak.^{15,22} Finally, scabies outbreaks are likely to increase in the near future as a result of an ageing population and increasing population density in urban areas.³⁷ Therefore, coordinated actions to control scabies at a global level are crucial.³⁸ In the future, the review of scabies outbreaks, which such a relevant impact on patients and staff, should lead to specific guidelines to address the issue that can also be applied in other settings, such as nursing

homes or psychiatric institutions and preventing from the risk factors for treatment failure.³⁹

CONCLUSION

Two independent scabies outbreaks that recently occurred in a Portuguese tertiary hospital are reviewed. Both outbreaks had a significant impact, with hundreds of individuals exposed and significant costs. International guidelines are still vague as regards the approach to scabies outbreaks in hospital settings. Reviews of these outbreaks and their approach may possibly be used in psychiatric institutions, nursing homes and prisons, among others. Further studies may increase our knowledge on the best approach to an emerging and recurrent issue in hospital institutions. The development of guidelines on the approach to outbreaks of scabies in institutional settings is crucial.

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HUMAN AND ANIMAL PROTECTION

The authors declare that this project complied with the regulations that were established by the Ethics and Clinical Research Committee, according to the Helsinki Declaration of the World Medical Association – 2013 version.

DATA CONFIDENTIALITY

The authors declare that they have followed the protocols of their work centre on the publication of patient data.

CONFLICTS OF INTEREST

The authors declare that there were no conflicts of interest in writing this manuscript.

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