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Healthcare-seeking behaviour in reporting of scabies and skin infections in Ghana: A review of reported cases

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Background: Scabies is a neglected tropical disease. In resource-poor settings, scabies and other skin infections are often unreported to a health centre, or misdiagnosed. Dermatological expertise and training are often lacking. Little is known about patient healthcare-seeking behaviour. This study reviewed diagnosed skin infections reported to urban (Greater Accra) and rural (Oti region) study health centres in Ghana over six months in 2019.

Methods: Study staff received classroom and clinical dermatology training. Skin infection diagnoses and anonymised patient information were recorded. Descriptive statistics and spatial analysis described patient demographics, and distance travelled to clinic, noting bypassing of their nearest centre.

Results: Overall, 385 cases of skin infections were reported across the Greater Accra and Oti study clinics, with 45 scabies cases (11.6%). For scabies, 29 (64.4%) cases were in males. Scabies was the third most common diagnosis, behind bacterial dermatitis (102, 26.5%) and tinea (75, 19.5%). In the rural Oti region, 48.4% of patients bypassed their nearest clinic, travelling a mean 6.2 km further than they theoretically needed to. Females travelled further in comparison to males.

Conclusions: There must be greater public and professional awareness of scabies and skin infections as high-burden but treatable conditions, along with assessment of their community burden.

Keywords: dermatology, Ghana, neglected tropical diseases, NTDs, scabies, skin infections

Introduction

Scabies, defined by the World Health Organization (WHO) as a neglected tropical disease (NTD), is an intensely itchy skin condition due to the transmission (predominantly skin-to-skin) of the *Sarcoptes scabiei* mite, causing significant morbidity and loss of quality of life.[1] Female mites burrow into the skin and lay eggs, which creates an allergic reaction, often presenting as a severe itch in those infected.

In resource-poor settings, scabies is both stigmatising and hard to diagnose, and thus there is significant underreporting and misdiagnosis of cases.[1,2] There are an estimated 455 million cases globally each year, with 0.2% of global disability-adjusted life years associated with scabies (higher than most other NTDs such as African trypanosomiasis, dengue or schistosomiasis).[3]

Children are typically more likely to be infected than adults, and risk factors include overcrowding, population density, malnutrition, sharing of fomites (objects likely to transmit infection such as clothes, towels and sleeping mats), climate and rainfall.[1] Treatment is often a skin ointment, such as benzyl benzoate (the most commonly used medicine in Ghana due to it being relatively cheap to purchase) or permethrin (the main treatment in the UK). Oral ivermectin is also effective, but is typically too expensive for routine use in the lower-middle income country (LMIC) setting despite ivermectin donations from pharmaceutical companies for use in Mass Drug Administrations against other NTDs such as lymphatic filariasis or onchocerciasis. The top-level numbers associated with scabies are likely the 'tip of the iceberg' when it comes to its overall impact and the prevalence of secondary complications – for example, there are noted links with impetigo and emerging evidence of complications that may include cardiovascular and renal complications, rheumatic heart disease and sepsis.[2]

Scabies is hard to distinguish from other skin conditions, especially if it does not present in its classic form and if the main symptom presented is an itch. In 2018, the International Alliance for Control of Scabies (IACS) developed a 'Delphi consensus criteria' for reliable and consistent approaches to diagnosis of scabies in a resource-poor setting (using clinical judgement and not reliant

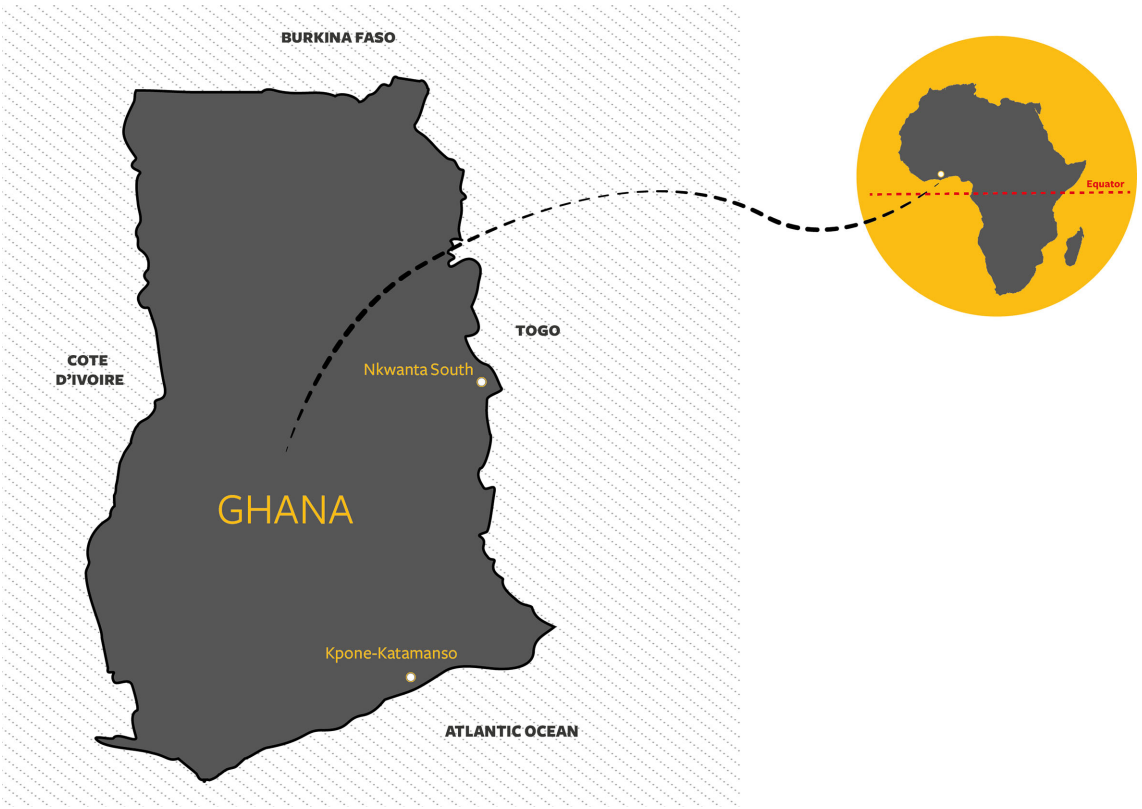

Figure 1. Study site locations. Nkwanta South in the Oti region of Ghana, and Kpone-Katamanso in Greater Accra.

on microscopy or any other diagnostic tool).[4] Outbreaks can be challenging to recognise and control, and infestations hard to clear up.[5]

This study prospectively identified cases of skin infections reported to selected urban and rural healthcare centres in Ghana, with the aim of ascertaining patient demographics and healthcare-seeking behaviour, specifically travel distance to clinic.

Materials and methods

The data collection took place between 1 June and 30 November 2019 (six months). Study clinics were based in Kpone-Katamanso, a peri-urban district in the Greater Accra region in Ghana, and in Nkwanta South, a predominantly rural district in the Oti region (formerly Volta region, Figure 1).

Study staff received a one-day classroom training session covering skin infections, conducted by three Dermatology Practitioners – two Dermatologists and a Physician Assistant specialising in dermatology. The trainees also participated in a one-day clinical training in the Accra-based Rabito Clinics (private-sector health facilities specialising in dermatology). There, they reviewed cases presenting that day, alongside the attending dermatologist, and this included a range of infectious skin conditions including scabies. The training included presentations on, and exercises about, the IACS Consensus Criteria and the WHO manual 'Recognizing neglected tropical diseases through changes on the skin—A training guide for front-line health workers'. See https://www.the-ciru.com/global-health-scabies for training materials and resources made available. Similar approaches were used in resource-constrained areas to train health workers to diagnose and manage skin diseases in Mali, West Africa.[6]

Further cascading of this training programme was carried out by study colleagues to healthcare workers in Nkwanta South. Those trained were nurses, community health officers and physician's assistants, all individuals who would assess patients and prescribe treatment. It was these healthcare workers who reviewed the patients and used clinical judgement to make the diagnosis. The study focused on patients who self-reported to the study clinic, with a suspected skin infection, as part of routine health service activity.

There were 12 clinics and one hospital involved in the study. The clinics provide primary healthcare services such as treatment of minor ailments, and refer complicated cases to a capable well-equipped hospital. The study health facilities, therefore, saw walk-in patients with different types of illnesses, including patients with all types of skin problems, but here only recorded those with suspected skin infections. There were no specialised skin clinics as part of the study. When a patient was diagnosed with a skin infection, this was recorded onto a separate form created specifically for this study (see Appendix). There was no microscopy available, so where scabies was diagnosed, this would be 'clinical scabies' or 'suspected scabies' (rather than 'confirmed scabies'), as per the Delphi Consensus Criteria. However, in the patients' healthcare records and on the study

Table 1. Overall summary of data collected on skin infections, and scabies, including breakdown by gender. IQR: Interquartile range

	Nkwanta (%)	Kpone Katamanso (%)	Total (n=385)
All skin infections	225	160	385
Scabies	37 (16.4)	8 (0.05)	45 (11.7)
Median age (IQR)	7 (3–25)	11 (2–24)	8 (2–24)
All skin infections			
Male	108 (48.0)	80 (50.0)	188 (48.8)
Female	117 (52.0)	80 (50.0)	197 (51.2)
0–10 years old	111 (49.3)	90 (56.3)	201 (52.2)
11–20 years old	50 (22.2)	24 (15.0)	74 (19.2)
21–30 years old	30 (13.3)	19 (11.9)	49 (12.7)
31–40 years old	9 (4)	10 (6.3)	19 (4.9)
41–50 years old	9 (4)	9 (5.6)	18 (4.7)
51–60 years old	2 (0.9)	3 (1.9)	5 (1.3)
>60 years old	14 (6.2)	4 (2.3)	18 (4.7)
Scabies			
Male	22 (59.5)	7 (87.5)	29 (64.4)
Female	15 (40.5)	1 (12.5)	16 (35.6)
0–10 years old	18 (48.6)	3 (37.5)	21 (46.7)
11–20 years old	12 (32.4)	1 (12.5)	13 (28.9)
21–30 years old	3 (8.1)	2 (25.0)	5 (11.1)
31–40 years old	0 (0.0)	2 (25.0)	2 (4.4)
41–50 years old	1 (2.7)	0 (0.0)	1 (2.2)
51–60 years old	0 (0.0)	0 (0.0)	0 (0.0)
>60 years old	3 (8.1)	0 (0.0)	3 (6.7)

Table 2. Summary information on distance to seek care and bypassing of nearby health facility. SD: standard deviation

	Male (%)	Female (%)	Total
Bypassed the nearest health facility	51 (46.8)	58 (53.2)	109 (48.4)
Did not bypass the nearest health facility	57 (49.1)	59 (50.9)	116 (51.6)
Theoretical travel distance in km	1.9 (SD: 2.5)	1.9 (SD: 1.2)	1.9 (SD: 1.9)
Distance travelled in km	7.5 (SD: 10.1)	8.6 (SD: 11.3)	8.1 (SD: 10.8)

form, the diagnosis did not distinguish between suspected and clinical scabies. Data collected included the diagnosis, patient's age, patient's locality/neighbourhood, the name of the health facility where they reported, and medical prescription. Names and residential addresses of patients were not provided on the study form, to ensure anonymity. Children were defined as individuals under 18 years old. There were several references to dermatitis on the study form, with feedback from the study team; this refers to a diagnosis of a bacterial dermatitis (of unknown microbiology) where antibiotics were prescribed.

Paper forms were locally scanned (in Nkwanta) or transferred onto local Excel spreadsheets (Kpone-Katamanso). Once a month, data were securely transferred between the Ghana Health Service and the University of Southampton. Data were transferred from the scans of the study form or the Excel spreadsheet into software Stata SE version 16.0 and R v3.6 in RStudio v1.2 for analysis using descriptive statistics.

Percentages were used to describe the characteristics of the patients. Also, association between categorical variables was assessed using chi-square test. The median and interquartile ranges were reported due to the distribution of patient ages. The mean and standard deviation of distance travelled to health facilities were reported for patient journeys. We analysed the count of cases by day and gender to investigate if there were any significant differences between males and females relative to the days they reported at a health facility. The analysis by day assessed the hypothesis that females might report more frequently at health facilities on market days (Monday and Tuesday) compared with the other days.

Two straight line distances were calculated: one was from the community of origin to the nearest health facility (theoretical distance), and the other was from the community of origin to the facility where treatment was sought. Where a patient did not seek care at the nearest health facility, they were classified as 'bypassed'. Spatial analysis was performed for only Nkwanta South, as there were no patterns of bypassing or longer travels in urban Kpone Katamanso.

Results

Overall, 385 cases of skin infections were reported across both the Greater Accra and Oti region health facilities, with 45 (11.7%) scabies cases diagnosed (Table 1). For all skin infections, there were 197 cases (51.2%) in females, and 188 cases (48.8%) in males. For scabies infections, 29 (64.4%) of cases were in males, and 12 cases (46.7%) were in children below 11 years old. By diagnosis, scabies was the third most common diagnosis, behind bacterial dermatitis (102 cases, 26.5%, including 11 diagnoses written as septic dermatitis) and tinea (81 cases, 21.04%, including diagnoses of ringworm). Other specific infections recorded included Varicella (chicken pox) and impetigo (see Appendix). There were no recorded cases of encrusted scabies.

Considering healthcare-seeking behaviour in Nkwanta South, patients typically bypassed their nearest health facility (48.4%), travelling further than they theoretically needed to (Table 2). For example, many cases in Nkwanta South were reported to Nkwanta District Hospital rather than to the local CHPS facility or health centre (Figure 2). Whereas theoretical travel to the nearest health facility was 1.9 km, the mean travel distance to seek treatment for skin infections was 8.1 km. There was no significant difference in bypassing behaviour between males and females (chi square=0.12, p=0.724), though females typically travelled further overall than males.

By day of case being reported, more males at Kpone Katamanso sought care on Wednesday and Thursday, whereas in Nkwanta South, males were slightly more frequently reporting cases across Monday to Wednesday. Specifically, in Nkwanta South, 53 females were diagnosed with a skin infection on Monday or Tuesday (market days) compared with 63 females

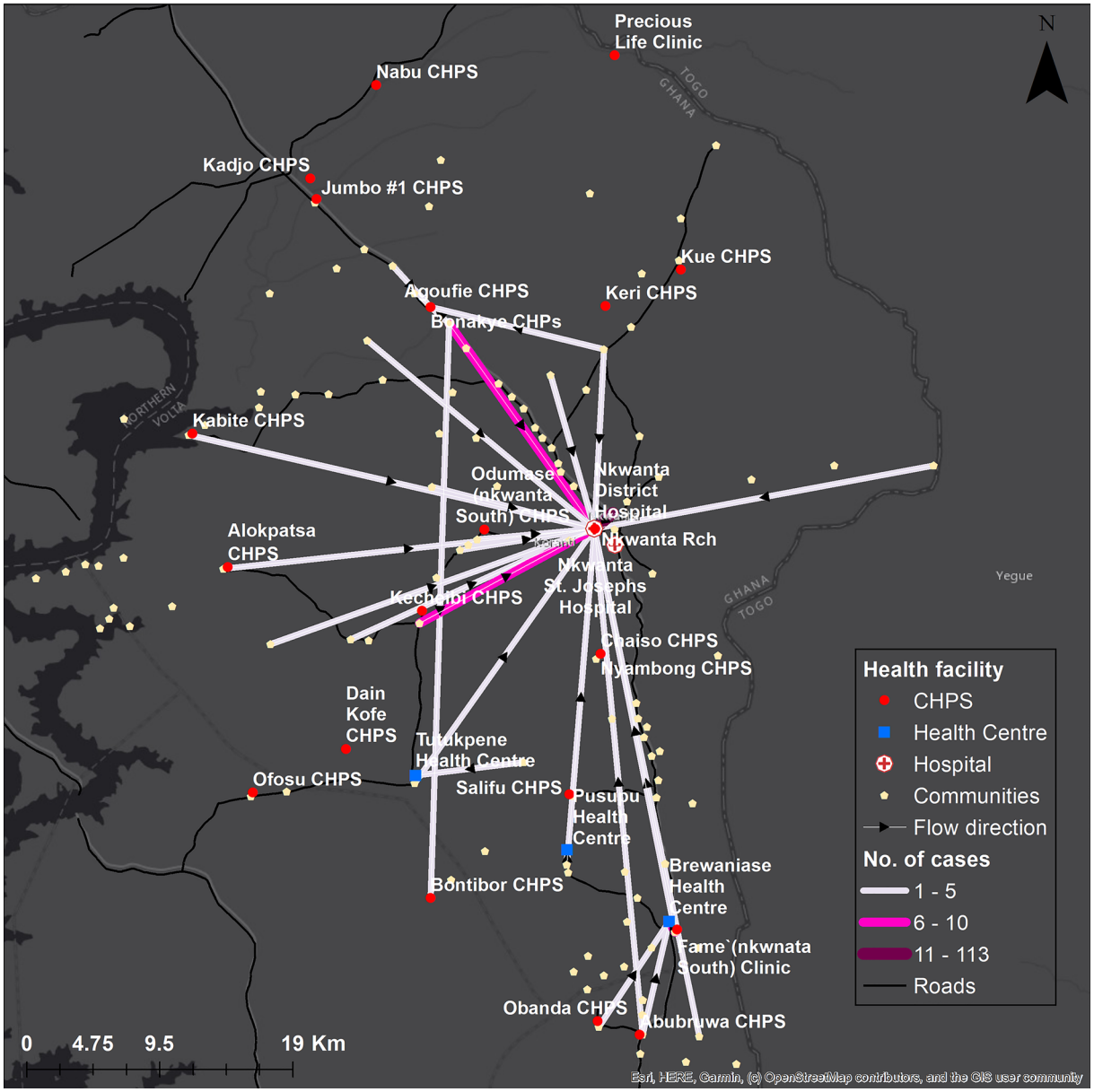

Figure 2. Movement of patients from residential locality to health facility, to seek care for skin infections. CHPS is the lowest tier of primary care facilities in Ghana.

reported on the other five days, though there was no statistical significance (p=0.25) (Figure 3).

Discussion

There were 385 skin infection cases recorded as part of this study, of which 45 were diagnosed as scabies. The most-recorded diagnosis was bacterial dermatitis, for which an antibiotic was prescribed. Around half of recorded skin infection cases showed bypassing of the nearest healthcare facility. By day, the clearest pattern was observed by women in Nkwanta South, most commonly visiting the health facility on Monday or Tuesday, though these differences were not statistically significant.

From the findings here, it appears that patients may travel from their locality to Nkwanta District Hospital on a market day, thus potentially combining a visit to the hospital with other business in the larger settlement of Nkwanta. Anecdotally, discussions between study colleagues and other members of the Nkwanta community suggest this to be a plausible hypothesis relating to healthcare-seeking behaviour. If a larger study confirmed statistically-significant links between presentation at a health centre and attending market day, this could have implications for resource management at the larger health centres and hospital sites. Access to healthcare can be a problem in sub-Saharan Africa, and patients may have to decide whether to travel for potentially many hours to attend a clinic.[7,8] Patients

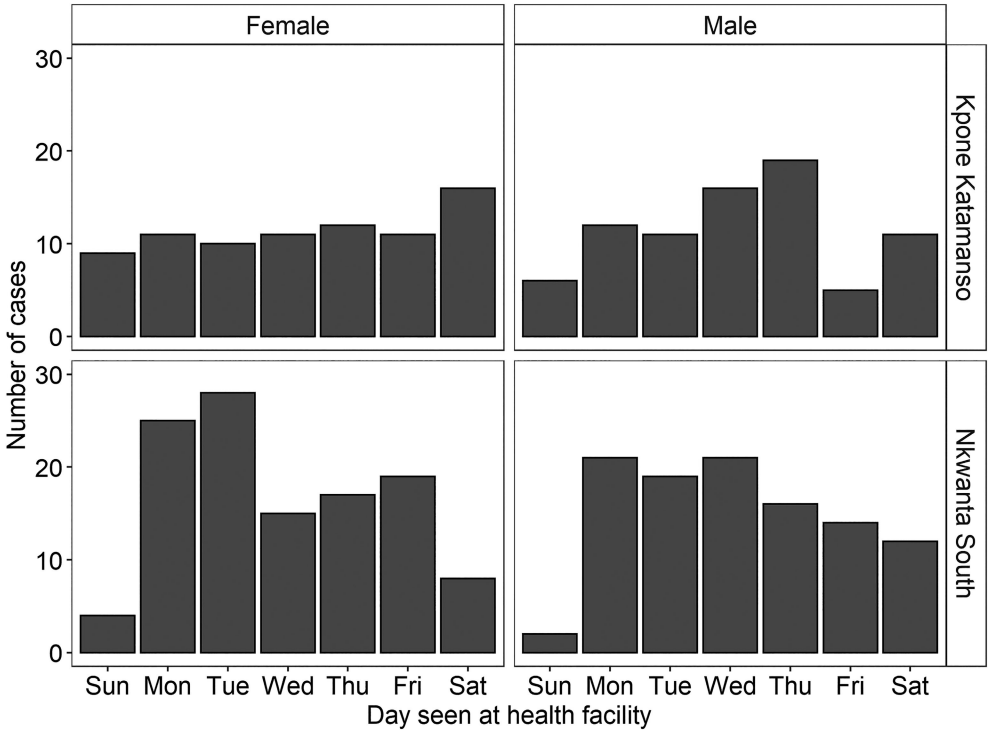

Figure 3. Days on which patients sought treatment compared by gender and location.

sometimes do not report their conditions where they are perceived to be stigmatised, along with considering the quality of the facilities available, confidence in accuracy of diagnosis and access to treatment.[9] Data produced privately from Kpone-Katamanso colleagues suggest that skin disease covers 0.04% of monthly attendances but is responsible for 1.25% of DALYs in Ghana (see Appendix). Further qualitative and quantitative research can identify care-seeking patterns and discern the reasons for them, alongside establishing the true burden of skin disease.

Public understanding of scabies is often limited. A massive outbreak of >6000 scabies cases occurred in the North-East region of Ghana in September 2019.[10] Undiagnosed (and reportedly some misdiagnosed cases) and untreated, media coverage reported how infested members of the community were temporarily banished from their homes, and local elders slaughtered a goat to appease the gods and remove any evil spirits. To quote from an article written at the time, 'we met face to face with the patients, mostly women and children, who looked tired with bloody open sores all over their bodies due to the excessive scratchings'.[10]

There has been anecdotal feedback from Ghana Community Health Officers (CHOs) that self-treatment of scabies and other skin infections includes the use of razor blades to remove the infected skin, followed by topical application of an unknown local (usually herbal) compound. There is known to be stigma associated with other skin NTDs, such as onchocerciasis, though there is evidence that stigma and misinformation can be reduced within community health programmes.[11] Findings from Guinea-Bissau showed that there was some public awareness of scabies, but also misperceptions including personal hygiene that includes washing or bathing as an effective measure for scabies prevention.[1,12] This misperception is also sometime raised in the scientific community,[13] which has the potential for negative impact upon generation of high-quality guidance.

There are several limitations to this study. There may have been uncertainty in the diagnosis of some skin infections, which are hard for non-specialists to diagnose. This uncertainty was mitigated to some extent by the provision of training, the accessibility of the training resources and the remote availability of dermatology expertise throughout the study. The study only considered reported cases, and there are thought to be large reservoirs globally of undiagnosed community cases. Additionally, the timeframe for data collection was just six months, and so seasonality could not be considered. Travel time and mechanised network distance are better measures of access compared with straight-line distance. However, studies in Ghana have found these three measures of distance to be highly correlated and have recommended the use of simpler straight-line distance measurement to save cost and time.[14,15] It is not known if the observed bypassing occurred during the patients' first visit to a health facility to report the skin infection (and therefore if previous reporting had taken place at their nearest compound or health centre).

Since the conclusion of this study, and based on the study group recommendations made during a meeting in Accra (December 2019), the Ghana Health Service has updated their mandatory 'NTD monthly reporting form' to include scabies. This provides aggregated data from each healthcare facility on numbers of scabies cases, stratified by age group and sex, and will give an insight into the reported burden of disease. The Ghana Health Service is preparing to more widely roll out Etracker, an

electronic patient information system that will work in addition to the District Health Information Management System (DHIMS2). Therefore, the GHS will be well placed to lead on longitudinal studies that incorporate qualitative research methods, to assess the patient journey and thus their healthcare-seeking behaviour, including each visit to a healthcare facility, case management and prescriptions of treatment.

Conclusions

There must be greater public and professional awareness of scabies and skin infections as high-burden but treatable infections, along with assessment of their community burden. As an NTD, scabies should be a notifiable disease in all countries (including high-income settings). The training materials developed as part of this study, plus resources being developed by IACS and others, can support community health workers in recognising and raising awareness of neglected skin diseases. Scabies training, case search and control in low-resource settings may benefit from leveraging resources from other skin NTD programmes. Dermatology should become a higher priority for health systems, with increased opportunities for healthcare workers to specialise and receive training, to ensure accurate reporting. There needs to be greater understanding of the socio-economic burden of scabies, including any associated stigma, self-treatment and local prescribing. Health services in LMICs can generate knowledge to better understand their own local needs, and present evidence-informed decision-making around scabies and infectious skin disease.

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Competing interests: None to declare.

Ethics: The study received ethical approval from the Ghana Health Service Ethics Review Committee (reference GHS-ERC002/03/19) and the University of Southampton ethics committee (reference 46472).

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Appendix I – Data collection form

Skin infection reporting form – research study

Age (in years) _____ **Sex (circle as appropriate)** – *Male* / *Female*

Locality - _____ Date of attendance: _____

Name of clinic: _____

The patient has been diagnosed with the following infectious skin disease (circle as appropriate)

Scabies Impetigo Leishmaniasis

Onchocerciasis Tinea Yaws

Other infectious skin disease (indicate here) - _____

Has treatment been prescribed by the healthcare worker, or advised to seek treatment elsewhere (e.g. a pharmacy)? Circle as appropriate

Prescribed Advised

What treatment was prescribed or advised? Circle as appropriate

Antibiotic Benzyl benzoate Herbal Ivermectin

Permethrin Monosulfiram Lindane Malathion

Other treatment (indicate here): _____

Any further relevant information: _____

This form was created as part of a research study funded by the University of Southampton, UK, and is a partnership between Southampton and the Ghana Health Service. See the study webpage *http://researchinvestments.org/scabies/*

Appendix II – Full table of skin infections recorded

Diagnosis	n	percent
Dermatitis	102	26.49
Tinea	81	21.04
Scabies	45	11.69
Impetigo	39	10.13
Varicella (chicken pox)	14	3.64
Fungal skin infection (unspecified)	13	3.38
Cutaneous larva migrans	12	3.12
Furunculosis	11	2.86
Skin infection	10	2.6
Bacterial skin infection	7	1.82
Other	35	9.09
Missing diagnosis	16	4.16

Appendix III – Skin disease in Ghana

From the Institute for Health Metrics and Evaluation, USA. Global Burden of Disease study. Direct link to the visualisation below http://ihmeuw.org/55xc Contributors to our study retrospectively looked up attendances at study clinics in Kpone-Katamanso, and identified that skin disease was responsible for 0.04 of all attendances across the 6 month study period.

The figure below shows skin disease ranks 20th in overall burden of disease for Ghana in 2017, responsible for 1.25% of DALYs in Ghana.