9-2011

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Keywords
HIV positive, teledermatology, skin disease, mobile teledermatology

Disciplines
Diseases | Immune System Diseases | Medicine and Health Sciences | Skin and Connective Tissue Diseases

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Introduction

There is a severe shortage of dermatologists in sub-Saharan Africa, with many areas having no dermatologists at all.[1] Furthermore, there is an increased prevalence of skin disease in HIV patients, with many conditions being unique to this population or more severe than in immunocompetent patients.[2] The presence of many of these conditions may affect HIV management.[3,4] Store-and-forward teledermatology offers a method for increasing access to skin specialists. Although many areas have limited computer connectivity, mobile phone networks are more accessible.[5,9] Mobile teledermatology uses mobile phones to perform store-and-forward teledermatology consultations. Studies evaluating patient acceptability of conventional store-and-forward teledermatology have been conducted in various study populations.[6,7,8] However, it is unknown whether patients, particularly those infected with HIV in resource-limited settings such as southern Africa, find the use of mobile phones acceptable for collecting their health information and would be willing to receive skin care through this method. It is possible that patients with a socially stigmatizing condition such as HIV have additional privacy concerns or that they may feel concerned about transmission of sensitive information by mass telecommunication technologies. While several studies have evaluated patient acceptance of store-and-forward teledermatology in industrialized countries, we were unable to find any studies on patient acceptance in resource poor settings among patients with HIV.[8,9,10,11] We have investigated whether the use of mobile teledermatology technology in a resource-limited setting in Botswana was culturally acceptable to HIV positive patients.

Survey

We conducted a cross-sectional survey of adult patients with HIV and mucocutaneous complaints in Botswana. Survey questions were developed by physicians in Botswana and the US, and were vetted by dermatologists with clinical experience in Botswana for face and content validity. The survey questions were tested with HIV positive outpatients at the dermatology clinic at the Princess Marina Hospital in Gaborone, Botswana. The study was

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approved by the appropriate ethics committees and the Botswana Ministry of Health. The study was conducted in consecutively recruited HIV positive patients in Botswana. The patients were at least 18 years old and presented with a skin or mucosal complaint that had not been previously evaluated by a dermatologist. The patients were recruited from the medical and oncology wards, the dermatology clinic, and the Infectious Disease Care Centre at the Princess Marina Hospital; from the Independence Surgery Center, a private primary care clinic in Gaborone; and from the outpatient clinics and medical wards at Athlone Hospital in Lobatse over a 5-week period from August 2009. Enrolled patients received both a face-to-face and mobile teledermatology evaluation and were afterwards asked to complete a questionnaire on their attitudes to mobile teledermatology at the end of the doctor-patient encounter. A Setswana-speaking nurse obtained consent, clarified any patient questions and administered the questionnaire in Setswana to patients unable to read English. Patients who were comfortable reading and writing in English completed the questionnaire on their own if they chose to do so. Enrolled patients received 30 pula (US $4.5) compensation to cover the cost of their travel.

We screened 89 patients, of whom 77 (87%) were recruited and 75 completed the survey (97% completion rate), see Table 1. Two patients agreed to participate but could not complete the survey due to nausea from chemotherapy. Most patients (71%) were 31–50 years old. Thirty four (44%) were males. Most patients were single (71%). A significant proportion of patients was unemployed (44%) or received their regular skin care outside Gaborone (39%). The majority of patients stated that time (76%), costs (57%) and distance (41%) were the major barriers in seeking medical care for their skin conditions (Table 2). Forty five percent of patients stated that it took 1–3 h to see a skin specialist, while 53% of patients stated that it took more than 3 h. If privacy was guaranteed, 99% of patients reported that they would be completely comfortable with a mobile teledermatology consultation, while only one patient stated that he or she would have to think about it, and none stated that they would be uncomfortable. When asked what their greatest concern was regarding mobile phone skin consultations, 82% of patients reported none, while 8% reported concerns over not having a face-to-face interaction with the physician and an equal number (n=6) reported concerns over an incomplete representation of their skin or poor photograph quality (Table 2). The majority of patients (91%) believed that they would receive the same treatment and quality of care via mobile teledermatology consultation as with a face-to-face interaction. Most patients were willing to wait 1–3 days (40%) or up to one week (27%) to receive a response from the mobile teledermatology consultation in exchange for the convenience of not having to travel to see a skin specialist. When asked which body sites patients were willing to accept having a mobile teledermatology consultation for, 58% of patients said that photography of the face was acceptable, 97% accepted photography of the chest, 92% accepted photography of the genitals, 96% accepted photographs of the legs and 95% accepted photography of the body as a whole. There was a significant difference between the acceptability of mobile consultation for lesions on the face versus all the other body sites (all P-values<0.01). There was no significant difference for any body site by age or sex (P=0.15–0.75). Most patients cited reduced cost of travel (85%) and reduced time away from home or work (65%) as the benefits that would make them prefer mobile teledermatology consultations over face-to-face consultations, while 13% of patients stated that they would not prefer mobile teledermatology consultations over face-to-face interaction with a dermatologist.

Our results provide insight into the demographics of the adult HIV positive population seen by the dermatology service in Gaborone and surrounding areas. A greater proportion of our patients (56%) were female, which reflects the national gender disparity in the prevalence of HIV. The median age of our cohort was 39 years, which is consistent with the age of peak prevalence of HIV nationally. Unlike national estimates however, most of our patients were

single (71%), whereas the national HIV prevalence is highest in those who are widowed (40%).[12] In the context of a severe shortage of dermatology providers in Botswana, our results emphasise the difficulties these patients often encounter in obtaining dermatology care, including distance, cost and time as barriers to care. Furthermore, patients viewed mobile teledermatology as an acceptable alternative to obtaining skin care from a face-to-face consultation with a dermatologist.

Our study had several limitations. The survey questions were not extensively validated. The questions were vetted by several dermatologists and other physicians and epidemiologists who all agreed on the importance of the inclusion of each question, which provides our instrument with some measure of content validity. The questions covered the dimensions recommended by Demiris *et al.* in their systematic review of patient acceptability studies in teledermatology.[8] Another limitation was the generalizability of our findings, since the results were obtained in HIV-positive adult patients in Botswana. However, it is reassuring to note that our cohort of patients was fairly representative of the general HIV-positive population in Botswana in terms of age and gender distributions. Finally, our patients were given compensation to help defray transportation costs, which may have led to response bias. However, such compensation is common in many studies.

Overall, mobile teledermatology consultations were well accepted by HIV-positive patients with mucocutaneous conditions in Botswana. Most patients said that mobile teledermatology consultations for all parts of their body would be acceptable. Patients were most sensitive about the transmission of facial lesions through mobile teledermatology. However, even patients who cited concerns about the transmission of identifiable facial photographs consented to mobile teledermatology evaluations of facial lesions, so long as care was taken to minimize the possibility of recognition.

Previous studies have assessed patient satisfaction with traditional store-and-forward teleconsultation in remote settings. [13] To our knowledge, this is the first study to address patient acceptance of mobile teledermatology in a population with a potentially stigmatizing underlying illness such as HIV. Given the rapid growth of mobile phone networks in developing countries, mobile teledermatology may be increasingly used to provide skin care in underserved communities. Our study demonstrates that HIV-positive patients find this technology acceptable for specialist consultations when face-to-face consultations may be difficult to obtain.

Acknowledgments

We gratefully acknowledge grants from the University of Pennsylvania Center for Public Health Initiatives to Drs Azfar and Kovarik, from the Penn Center for AIDS Research (CFAR), an NIH-funded program (P30 AI 045008) to Drs Azfar and Kovarik, and from the National Institute for Arthritis and Musculoskeletal and Skin Diseases (NIAMS) F32-AR056799 to Dr Azfar. We also thank Worship Muzangwa and Dr Zola Musimar at the Princess Marina Hospital, Dr Diana Dickinson at the Independence Surgery Centre, and colleagues at the Princess Marina Hospital and the Athlone Hospital, the Infectious Disease Care Centre, the Botswana-UPenn Partnership and the Ministry of Health of the Government of Botswana.

References

1. Schmid-Grendelmeier P, Doe P, Pakenham-Walsh N. Teledermatology in sub-Saharan Africa. Curr Probl Dermatol. 2003; 32:233–246. [PubMed: 12472018]
2. Spira R, Mignard M, Doutre MS, Morlat P, Dabis F. Prevalence of cutaneous disorders in a population of HIV-infected patients. Arch Dermatol. 1998; 134:1208–1212. [PubMed: 9801675]
3. Berger TG, Obuch ML, Goldschmidt RH. Dermatologic manifestations of HIV infection. Am Fam Physician. 1990; 41:1729–1742. [PubMed: 2190455]

4. Goh BK, Chan RK, Sen P, et al. Spectrum of skin disorders in human immunodeficiency virus-infected patients in Singapore and the relationship to CD4 lymphocyte counts. Int J Dermatol. 2007; 46:695–699. [PubMed: 17614796]

5. Chung P, Yu T, Scheinfeld N. Using cellphones for teledermatology, a preliminary study. Dermatol Online J. 2007; 13:2. [PubMed: 18328196]

6. Loane MA, Bloomer SE, Corbett R, et al. Patient satisfaction with realtime teledermatology in Northern Ireland. J Telemed Telecare. 1998; 4:36–40. [PubMed: 9640708]

7. Hicks LL, Boles KE, Hudson S, et al. Patient satisfaction with teledermatology services. J Telemed Telecare. 2003; 9:42–45. [PubMed: 12641892]

8. Demiris G, Speedie SM, Hicks LL. Assessment of patients' acceptance of and satisfaction with teledermatology. J Med Sys. 2004; 28:575–579.

9. Ebner C, Wurm EM, Binder B, et al. Mobile teledermatology: a feasibility study of 58 subjects using mobile phones. J Telemed Telecare. 2008; 14:2–7. [PubMed: 18318921]

10. Klaz I, Wohl Y, Nathansohn N, et al. Teledermatology: quality assessment by user satisfaction and clinical efficiency. Isr Med Assoc J. 2005; 7:487–490. [PubMed: 16106771]

11. Whited JD, Hall RP, Foy ME, et al. Patient and clinician satisfaction with a store-and-forward teledermatology consult system. Telemed J E Health. 2004; 10:422–431. [PubMed: 15689645]

12. (BAIS III). Botswana: Republic of Botswana Central Statistics Office, Gaborone; 2009. Stats Brief: Preliminary Results - Botswana AIDS Impact Survey.

13. Brandling-Bennett HA, Kedar I, Pallin DJ, Jacques G, Gumley GJ, Kvedar JC. Delivering health care in rural Cambodia via store-and-forward telemedicine: a pilot study. Telemed J E Health. 2005; 11:56–62. [PubMed: 15785221]

Table 1

Characteristics of the study population

	No (%)	95% CI (in %)
Patients screened	89	
Patients enrolled	77 (87)	
Patients completing the survey	75 (97)	
Male	34 (44)	31–53
Female	43 (56)	47–69
Median age (y)	39	IQR 32–45
Marital status		
Single	54 (71)	61–81
Married	17 (22)	13–32
Widowed	3 (4)	0–6
Divorced	2 (1)	0–8
Recruitment site		
Independence surgery	17 (22)	
PMH medical	21 (27)	
PMH oncology	23 (29)	
PMH dermatology clinic	14 (18)	
PMH Infectious Disease Care Centre	1 (1)	
Lobatse	2 (3)	
Site of regular skin care		
Gaborone	44 (57)	
Outside Gaborone	30 (39)	
None	3 (4)	
Employment status		
Employed	42 (56)	
Unemployed	33 (44)	
Retired	1 (1)	

Table 2

Barriers to dermatology care and attitudes towards mobile teledermatology

	No (%)	95% CI (in %)
What were the difficulties in seeking medical care for your skin condition?	43 (57)	46–69
Too costly	57 (76)	66–86
Takes too much time	3 (4)	0–9
Getting permission to leave home work	31 (41)	30–53
Too far	1 (1)	0–4
Shyness	7 (9)	3–16
Something else (including ”Doctor too booked”, “not enough Doctors”, “First time seeing Doctor”)		
How many hours of your day does it take to see a skin doctor (round-trip)?	2 (3)	0–8
<1	29 (45)	33–58
1–3 (includes:“long hours”, “many hours”	33 (53)	39–64
>3 (includes: “forever, “the whole day”)	13	-
Missing (includes: “never saw one”, "never had skin problems” “?”)		
What is your greatest concern regarding mobile teledermatology consultation?	6 (8)	2–15
Not having face-to-face interaction with doctor	2 (3)	0–7
Getting the wrong or worse treatment	6 (8)	2–15
Incomplete representation/bad picture	2 (3)	0–7
Privacy	60 (82)	73–91
None	4 (-)	
Missing		
Do you believe that you will receive the same treatment/quality of care via mobile teledermatology as face-to-face (FTF) consultation? Yes	67 (91)	84–97
How many days would you be willing to wait to get a response from the mobile teledermatology in exchange for the convenience of not having to travel far or wait for a FTF consultation?	5 (7) 14 (19)	1–13 10–28
Prefer FTF consultation	29 (40)	28–51
None - i.e. want the answer on the same day	20 (27)	17–38
1–3 days	3 (4)	0–9
1 week	2 (3)	0–7
More than one week, less than 1 month		
1 month or more		
Are the following sites acceptable for photography?*		
Face	43 (58)	47–70
Chest	70 (97)	93–100

	No (%)	95% CI (in %)
Genital	66 (92)	85–98
Legs	69 (96)	91–100
Body	69 (95)	88–100
Which benefits would make you prefer mobile teledermatology over FTF consultation?	61 (85)	76–93
Reduced cost of travel	47 (65)	53–76
Reduced time away from home or work	4 (6)	0–11
Better treatment or quality of care	9 (13)	5–21
Would not prefer mobile phone over face-to-face		

*Every patient who reported non-acceptance cited privacy as their concern.