Title: Consumer acceptance of patient-performed mobile teledermoscopy for the early detection of melanoma

Running Title: Consumer acceptance of patient-performed mobile teledermoscopy

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Conflicts of Interest

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Summary

What is already known on this topic

Cancer Councils recommend patients conduct regular skin self-examinations for melanoma early detection. Patient-initiated and performed mobile teledermoscopy may aid consumers in this process.

What does this study adds

Older adults at high risk of melanoma are highly accepting of mobile teledermoscopy. However, complete trust in the telediagnosis was a concern among some participants. Most participants found mobile teledermoscopy easy to conduct.

Abstract

Background: Mobile teledermoscopy allows consumers to send images of skin lesions to a teledermatologist for remote diagnosis. Currently, technology acceptance of mobile teledermoscopy by people at high risk of melanoma is unknown.

Objectives: We aimed to determine acceptance of mobile teledermoscopy by consumers based on: perceived usefulness; ease of use; compatibility; attitude, intention; subjective norms; facilitators, and trust before use. Satisfaction was explored after use.

Methods: Consumers 50-64 years at high risk of melanoma (fair skin, or previous skin cancer) were recruited from a population-based cohort study and via media announcements in Brisbane, Australia in 2013. Participants completed a 27-item questionnaire pre-teledermoscopy modified from a Technology Acceptance Model. The first 49 participants with a suitable Smartphone then conducted mobile teledermoscopy in their homes for early detection of melanoma and asked to rate their satisfaction.

Results: The pre-teledermoscopy questionnaire was completed by 228 participants. Most (87%) participants agreed mobile teledermoscopy would improve their skin self-examination performance and 91% agreed it would be in their best interest to use. However nearly half (45%) of participants were unsure, if they had complete trust in the telediagnosis. Participants who conducted mobile teledermoscopy (n=49) reported the dermatoscope was easy to use (94%), motivated them to examine their skin more often (86%), but 18% could not take photos in hard to see areas and 35% required help to submit the photo to the teledermatologist.

Conclusions: Mobile teledermoscopy consumer acceptance appears favourable. This new technology warrants further assessment for its utility in melanoma early detection or follow-up.

Key Words: teledermatology, telemedicine, mhealth, smartphones, home health monitoring

Introduction

Dermatologists diagnose skin conditions, including melanoma, with excellent accuracy based on a visual inspection.[1] Dermatology, therefore, is a medical speciality well suited to telemedicine. Teledermatology has been tested in the context of early detection, remote clinical diagnosis and patient triage for several dermatological conditions.[2-4] Benefits of telemedicine include increased access to care, reduced waiting time, reduced travel, potential cost savings, and efficient referral.[5] Concerns about teledermatology include lack of direct patient contact and insufficient follow-up.[6] Teledermatology can be performed via live video communication between doctor and patient or via 'store and forward' systems.[1] The latter allow electronic transmission of photographs of skin conditions to a dermatologist for diagnosis and management advice and is more easily organised due to time independence of the patient and doctor. One application of teledermatology used for melanoma diagnosis is mobile teledermoscopy. Mobile teledermoscopy uses a dermatoscope attachment for a smartphone, which allows lesion magnification under light and a specialised application (app) to simplify the workflow of sending images and clinical information.

As summarised in four reviews, store and forward teledermatology for skin cancer diagnosis has high diagnostic accuracy compared with face-to-face diagnosis.[7-10] In one study on store and forward teledermoscopy, 955 lesions (n=690) were diagnosed by two teledermatologists with an overall diagnostic accuracy rate of 94%.[11]

Previous studies have assessed satisfaction of teledermatology among general practitioners when used to obtain a second opinion from dermatologists.[12-14] Patient satisfaction with teledermatology has been summarised in four reviews. [6,8,10,15] Patient satisfaction with store and forward teledermatology varied widely, from 42-93%, [8] using a range of data collection instruments. Only one small pilot study[16] focused on consumer-driven mobile teledermoscopy for melanoma early detection, and participants found the dermatoscope easy to use.

The present study assessed the self-reported consumer technology acceptance of mobile teledermoscopy when used for melanoma early detection during skin self-examination (SSE). Technology acceptance refers to the consumers attitudes towards mobile teledermoscopy and

if they would or would not use it. Selected participants with a suitable smartphone trialed the dermatoscope at home and their satisfaction with mobile teledermoscopy was assessed both quantitatively and qualitatively.

Methods

The ethics committees of the Queensland University of Technology (QUT) and QIMR Berghofer Research Institute approved the study (QUT approval number 1200000553; QIMR approval number PI309). This research used data from the pre and post-teledermoscopy surveys.

Pre-teledermoscopy survey

Potential participants between 50-64 years were recruited through the QSkin Sun and Health Study (QSkin),[17] a cohort study conducted in Queensland, Australia to investigate skin cancer risk factors. QSkin enrolled 43,794 participants. Investigators selected a random sample of 500 QSkin participants to be invited to the current study that lived within the Brisbane area and met at least one criterion for high risk of melanoma. These included fair skin, light eye colour, numerous dysplastic naevi or history of skin cancer. Potential participants were mailed an expression of interest letter to complete the pre-teledermoscopy survey. Of those, 261 participants and 59 volunteers (who joined the study after a media announcement, and also met the inclusion criteria) received a consent form and survey (total n=320). Overall, 230/320 participants (72%) completed the pre-teledermoscopy survey and returned it by mail.

Outcome measure pre-teledermoscopy

Orruno et al.[13] tested a modified version of the Technology Acceptance Model. Using the model, they developed a 33-item multidimensional questionnaire to assess general practitioners' teledermatology acceptance. We adapted this questionnaire for consumer-driven mobile teledermoscopy and excluded eight items relating to physician practices, and added two items assessing trust. Five experts in melanoma research evaluated and approved of the instrument face validity.. Cronbach's alpha for each of the seven domains was acceptably high (above recommended 0.70), except for the facilitators (0.68) and compatibility (0.48) domains, likely due to small number of items in these domains (3 and 4,

respectively). Higher Cronbach alpha scores indicate that the items in a questionnaire measure the same construct.

Response options for the resulting 27-item survey ranged from 5 (strongly agree) to 1 (strongly disagree), which were collapsed into three categories for reporting: 3=agree (agree/ strongly agree), 2=neutral and 1=disagree (disagree/ strongly disagree). Questions were summarised in seven domains: perceived usefulness (5 items); perceived ease of use (4 items); attitude and intention (6 items); compatibility (4 items); facilitators (3 items); subjective norms (3 items), and trust (2 items).

Post- teledermoscopy survey

We assessed diagnostic accuracy of teledermoscopy and satisfaction with patient-performed mobile teledermoscopy. Diagnostic accuracy and clinical results were previously reported.[18] Briefly, among all participants who completed the pre-teledermoscopy survey (n=230), the first 58 participants who expressed interest and had access to an iPhone were enrolled and mailed the dermatoscope (FotoFinder Systems GmbH, Bad Birnbach, Germany) (Fig. 1). They conducted one SSE using mobile teledermoscopy in their homes for melanoma early detection. The dermatoscope has both polarised and non-polarised capabilities, participants were asked to use the non-polarised option. Data is available for 49 participants. The 49 participants performed mobile teledermoscopy following written instructions, including instructions on how to download the Handyscope app, how to use the dermatoscope to obtain and send dermoscopic images, and how to take a second clinical image to verify the anatomical location of the lesion. Participants were provided with the Asymmetry and Colour (AC) Rule for identifying melanoma[19] and asked to photograph spots they 'did not like the look of'. Participants submitted their dermoscopic and anatomical images to the study researchers from their iPhone via the handyscope app. Photos were reviewed by the study dermatologist and dermatology registrar. Participants were asked to return the dermatoscope and questionnaire via pre-paid mail. Figure 2 displays participant recruitment and flow through the study.

Participants whose differential telediagnosis included skin cancer were provided with their results via phone by the study dermatology registrar under supervision of the same dermatologist who undertook the telediagnosis. Participants were referred to their regular

general practitioner or dermatologist if excision was recommended. When the lesions were telediagnosed as likely benign, participants were provided with their results at the follow-up in-person consultation by the dermatologist within three months of telediagnosis. The follow-up consultation was conducted to assess the diagnostic accuracy of the telediagnosis compared to in-person clinical skin examination and results have been previously reported.[18] Participants were provided with a gift voucher (AUD$100) for reimbursement of their time, cost of the app, and travel. The clinical outcomes were reported previously.[12] The 49 participants who conducted mobile teledermoscopy submitted 309 lesions to the teledermatologist (median 5 photos per person, range 0-21). Of the 309 lesions, all but two dermoscopic images which were of poor quality, allowed telediagnosis. Participants demonstrated an 89% diagnostic agreement between tele-and clinical diagnosis for consumer-submitted photos of lesions overall, but lesion-based sensitivity (41%) was low owing to some lesions being missed by patients that the dermatologist considered worthwhile photographing.[18] Figure 3 displays a dermoscopic image captured by a participant.

Outcome measures post-teledermoscopy survey

The post-teledermoscopy survey was completed by the 49 participants after using the dermatoscope at home, and assessed their satisfaction with mobile teledermoscopy. The questions were adapted from a previous study.[16,20] Forced choice survey questions asked participants to rate their confidence conducting SSE alone, or with mobile teledermoscopy, any difficulties experienced, if they required help taking photos and if they would use mobile teledermoscopy in the future. Participants were asked one open-ended question about their opinions on conducting mobile teledermoscopy at home.

Data analysis

Descriptive statistics were computed for demographic variables and mobile teledermoscopy acceptance and satisfaction questions. Fisher's exact tests were used to measure associations between participants' skin cancer history and mole count with teledermoscopy acceptance. Internal consistency of the domains was calculated using Cronbach's alpha.

Results

Participant characteristics are described in Table 1. We excluded one participant with extensive missing data and one participant who was outside the age limit, leaving 228 evaluable participants. Both genders were equally represented (51% female). Most participants were between 50 – 54 years (47%), and had sun-sensitive phenotypic characteristics (blue/grey eye colour 48%, fair complexion 85%). Half of participants had had a skin cancer removed previously, only one had used mobile teledermoscopy previously. Ninety-two per cent of participants who completed the follow-up survey had an iPhone 4 or 5.

Pre-teledermoscopy

Overall, 13 out of 27 (48%) items were rated as 'strongly agree' or 'agree' by 75% or more of the participants (Table 2). Participants on average agreed (median= 3) with all items in the domains perceived ease of use, facilitators, subjective norm, attitude/intention and perceived usefulness. Participants reported neutral viewpoints (median =2) when asked whether they would have 'complete trust' in the teledermatologists telediagnosis, and were unsure if mobile teledermoscopy 'would fit in with their current habits'. Participants who had a previous skin cancer removed compared to participants without prior skin cancer were more likely to agree with the items: 'Mobile teledermoscopy will help to diagnoses skin cancer quicker' (80% compared to 69%, p=0.01); 'Diagnosis of a suspicious mole or spot made through mobile teledermoscopy would be clear and easily understandable' (54% compared to 47%, p=0.04), and 'My doctor will welcome the fact that I use mobile teledermoscopy'(61% compared to 51%, p=0.04) (Table 2). There was no difference in teledermoscopy acceptance for participants who had one or more moles on their upper arm, versus those who did not any have moles (data not shown).

Post-teledermoscopy

Most participants who conducted mobile teledermoscopy (42/49; 86%) agreed mobile teledermoscopy motivated them to conduct SSE regularly and the dermatoscope was easy to use (46/49; 94%). On average, participants were confident taking photos with the dermatoscope (median=8, scale 1 not at all confident to 10 highly confident, range 4-10). Most participants (38/49; 78%) wished to use mobile teledermoscopy again in the future.

Sixty-five per cent of participants (32/49) experienced no difficulties when conducting mobile teledermoscopy. Barriers reported by participants included: 9/49 (18%) could not take a photo in a 'hard to see' body location; and 7/49 (14%) had difficulty submitting the photo to the teledermatologist. Difficulties included not being able to connect to an internet account on their iPhone, sequencing or labelling of images or personalising the app. Thirty-five per cent of participants (17/49) required help from their partner, child, friend or study personnel when submitting photos on their iPhone. Most participants (36/49, 74%) had someone assist with taking photos including their partner, child or sibling. The majority of participants (37/49, 75%) did not experience any worry or distress waiting for their results, however, 6/49 participants felt anxious conducting mobile teledermoscopy. One participant had difficulty understanding the study instructions provided and two participants were unable to take clear photos. Forty-one participants (84%) found the AC rule to be a good tool for finding moles to photograph, while six were unsure, and two disagreed (Table 3).

Open ended responses

Seventeen participants responded to the open-ended question. Participants provided positive feedback: *"Fascinating to see the skin close up. Every home should have one [dermatoscope]!"; "A very worthwhile study. Would be handy to monitor changes yourself with a dermatoscope."* The dermatoscope was a prompt for action. *"Having an opportunity to use the dermatoscope reminded me of the importance of self-examination…, as I had not been for my regular skin check-up with my dermatologist for two years in spite of my brother diagnosed with a melanoma."*

Participants noted concerns in particular about trust in the telediagnosis compared to in-person consultations and the need for training. "*It was an initial good tool, however, I am not a specialist and so I will not feel happy until you provide me with a full skin exam, then I'll know if my skills are ok*"; "*Generally I feel that I would prefer to have a professional examine me for melanoma, but I can appreciate the value of the dermatoscope if I lived in a rural or remote region*." Others commented: "*The concept of self-diagnosis is excellent, given the immediacy of the possible response, but it is dependent on the competence of the individual"; and* a participant noted the difficulty of imaging numerous dysplastic naevi clustered together, *"I have so many moles on my back it was hard to label which was which for this study."*

Discussion

We found that a high proportion of participants (78%) would use mobile teledermoscopy again in the future after experiencing it in this study. Mobile teledermoscopy was well-received and reported to be an easy process to conduct, that reinforced the importance of SSE for melanoma early detection. In the pre-teledermoscopy questionnaire almost all participants agreed with the items in the domains perceived ease of use, perceived usefulness, intention and attitude, facilitators, and subjective norm, while trust and compatibility received some neutral ratings.

This study is unique in that it i) uses mobile teledermoscopy, which involves a more intricate image acquisition process than teledermatology, allowing higher image quality, and ii) focuses on self-completed SSE in the home environment. In contrast most previous research assessed satisfaction with store and forward teledermatology conducted in health professional settings,[21-25] whereby nurses or general practitioners take the images. Preference for mobile teledermoscopy in this format varies. For example, in one study on store and forward teledermatology, participants did not express a clear preference for a consult method, 42% of participants agreed they would rather use teledermatology, 22% were unsure, and 37% preferred in-person consultations.[21] Collins et al. found no difference in satisfaction between in-person or mobile teledermoscopy consultation, with both groups pleased with the service.[24]

Only one small study previously assessed the feasibility of mobile teledermoscopy during a home SSE. [16] Similar to the findings here, the ten participants learned to use the technology with ease, but the study was limited by its very small sample size. Wu et al. assessed patient-performed mobile teledermoscopy for monitoring of skin lesions identified by a doctor during an in-person consultation.[26] The doctor completed the imaging process at the initial consultation and three to four months later the patient completed the imaging process for the same lesion in the office-setting. Most participants did not report any barriers to use, except the patient's desire to see a dermatologist in-person.[26] Trust in the telediagnosis is a potential barrier to use as expressed by some participants in the current study who would prefer an in-person consultation. The qualitative comments indicate that training and reassurance that they

self-selected the correct lesions could improve trust in subsequent rounds. Most participants were satisfied with the AC rule in this research. However in the qualitative comments some participants raised concerns about their own ability to find the most relevant skin lesions. No randomised clinical trial has been performed to demonstrate that using the AC rule or the more common ABCDE rule during mobile teledermoscopy improves the accuracy of laypersons to self-detect melanoma.[27]

Other barriers reported by participants in this study included: difficulty taking photos in hard to see locations; and experiencing anxiety in the period of waiting for a telediagnosis. Mobile teledermoscopy may not be practical for whole body skin examinations for persons without access to help. The benefits of having well-trained partners assist in conducting skin checks in hard-to-see locations have been previously reported.[28,29] Participants' anxiety levels may have increased owing to a longer delay in receiving results than we found in previous studies. The waiting time in this study was due to only having one dermatologist reviewing the photos. Previous research found participants would prefer to receive their results after conducting mobile teledermoscopy "up to 1 day" later.[30] To reduce any anxiety when conducting mobile teledermoscopy, provision of results would need to be streamlined to provide a prompt service.

The present study included an older age demographic, and a barrier among a minority of participants was downloading and personalising the app. Younger patients may have fewer technological issues, and may be more inclined to trust a mobile diagnosis, given their greater likelihood to also conduct other aspects of their life online. In this research most participants indicated they would use mobile teledermoscopy if it saved them money. Many people own a Smartphone and therefore they already have available part of the equipment needed to conduct mobile teledermoscopy.[31] Cost and technical support were found to contribute to user acceptance of telemedicine in a qualitative European study about user-end adoption of home telemedicine among adults 55-75 years of age. [32] The cost of the most recent mobile dermatoscopes for smartphones ranges widely from about US$50 to US$600, but less costly innovative solutions may come forward in the future.

We are cautious of generalising our findings to other settings, as we studied a relatively homogenous sample of patients at high-risk for melanoma. However, implementation of this technology would likely focus on high-risk groups once it is rolled out, and so our restriction

to high-risk patients was not unreasonable. Arguably, rural populations have the most to gain from telemedicine services, and although this research was completed in an urban population, participants nonetheless reported high acceptance presumably as they can also benefit from time-savings, and appreciated the potential for rapid diagnosis. The items in the compatibility domain had a low Cronbach alpha. The items may not fully discriminate compatibility because it is difficult to measure a new technology especially if individuals have not used mobile teledermoscopy to know how compatible it is. Therefore their scores might be inconsistent and contribute to a low Cronbach alpha. These domains would require further development and items to be added in future questionnaire use.

Despite high levels of acceptance and enthusiasm in this sample at high risk of melanoma, many practical aspects still need to be resolved before mobile teledermoscopy is ready for widespread consumer use. Further diagnostic studies to optimise acceptability and confidence of use are required to build consumer trust in the telediagnosis.

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Table 1 Participant Characteristics

Characteristic	Pre-teledermoscopy survey n (%)	Post-teledermoscopy n (%)
Total	n=228	n=49
Gender		
Male	111 (48.7)	24 (49.0)
Female	117 (51.3)	25 (51.0)
Age		
50-54	108 (47.4)	19 (38.8)
55-59	78 (34.2)	16 (32.7)
60-64	42 (18.4)	14 (28.6)
*Educational attainment**		
Primary school or leaving certificate	23 (10.1)	4 (8.2)
High School or trade	44 (19.3)	8 (16.3)
University degree/ diploma	157 (68.9)	36 (73.5)
Work		
Full-time (including self-employed)	134 (58.8)	38 (77.6)
Part-time	33 (14.5)	3 (6.1)
Other/did not specify	61 (26.7)	8 (16.3)
*Marital status**		
Living with partner	185 (81.1)	41 (83.7)
Living without partner	42 (18.4)	8 (16.3)
Previous skin cancer excised		
Yes	114 (50.0)	24 (49.0)
No or unsure	114 (50.0)	25 (51.0)
Skin type		
Fair	193 (84.6)	44 (89.8)
Medium	32 (14.0)	4 (8.2)
Dark	3 (1.3)	1 (2.0)
Moles larger than 2mm on upper arm		
0 moles	97 (42.5)	18 (36.7)
1-10 moles	108 (47.4)	24 (49.0)
11+ moles	23 (10.1)	7 (14.3)
*Eye colour**		
Blue/Grey	110 (48.2)	19 (38.8)
Green	29 (12.7)	6 (12.2)
Hazel/ Brown	85 (37.3)	24 (49.0)
Other (more than 1 colour)	3 (1.3)	-

**4 missing education, 1 missing marital status, 1 missing eye colour in pre-teledermoscopy survey;*
**1 missing education in post-teledermoscopy survey.*

Table 2 Pre-teledermoscopy survey

Items	n (%) n=228	Skin cancer excised n (%) n=114	No personal skin cancer history n=114	P-value	Cronbach alpha
Perceived Usefulness					0.83
MTD will help me to examine my skin more rapidly †				0.64	
Agree	174 (76.3)	94 (82.5)	97 (85.1)		
Unsure	44 (19.3)	15 (13.2)	15 (13.2)		
Disagree	9 (3.9)	5 (4.4)	2 (1.8)		
MTD will improve my skin self-examination performance				0.99	
Agree	198 (86.8)	99 (86.8)	99 (86.8)		
Unsure	24 (10.5)	12 (10.5)	12 (10.5)		
Disagree	6 (2.6)	3 (2.6)	3 (2.6)		
The use of MTD will improve the diagnosis of spots and moles on my skin that look suspicious				0.09	
Agree	194 (85.1)	93 (81.6)	101 (88.6)		
Unsure	30 (13.2)	17 (14.9)	13 (11.4)		
Disagree	4 (1.8)	4 (3.5)	-		
MTD will help me save time				0.91	
Agree	134 (58.8)	68 (59.6)	66 (57.9)		
Unsure	79 (34.6)	38 (33.3)	41 (36.0)		
Disagree	15 (6.6)	8 (7.0)	7 (6.1)		
MTD will help to diagnose skin cancer quicker				0.01	
Agree	170 (74.6)	91 (79.8)	79 (69.3)		
Unsure	55 (24.1)	20 (17.5)	35 (30.7)		
Disagree	3 (1.3)	3 (2.6)	-		
Perceived Ease of Use					0.80
It will be easy to perform MTD				0.63	
Agree	149 (65.4)	75 (65.8)	74 (64.9)		
Unsure	77 (33.8)	39 (24.2)	38 (33.3)		
Disagree	2 (0.9)	-	2 (1.8)		
I will easily learn how to use MTD				0.77	
Agree	197 (86.4)	100 (87.7)	97 (85.1)		
Unsure	28 (12.3)	13 (11.4)	15 (13.2)		
Disagree	3 (1.3)	1 (0.9)	2 (1.8)		
Diagnosis of a suspicious mole or spot made through MTD would be clear and easily understandable				0.04	
Agree	115 (50.4)	61 (53.5)	54 (47.4)		
Unsure	107 (46.9)	53 (46.5)	54 (47.4)		
Disagree	6 (2.6)	-	6 (5.3)		
I will find it easy to acquire the necessary skills to use MTD				0.81	
Agree	194 (85.1)	96 (84.2)	98 (86.0)		
Unsure	29 (12.7)	16 (14.0)	13 (11.4)		
Disagree	5 (2.2)	2 (1.8)	3 (2.6)		
Compatibility					0.48
MTD will help me to examine my skin more thoroughly				0.99	
Agree	203 (89.0)	101 (88.6)	102 (89.5)		

Unsure	20 (8.8)	10 (8.8)	10 (8.8)		
Disagree	5 (2.2)	3 (2.6)	2 (1.8)		
The use of MTD will involve major changes in my skin self-examination practice				0.78	
Agree	156 (68.4)	79 (69.3)	77 (67.5)		
Unsure	50 (21.9)	23 (20.2)	27 (23.7)		
Disagree	22 (9.6)	12 (10.5)	10 (8.8)		
The use of MTD fits with my current skin self-examination habits				0.23	
Agree	154 (67.5)	55 (48.2)	44 (38.6)		
Unsure	43 (18.9)	28 (24.6)	39 (34.2)		
Disagree	31 (13.6)	31 (27.2)	31 (27.2)		
The use of MTD may interfere with my usual skin self-examination				0.31	
Agree	6 (2.6)	3 (2.6)	3 (2.6)		
Unsure	39 (17.1)	15 (13.2)	24 (21.1)		
Disagree	183 (80.3)	96 (84.2)	87 (76.3)		
Intention and attitude					0.84
I will use MTD when it is offered to me				0.88	
Agree	203 (89.0)	103 (90.4)	100 (87.7)		
Unsure	19 (8.3)	8 (7.0)	11 (9.6)		
Disagree	6 (2.6)	3 (2.6)	3 (2.6)		
I will use MTD routinely when I do skin self-examination in the future				0.54	
Agree	168 (73.7)	86 (75.4)	82 (71.9)		
Unsure	52 (22.8)	23 (20.2)	29 (25.4)		
Disagree	8 (3.5)	5 (4.4)	3 (2.6)		
I will use MTD if it will save me time				0.52	
Agree	172 (75.4)	88 (77.2)	84 (73.7)		
Unsure	30 (13.2)	12 (10.5)	18 (15.8)		
Disagree	26 (11.4)	14 (12.3)	12 (10.5)		
I will use MTD if it will save me money				0.72	
Agree	154 (67.5)	80 (70.2)	74 (64.9)		
Unsure	43 (18.9)	20 (17.5)	23 (20.2)		
Disagree	31 (13.6)	14 (12.3)	17 (14.9)		
In general, MTD will be useful to improve diagnosis of skin cancer				0.30	
Agree	201 (88.2)	104 (91.2)	97 (85.1)		
Unsure	25 (11.0)	9 (7.9)	16 (14.0)		
Disagree	2 (0.9)	1 (0.9)	1 (0.9)		
Participating in MTD will be in my best interests				0.99	
Agree	208 (91.2)	104 (91.2)	104 (91.2)		
Unsure	18 (7.9)	9 (7.9)	9 (7.9)		
Disagree	2 (0.9)	1 (0.9)	1 (0.9)		
Subjective Norm					0.77
Other health professionals (physicians, nurses, other specialists etc.) will welcome the fact that I use MTD				0.81	
Agree	120 (52.6)	63 (55.3)	57 (50.0)		
Unsure	104 (45.6)	49 (43.0)	55 (48.2)		

Disagree	4 (1.8)	2 (1.8)	2 (1.8)		
Most of my friends or family will welcome the fact that I use MTD				0.21	
Agree	154 (67.5)	83 (72.8)	71 (62.3)		
Unsure	65 (28.5)	28 (24.6)	37 (32.5)		
Disagree	9 (3.9)	3 (2.6)	6 (5.3)		
My doctor will welcome the fact that I use MTD				0.04	
Agree	170 (55.7)	69 (60.5)	58 (50.9)		
Unsure	55 (43.0)	42 (36.8)	56 (49.1)		
Disagree	3 (1.3)	3 (2.6)	-		
Trust					0.78
I will have complete trust in the dermatologist's diagnosis based on a photo I emailed as part of MTD				0.85	
Agree	107 (46.9)	63 (55.3)	64 (56.1)		
Unsure	104 (45.6)	41 (36.0)	38 (33.3)		
Disagree	17 (7.5)	10 (8.8)	12 (10.5)		
I will rely on the teledermatology process to supply accurate information about a mole or spot				0.96	
Agree	127 (55.7)	54 (47.4)	53 (46.5)		
Unsure	79 (34.6)	51 (44.7)	53 (46.5)		
Disagree	22 (9.6)	9 (7.9)	8 (7.0)		
Facilitator					0.68
I will use MTD if I receive adequate training				0.40	
Agree	210 (91.1)	106 (93.0)	104 (91.2)		
Unsure	10 (4.4)	3 (2.6)	7 (6.1)		
Disagree	8 (3.5)	5 (4.4)	3 (2.6)		
I will use MTD if I receive technical assistance when I need it				0.88	
Agree	194 (85.1)	96 (84.2)	98 (86.0)		
Unsure	24 (10.5)	12 (10.5)	12 (10.5)		
Disagree	10 (4.4)	6 (5.3)	4 (3.5)		
There are health professionals available who will help me with MTD				0.99	
Agree	132 (57.9)	66 (57.9)	66 (57.9)		
Unsure	95 (41.7)	48 (42.1)	47 (41.2)		
Disagree	1 (0.4)	-	1 (0.9)		

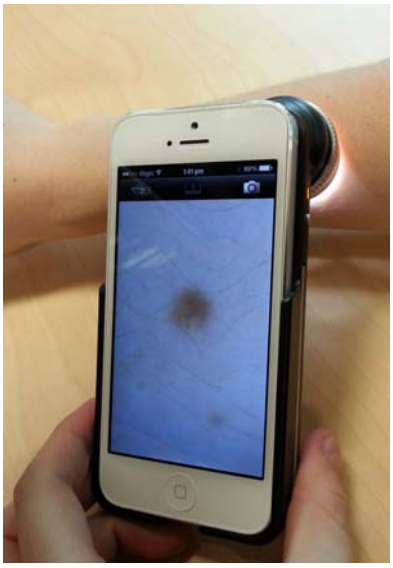
†1 participant missing; MTD= mobile teledermoscopy; strongly agree and agree combined into a single agreement category; strongly disagree and disagree combined into a single disagreement category.

Table 3
Satisfaction with mobile teledermoscopy for melanoma screening

Items	n (%) n=49
*Taking photos with the dermatoscope attachment was easy**	
Agree	46 (93.9)
Unsure	1 (2.0)
Disagree	-
Having the dermatoscope has motivated me to do skin examinations on myself more regularly	
Agree	42 (85.7)
Unsure	3 (6.1)
Disagree	4 (8.1)
Conducting a whole body skin examination was easy	
Agree	26 (53.1)
Unsure	9 (18.4)
Disagree	14 (28.5)
Would you wish to send photos to a doctor to assist you in checking your own skin in the future?	
Yes	38 (77.6)
Unsure	4 (8.2)
No	7 (14.3)
Did you experience any difficulties when photographing your moles or skin spots?	
Yes	17 (34.7)
No	32 (65.3)
If yes, what experiences did you find difficult? (select all that apply)	
I could not understand the instructions	1 (2.0)
I could not download the Handyscope FotoFinder app	-
I could not take a clear or close-up photo of a particular mole or spot	2 (4.1)
I could not photograph a particular mole or skin spot because it was in a hard-to-see location or angle	9 (18.4)
I had difficulty personalising the app functions (for e.g. entering my study ID, gender, birth date)	3 (6.1)
I had difficulty sending the e-mail to the study dermatologist	7 (14.3)
Did you ask another person to help you photograph your moles or skin spots?	
Yes	36 (73.5)
No	13 (26.5)
*By taking pictures of your spots or moles, did you feel distressed, anxious or worried about these spots or moles?**	
Yes	6 (12.2)
Don't know	4 (8.2)
No	37 (75.5)
Did you find the AC (asymmetry, colour) Rule to be a good tool to guide you in finding spots or moles to photograph?	
Yes	41 (83.7)
Don't know	6 (12.2)
No	2 (4.1)

*answer missing from 2 participants

Figure 1



iPhone 5 with dermatoscope attachment.

Figure 2 Participant recruitment

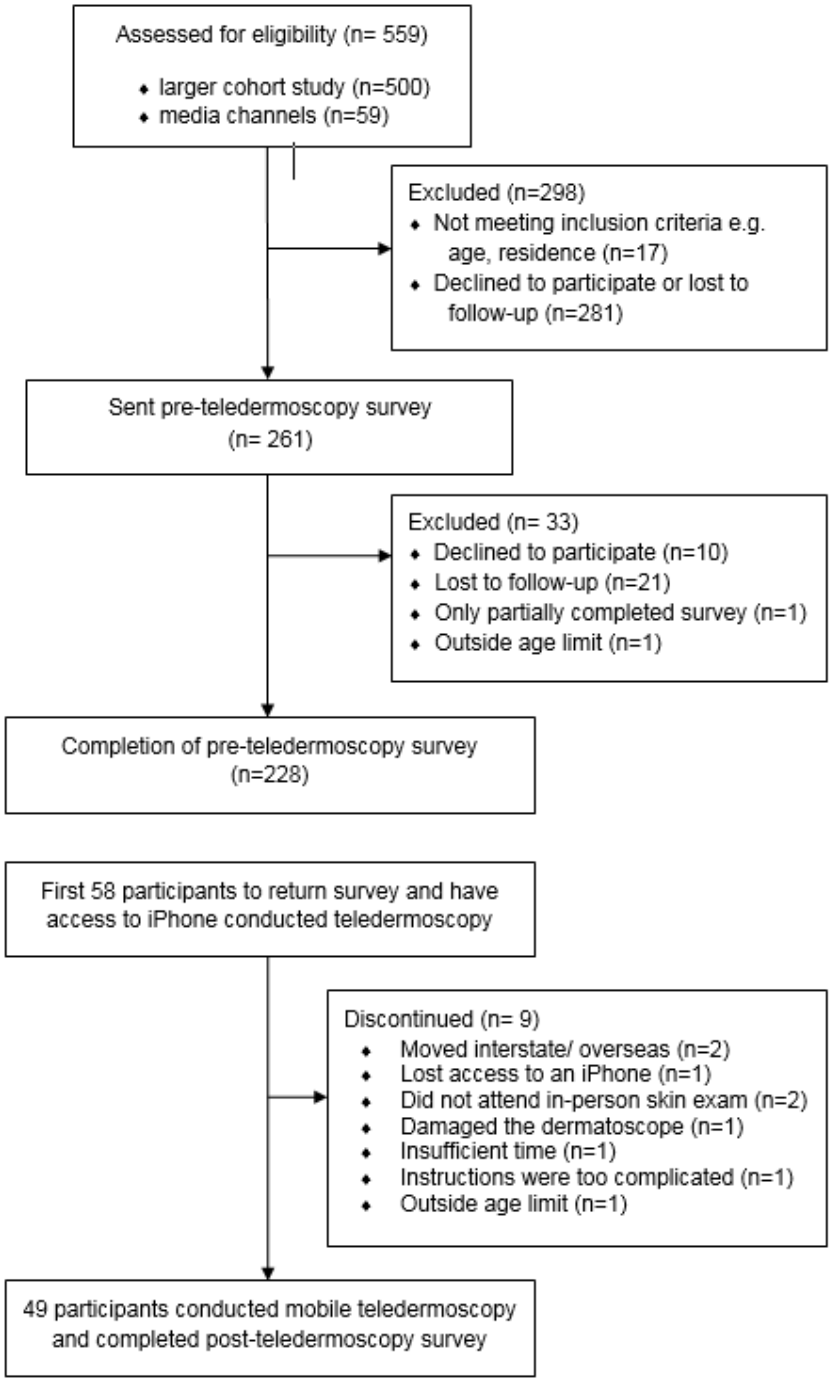


Figure 3

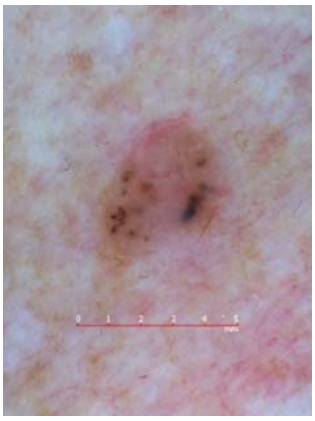


Image selected and photographed by participant. Telediagnosis BCC. Confirmed at histopathology.