General practitioners' perceptions of asynchronous telemedicine in a randomized controlled trial of teledermatology.

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General Practitioners' Perceptions of Asynchronous Telemedicine in Dermatology: quantitative results from a randomised controlled trial

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Abstract

Background: Telemedicine is viewed as having a key role to play in the Government's plans to modernise the NHS.[1] However, to date there are few studies which have explored the views and acceptability of GPs towards telemedicine in primary care.
Aim: To elicit the perceptions of GPs towards teledermatology (TD) before and after it's introduction into their Practices and to observe whether GP views of TD had changed over the course of the study.
Design of study: A postal questionnaire administered as part of a wider randomised controlled trial of telemedicine in dermatology.
Setting: A locality group of eight General Practices in Sheffield and a single teaching hospital in Sheffield that provided the local dermatology referral service.
Method: A postal questionnaire circulated to all GPs from the eight participating Practices.
Results: A 85.7% (36/42) response rate was achieved. Only 21% (n=7; 95% CI: 10-37%) of respondents felt satisfied/very satisfied with TD in their Practice, 47% (n=16) said that they were dissatisfied or very dissatisfied. Thirty one per cent (n=10; 95% CI: 18-49%) said that they felt confident about diagnosis and management of care through TD, with 28% (n=9) reporting that they were unconfident. Only 23% (n=8; 95% CI: 12-39%) of respondents said that they would consider using a telemedicine system in the future, 34% (n=12) said they would probably or definitely not and 43% (n=15) were unsure. There was some evidence that GPs views about TD became more negative over the course of the study. **Conclusions:** The study reports less favourable GP responses to telemedicine than observed in previous studies, and suggests that the model of telemedicine described in this study paper would not be widely acceptable to GPs. (234

words)

Keywords: general practitioner, perceptions, satisfaction, telemedicine, dermatology.

Introduction

Studies relating to the acceptance of telemedicine, and more specifically teledermatology (TD) have tended to focus on patient satisfaction [2-8], rather than health professional perceptions. Studies that do exist tend to focus on perceptions of synchronous or 'real-time' telemedicine rather than asynchronous or 'store and forward' telemedicine (see footnote). The few studies that do exist suggest high levels of satisfaction among doctors involved in the use of telemedicine. [9-14]

The authors are aware of no other published studies that have reported upon the views and perceptions of GPs towards *asynchronous* telemedicine in dermatology *over time*. Therefore, this paper provides an original contribution to the current telemedicine literature in primary care.

Methods

Sampling and recruitment

The study was conducted within the context of a randomised controlled trial of telemedicine in dermatology (funded by the NHS R&D Health Technology Assessment Programme) [15] . The project aimed to compare the traditional outpatient consultation with an application of telemedicine for obtaining a specialist dermatological opinion. The trial was conducted between a locality of eight group General Practices in Sheffield (with 42 GPs serving a total population of almost 38,000), and generating around 400 new, adult dermatology referrals each year to a single teaching hospital in Sheffield, which currently provides the local dermatology referral service. It comprised of new (referred with a new problem or not seen by the hospital dermatologist in the preceding 12 months), consenting adult (aged 16 and over) patients judged by the general practitioner to require a conventional outpatient consultation with an NHS hospital consultant dermatologist.

There were two main reasons for patient exclusion into the RCT. Firstly, the nature of the dermatological problem. These related to anatomical sites e.g. genital lesions, a strong perception that palpation of the skin was crucial to diagnosis and management, or the possibility that physical treatment was needed immediately (potential melanomas and squamous cell cancers were excluded from the trial, thus leaving possible basal cell carcinomas within the trial. The second reason for exclusion, unrelated to the skin problem was mental illness or handicap, language barriers, patients that wished to consult privately and patients that refused to consent. Patients were randomised by their GP into two groups who received a traditional specialist dermatological opinion through (a) a traditional outpatient consultation (the control group) or (b) an asynchronous telemedicine consultation (the telemedicine group) control or telemedicine group. The GP was responsible for taking the telemedicine photographs, entering and transmitting the clinical data. Ethical approval for the trial was gained from the Local Medical Research Ethics Committee.

Instruments

A questionnaire was posted to all 42 GPs in the eight participating TD practices in Sheffield in March 2002. The questionnaire was designed to identify the GPs' perceptions and views of TD, as

well as their views about being part of the clinical trial. A formal definition of teledermatology was not provided to the GPs although one of the researchers (IB) had previously visited each participating Practice to describe the study and TD. The questionnaire comprised of 15 pre-coded items with ordered categorical (Likert) responses, and 7 open-ended questions, which were generated through prior discussions with doctors, a review of the relevant literature and from the researchers' knowledge of the area and from the results of the questionnaire, circulated at the beginning of the study [16] A preliminary paragraph pointed out that the questionnaire related specifically to the views of the GPs who had been actively recruiting patients as part of the study as well as those who had chosen not to be actively involved. The original intention had been to undertake in-depth qualitative interviews with all the participating GPs. However, due to a low response by the GPs to be interviewed, a pragmatic decision was taken to develop a postal questionnaire in order to gain data that would yield a higher response. The data was analysed using the Statistical Package for Social Sciences Version 10 [17] using Chi-square, Mann-Whitney, Kendall's tau-b tests and Wilcox Signed Ranks Tests. The chi-squared test was used to examine associations between nominal (ordered) categorical responses. The Mann-Whitney test was used to compare ordinal responses across two independent groups. Kendall's Tau statistic was used to test for associations or correlations between the ordinal responses to any two of the questions. The Wilcox Signed Rank Test was used to look for associations between paired responses pre and post TD.

Results

TD Questionnaire

The questionnaire was posted to 42 GPs in the eight participating practices in March 2002. The response rate after two weeks was 52.3% (22/42). Following a reminder this increased to 85.7% (36/42). Respondents were representative of the all the Practices involved. Forty four per cent (n=16) of the sample were women, and 53% (n=19) were men (this information was not available for one respondent (2.8%). Responses to the questionnaire did not vary by gender. Almost three quarters (72.8%; n=28) of respondents said that they had been actively involved in recruiting patients onto the TD study and 22.2% (n=8) said they had not been involved in recruiting patients to the study. Eighty-six per cent (n=31) reported being very/fairly enthusiastic about being involved in the TD project compared to other categories (unsure/not enthusiastic/at all). Only 21% (n=7) of respondents felt that all or most of their expectations of TD had been met. As identified in the questionnaire completed by GPs prior to the introduction of TD within their practice [2] expectations of TD were of quicker access to specialist opinion, decreased referrals, effective means of obtaining a diagnosis, increased convenience for patients and an educational and teaching element for the GP. Only 21% (n=7) of respondents felt satisfied or very satisfied with TD in their practice, 47% (n=16) said that they were dissatisfied or very dissatisfied with it and 32% (n=11) were unsure. The respondents who reported being satisfied with TD in their practices were significantly more likely to feel confident about diagnosis and management through TD (Kendall's tau-b= 0.34, p=0.020), to think that TD would make things better for them as GPs (Kendall's tau-b=0.54, p=0.001), that TD would make things better for their patients (Kendall's tau=0.62,p=0.001), perceive TD (Kendall's tau=0.55, p=0.001) and TM (Kendall's tau=0.39, p=0.015) to have a useful role to play in GP practices, and say that their expectations of TD had been met than those who felt dissatisfied with TD in their practices (Kendall's tau=0.49, p= 0.003). Furthermore those who said they were satisfied with TD in their practice were significantly more likely to say that they would consider using the TD system in the future

(Kendall's tau=0.64, p=0.001) than those who felt dissatisfied. Interestingly, those who reported being satisfied with TD in their practice were more likely to say that they had concerns relating to TD than those who were dissatisfied (Kendall's tau-b= -0.28, p=0.039). Thirty one per cent (n=10) said that they felt confident about diagnosis and management of care through TD, 28% (n=9) said that they were unconfident and 41% (n=13) remained unsure. Additional views of GPs towards TD are provided in Table 1.

Changes of GPs perceptions and attitudes towards TD over time

In order to identify if there had been changes in GPs perceptions and attitudes over the period of the study, responses to the questionnaire completed by GPs prior to the introduction to TD [18] were compared to the questionnaire completed by GPs one year following the introduction of TD within their Practices. This compared GPs responses as a *group* and were not paired responses. There was no significant relationship to suggest that GPs perceptions changed over time, although respondents who perceived themselves to be knowledgeable about TD pre TD were more likely to feel satisfied with TD in their practice than those who felt that their knowledge of TD was limited (Kendall's tau-b= -0.41, p=0.37). Furthermore, there was some association between prior expectations and satisfaction. Respondents who perceived their expectations of TD to be high (pre-TD) were more likely to say that they felt satisfied with TD in their practice (Kendall's tau-b=0.51, p=0.023).

Furthermore, there was some evidence although not statistically reliable that GPs opinions had become more negative over time. For example the GPs were asked how confident they felt about the diagnosis and management of care through TD, although 27% (n=7; 95% CI: 9-45%) of GPs who responded to the pre TD questionnaire said that they felt confident with the diagnosis and management through the TD system, compared with 31% (n=10; 95% CI: 18-49%) of those who completed the post TM questionnaire, 41% (n=13) of GPs said they were unconfident with TD post TD, compared with only respondent (4%) who said s/he felt unconfident with diagnosis and management through TD pre TD.

Paired responses (GPs who completed both the pre and post TD questionnaires)

In order to compare *individual* responses over time, GP responses were paired pre and post TD (see Table 2). Overall there were 17 matched/paired responses (i.e. individual GPs who had completed both the pre and post TD questionnaire). Again, there were no significant findings to suggest that GPs perceptions changed over time. However, there was some evidence although not statistically reliable that GPs opinions had become more negative over time.

Open-ended comments

It was anticipated that open-ended questions would provide more detailed information about some of the subjective perceptions and concerns of the GPs about TD. However, the respondents tended to write one-word responses, which did not help to understand some of the responses given to the Likert type questions. Nevertheless, these comments provided some insight into what seemed important to these GPs.

Positive aspects of TD in General Practice

Sixty per cent of respondents (n=26) responded to this question. Of these, 30.7% (n=8) said they had liked nothing about TD in their practice. The remaining respondents (69.2%; n=18) said they had liked:

- the improved access to experts (n=12)
- receiving prompt feedback from consultants (n=6)
- using the TD technology and taking the photographs (n=4)

Negative aspects of TD in General Practice

Ninety one per cent of respondents (n=33) responded to this question. Two respondents (6%) said that there had been nothing they had disliked about using TD in their practice. The remaining respondents (93.9%; n=31) identified thee factors:

- complex referral procedure (time consuming) (n=11)
- increased workload (increased paperwork, taking photographs) (n=18)
- technology related issues-TD system complicated (with problems establishing a connection between sites (n=9)

What could have been better in terms of the TD technology?

Sixty per cent of respondents (n=22) responded to this question. Almost a quarter of these (22.7%; n=5) felt that nothing could have been better. However, most respondents (77.2%; n=17) three factors were identified:

- Simplification of TD software (n=9)
- Faster and more reliable connections (n=6)
- Less complex referral procedure (n=6)

Concerns about TD in General Practice

Fifty three per cent of respondents (n=19) responded to this question. Concerns related to:

- increased workload (n=8)
- time consuming (n=8)
- TD system too complex (n=3).

What other things would help GPs (when managing dermatology patients)

Fifty eight per cent of respondents (n=21) responded to this question.

- shorter out patient waiting list (n=8)
- improved GP access to a specialist opinion (telephone access for information and advice) (n=6)
- slots to see urgent patients (n=4)

Discussion

Owing to the small sample size, it is difficult to generalize from the findings of the study. The GPs who completed the questionnaires had agreed to take part in the research trial (one practice was invited to participate but declined. The reason provided by the practice being that the extra workload associated with participating in the study would be unsustainable), therefore may have been more accepting of telemedicine in comparison to the general GP population. There is also the potential for response bias, the non-responders may have been less satisfied with TD than those who responded and we have no information about the non-responders in this study.

However, prior to the introduction of TD into their practices, GPs expressed clear views about what they viewed as the role of TD [16]. There was a general perception that TD in General Practices would result in quicker diagnosis and treatment, decreased referral rates and improved medical education and training. There was an overwhelming view that a telemedicine system needed to be quick, easy to use, efficient and reliable. However, the follow up questionnaire one year following the

introduction of TD within the Practices found that only 21% (n=7) of GPs felt that these initial expectations had been met. Forty seven per cent (n=16) of GPs said that they were dissatisfied with only 21% (n=7) of the GPs reporting that they were satisfied with TD. This being reflected in the finding that only 23% (n=8) of GPs would consider using TD again in the future. Despite the GPs liking the improved access to experts, and receiving prompt feedback from the consultants, many disliked the complex referral procedure, increased workload and the time it took to use the TD system. However, it is unclear from this study whether the GPs were reacting specifically to telemedicine or to problems with the nature of the trial itself. Most of the GPs made comments that the process of recruiting patients to the trial had been time consuming and complex. This is important as within this study all of the referral process was carried out by the GP, however, there are other possible models of telemedicine care where the nursing staff are more involved in the referral process, thus reducing the workload of the GP. Such differences are likely to have major effects on satisfaction. In light of this it is suggested that future studies should observe Practices that are currently using TD as part of their routine practice and that are not part of a clinical trial and consider how other models of delivering telemedicine effect GP satisfaction.

Conclusion

This study reports less favourable GP responses to telemedicine than observed in previous studies [9-14], and suggests that GPs remain cautious about the introduction of TD into their Practices. It also suggests that using the model of telemedicine described in this paper would not be appropriate and widely acceptable to GPs.

(3,027 words inc refs excluding tables)

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Table 1: General practitioners' views of teledermatology (**post TD)**

	Good	Poor	Unsure	95% CI
	n %	n %	n %	for Good
Results and management received back from the TD consultant	11 (52)	1 (5)	9 (43%)	32-72
	Agree	Disagree	Unsure	95% CI

				for Agree
Do you feel using TD will improve healthcare in dermatology	14 (39)	6 (17)	16 (44)	25-55
Do you think TD will save your colleagues time/effort	6 (17)	21(58)	9 (25)	8-32
Do you think TD will make things better for you as a GP	8 (24)	15 (46)	10 (30)	13-41
Do you think TD will make healthcare better for your patients	11 (32)	7 (21)	16 (47)	19-49
	Useful	Not useful	Unsure	95% CI for Useful
To what extent would you say TD has a useful role to play in GP practices	16 (46)	12 (34)	7 (20)	30-62
To what extent would you say TM has a useful role to play in GP practices	10 (29)	10 (29)	14 (41)	17-46
	Met n %	Not Met n %	Unsure n %	95% CI for Met
To what extent have [your] expectations [of TD] been met	7 (21)	11(33)	15 (46)	11-38
	Satisfied	Dissatisfied	Unsure	95% CI for Satisfied
How satisfied are you now with TD	7 (21)	16(47)	11(32)	10-37
	Confident	Not Confident	Unsure	95% CI for Confident
How confident do you feel now about the diagnosis and management of care through the TD	10(31)	9(28)	13(41)	18-49
	Yes	No	Unsure	95% CI for Yes
Would you/your practice now consider using TD in the future	8(23)	12(34)	15(43)	12-39

Table 2: Paired responses (results of GPs who completed both the pre and post TD questionnaires)

	Pre TD perceptions	Post TD perceptions		
		Yes	No	Unsure
Confidence with diagnosis and management of care through the TD (paired=15)	4	2	2	0
Yes	1	0	1	0
No	10	3	5	2
Unsure				
Worries or concerns about using TD (paired=15)				
Yes	8	7	1	0
No	7	3	4	0
Unsure	0	0	0	0
Do you feel TD will make things better for you as a GP (paired=15)				
Yes	5	2	2	1
No	0	0	0	0
Unsure	10	3	4	3
Do you feel using TD will improve healthcare in dermatology (paired=17)				
	10	6	2	2
Yes	0	0	0	0
No	7	2	2	3
Unsure				
		Met	Not Met	Unsure
Expectations of TD (paired=16)				
High	3	2	0	1
Low	0	0	0	0
Unsure	13	3	7	3