SYSTEMATIC REVIEW

Travel Avoidance Using Telepediatric by Patients and Healthcare Providers: a Review of the Literature

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ABSTRACT

Introduction: Telepediatric is one of the subspecialties of telemedicine that can be defined as the use of information and communication technology tools to offer healthcare services to children at a distance. **Aim:** The use of telepediatric healthcare services for children living in rural or deserved areas may reduce the cost and time of travel to access these services. This study aims to review published papers that assess the percentage of avoided travel or referrals with the use of telepediatric. **Methods:** This is a systematic review study. PubMed database was searched in September 2019 to retrieve the published papers. The final 24 retrieved papers were assessed based on the variables such as modality, referral setting, specialty, continent, weight, and percentage of avoided travel. The multivariate linear regression model was used to estimate the percentage of travel avoidance by telepediatric.**Results:** The linear regression model was determined based on the provided specialty for telepediatric (cardiology, general (multi), and other (rehabilitation, dermatology, psychiatry, respiratory)) with R2 =0.41. The results showed that the mean percentage of avoided travel in cardiology specialty as a baseline was 56%. The use of telepediatric in the general (multi) and other specialties can avoid travel for 26.5% (p=0.02) and 85% (p=0.03) respectively. **Conclusion:** This study showed that telepediatric could reduce travel at least 26.5% and maximal 85%. These results can be used by healthcare providers to decide on the implementation of successful telepediatric systems to reduce referrals.

Keywords: Telemedicine, Systematic review, Travel, Referral, Avoid.

1. INTRODUCTION

Telepediatric is one of the subspecialties of telemedicine that can be defined as the use of information and communication technology tools to offer healthcare services to children at a distance (1).

Pediatric patients in rural areas often do not have access to specialty pediatric care, therefore when a physician who is working in these areas needs to consult with pediatricians, a lot of time and money are spent to travel children and their families for an in-person visit (2).

One of the most remarkable characteristics of telemedicine is its impact on the need for travel, not only for patients but also for medical staff. Telemedicine, however, cannot prevent all referrals or travel. Several factors can affect the referral pattern of patients from remote or rural areas to central hospitals. For example, in some cases due to the severity or urgency of a problem, telemedicine is not as helpful as in situations that are not urgent (3).

It is important before making any decision to implement a telemedicine system in a given area to focus on how much the new system can influence referral and travel patterns (4). While travel expenses are always a component of any cost study of telemedicine systems, they are considered separately in this study because a significant investment in a system that has a low rate of avoided travel does not seem economically reasonable.

This systematic review study aims to measure the impact of telepediatric systems on referral or travel

patterns from remote and rural areas to metropolitan areas, as one of the major advantages of this technology is its ability to provide health care and medical services over distance delivery and provide equitable health services to remote areas.

2. AIM

The use of telepediatric healthcare services for children living in rural or deserved areas may reduce the cost and time of travel to access these services. This study aims to review published papers that assess the percentage of avoided travel or referrals with the use of telepediatric.

3. METHODS

Data source

The literature search was conducted using MEDLINE database only as a study showed that searching through MEDLINE alone could retrieve 80–90 percent of the potentially relevant publications in the telemedicine field (5). The search was performed during September 2019 and covered all publications with abstracts and without any date limitation.

Search strategy

We used keyword combinations to search as follows: [telemedicine OR telehealth OR telecare OR telepsychiatry OR teledermatology OR teledentistry OR telesurgery OR teleradiology OR teleneurology OR telepaediatrics OR telepaediatrics OR teletrauma OR teleconsultation OR "tele emergency" OR telepsychology OR "tele wound care" OR "tele ENT" OR teleotology OR telecardi* OR telemonitoring OR teleophthalmology OR televisit* OR telematics OR "telehome care" OR telediagnosis OR telenursing OR teleoncology OR telemetry OR teleconsulting OR teleservice OR telesonography OR teleobstetric OR telegyn* OR teleburn* OR telenursing OR telerehabilitation OR telegeriatrics OR telemedical OR PACS OR "remote consultation" OR "health information system" OR "web based" OR "computer aided"] AND [referral* OR visit* OR hospitalisation OR transfer* OR transport* OR admission* OR travel* OR cost saving* OR appointment OR cost stud* OR remote consultation* OR economic*] AND [avoid* OR reduce* OR decrease* OR unnecessary* OR save* OR prevent]

Inclusion criteria

Publications were included in the review if the study:

a) Was written in English,

b) Reported the percentage of avoided referrals directly, or if this data was easily calculable using the information in the paper,

c) Considered travel or travel-related issues for patients, carers or health professionals, and compared telemedicine with a non-telemedicine alternative, and included appropriate details on those data, methods of analysis and outcomes applicable to avoidance of travel,

d) Included an aim involving the comparison of travel, or if the comparison of travel was covered as a secondary or incidental issue,

e). Was a controlled study or uncontrolled studies in which the number of subjects was no less than 15.

Exclusion criteria

Publications were excluded from the review if the study:

a) Involved telehome care did not report the sample size or methodology for calculating the percentage of avoidable travel,

b) Provided only anecdotal information on travel-related issues, without credible data and analysis,

c) Was a single case study or series of case studies of less than 15 individuals,

d) Was about medical or health education,

e) Was a review paper,

f) Was only about infant specialty (under one year).

Selection of publications

All titles and abstracts retrieved from the search were read and reviewed by two of the authors of this paper, and any study that might contain information relating to the impact of telemedicine on travel, referral, and the transfer was considered for further investigation. Full-text papers were then obtained for closer evaluation. In some cases, the full-text papers were not available. Data were extracted from relevant papers based on publication year, modality, referral setting, specialty, continent, study design, sample size, weight and percentage of avoided travel (Table 1).

Statistical analysis

In this study, the descriptive and analytical statistics were used for data analysis. We used a multivariate linear regression model in accordance with Wootton's study method to estimate the percentage of travel avoidance by telemedicine (3). The variables used to estimate in modeling include modality, referral setting, specialty, continent, weight, and percentage of avoided travel.

Dummy coding was used for multilevel variables as follows:

a) Modality - baseline (real-time); hybrid; store and forward,

b) Continent - baseline (America); Europe; Australia; Asia; Africa,

c) Specialty - baseline (cardiology); general (multi specialties); urology- orthopedic- surgery; emergency- burn care; other (rehabilitation, dermatology, psychiatry, respiratory).

A weighting factor was also calculated to reduce the risk of bias of the included studies with the sum score of three items such as reliability of data, study performance, and sample size.

To determine the reliability of data, studies were divided into three groups:

a) Studies in which data were collected prospectively on avoidance of travel (Score 3);

b) Studies in which data were collected prospectively on avoidance of travel and it was estimated based on the opinion of researchers (Score 2);

c) Studies in which data were collected retrospectively or hypothetically on avoidance of travel (Score 1).

The following criteria were used to assess study performance:

a) Participants: how employed to the study;

Author	Year	Modality	Referral setting	Specialty	Continent	Study design	Sample size	Weight	Percentage of avoided travel
Vallasciani, S 6.	2019	Real-time	Primary care	Urology	Asia	1	105	5	59.0
Reliford, A 7.	2019	Real-time	Hospital	Psychiatry	America	3	35	7	75.0
Strickler, A. S 8.	2018	Hybrid	Hospital	Rehabilitation	America	1	35	4	90.0
Martinez, R 9.	2018	Hybrid	Primary care	Burn care	Africa	1	838	7	72.5
Holt, T 10.	2018	Real-time	Primary care	General	America	3	38	7	63.0
Camp, M. W 11.	2018	Store and forward	Primary care	Orthopedic surgery	Australia	1	19020	5	12.0
Cifuentes, C 12.	2017	Real-time	Primary care	Respiratory	America	3	716	8	86.3
McWilliams, T 13.	2016	Hybrid	Primary care	Burn care	Australia	1	1312	5	27.7
Yang, N. H 14.	2015	Real-time	Hospital	Emergency	America	1	135	6	31.0
Parade-la-De-La-Morena, S 15.	2015	Store and forward	Primary care	Dermatology	Europe	1	383	7	90.0
Bator, E. X 16.	2015	Hybrid	Primary care	Urology , surgery	America	2	1032	8	38.5
Labarbera, J. M 17.	2013	Real-time	Hospital	General	America	1	153	7	14.3
Desai, S 18.	2013	Real-time	Hospital	Emergency	Australia	2	34	4	47.0
Akkoyun, I 19.	2012	Store and forward	Hospital	Surgery	Asia	3	38	5	83.0
Grant, B 20.	2010	Real-time	Hospital	Cardiology	Europe	3	124	8	75.0
Callahan, C. W 21.	2005	Store and forward	Primary care	General	America	3	267	8	12.0
Sicotte, C 22.	2004	Real-time	Primary care	Cardiology	America	1	78	5	42.0
Justo, R 23.	2004	Real-time	Primary care	Cardiology	Australia	1	72	4	90.0
Bellavance, M 24.	2004	Real-time	Hospital	Cardiology	America	3	363	9	70.0
Widmer, S 25.	2003	Real-time	Hospital	Cardiology	Europe	3	194	8	98.0
Smith, A. C 26.	2002	Hybrid	Hospital	General	Australia	3	387	7	28.0
Smith, A. C 27.	2001	Hybrid	Hospital	General	Australia	2	85	5	14.0
Tsilimigaki, A 28.	2001	Real-time	Hospital	Cardiology	Europe	3	93	6	47.0
Finley, J. P 29.	1997	Real-time	Hospital	Cardiology	America	3	135	6	22.0

Table 1. Characteristics of included papers

b) Intervention: intervention explanation for the treatment of patients;

c) Data analysis: how the data were analyzed;

d) Outcomes: participants' data and statistical results (even missing or omissions).

If all the above criteria were described in full detail and clarity, the study can be considered as high quality (score = 3). If one of the criteria was not accurately described or not mentioned at all, the study can be considered as medium quality (score = 2), and if more than one criteria were not accurately described, the study can be considered as low quality (score = 1).

The number of participants in the intervention group (telemedicine) was used to calculate sample size as follows:

1) ≥ 150 participants (score 3);

2) 50- 149 participants (score 2);

3) 15- 49 participants (score 1).

A weighting factor was calculated by summing the scores of all three items (at least 3 and maximal 9).

Data were analyzed using SPSS (Version 22). The STEPWISE method was used to examine the significance of the variables.

4. RESULTS

From 6579 publications identified in the literature search, 859 were retrieved for closer inspection, and 257 papers were chosen to review as they met the inclusion criteria. Since 257 papers cannot be included in one article, we decided to divide the papers based on the specialty and report them in separate articles. Therefore, in this article pediatric specialty has been discussed (Figure 1).

In this review, 24 papers were found related to telepediatrics and avoidable travel and provided the following results (Table 1).

Year of publication

Between 1997- 2005, 9 papers (37.5%) were published

Coefficientsa,b					
	Unstandardized Coefficients		Standardized Coefficients	t	P-value
	B	Std. Error	Beta		
Baseline (cardiology)	56.000	6.114		9.160	.000
general	-29.438	11.723	-.432	-2.511	.020
other	28.823	12.969	.383	2.222	.037

Table 2. Coefficients of fitted model (using cardiology as a predictor)

that assess the percentage of travel avoidance in the telepediatric field. There is no published paper in this field during 2006-2009, but the majority of papers (n=15, 62.5%) published during 2010- 2019.

Modality

In 14 papers (58.4%) real-time, in 6 papers (25%) hybrid, and in 4 papers (16.6%) store and forward telepediatric modality has been used.

Referral setting

In 13 papers (54%) referrals were done from the hospital and in 11 papers (46%) from primary care settings.

Specialty

Seven papers (29%) were performed on cardiology, 5 (21%) on general, 2 (8.3%) on emergency, and 2 (8.3%) on burn care specialties. The rest of the papers (n=8, 33.4%) were done on urology, orthopedic, surgery, rehabilitation, dermatology, psychiatry, and respiratory.

Continent

Eleven papers (46%) were done in America, 6 (25%) in Australia, 4 (16.6%) in Europe, 2 (8.3%) in Asia, 1 (4.1%) in Africa continent.

Sample size

The number of participants in the intervention group (telemedicine) was from 34 to 19020. Generally, participants in 11 papers (46%) were more than or equal to 150, in 8 papers (33%) were between 50 to 149, and in 5 papers (21%) were between 15 to 49.

Percentage of avoided travel

The percentage of avoided travel in reviewed papers was reported from 12 to 98. In 12 papers (50%) this percentage was more than 50.

Analytical statistics

The coefficients for modality and continent were not significant. Therefore, considering the specialty of cardiology as a baseline, the linear regression model in our study (R2 = 0.41) was:

Y= 56- 29.4 (general) + 28.8 (other)

The above regression equation, in which Y expresses the percentage of avoided travel, indicates that the mean percentage of avoided travel in cardiology specialty as a baseline when general and other = 0, was 56%, in the general (multi) specialty when other = 0, was 26.5% (p = 0.02), and in the other specialties, when general = 0, was 85% (p=0.03). Generally, telepediatric could reduce travel at least 26.5% and maximal 85% (Table 2).

In other words, studies that offered general (multi) specialties have been led to avoid travel on average 29.5 percent less than and other (rehabilitation, dermatology, psychiatry, respiratory) specialties, have been led to avoid travel on average 29 percent more than cardiology specialty.

5. DISCUSSION

The linear regression analysis based on specialties used in telepediatric showed that the mean percentage of avoided travel was 26.5%, 56%, and 85% in the general (multi), cardiology, and other (rehabilitation, dermatology, psychiatry, respiratory) group respectively. This result shows that since rehabilitation, dermatology and psychiatry are not emergency specialties; telemedicine could help to provide healthcare services in referral settings for children, and therefore avoided travels more than cardiology specialty which is considered sometimes emergency. The lower mean percentage of avoided travel in the general specialty is also probably due to this fact that the general specialty referred to multiple medical services with different conditions, therefore the benefit of using telemedicine is different in each one.

Two papers showed the lowest percentage of avoided travel. In the first study that was conducted by Camp, et al, a web-based fracture pathway was used to triage patients for pediatric orthopedic surgery 11. In this study, the store and forward method lead to a 12% reduction in referrals. The second study done by Callahan, et al, used a web-based, store and forward system to provide teleconsultation services in a general specialty, and showed this method could reduce 12% of travels (21).

The highest percentage of avoided travel among the reviewed papers was presented by Widmer, et al. This study showed that a real-time method to transmit echo-

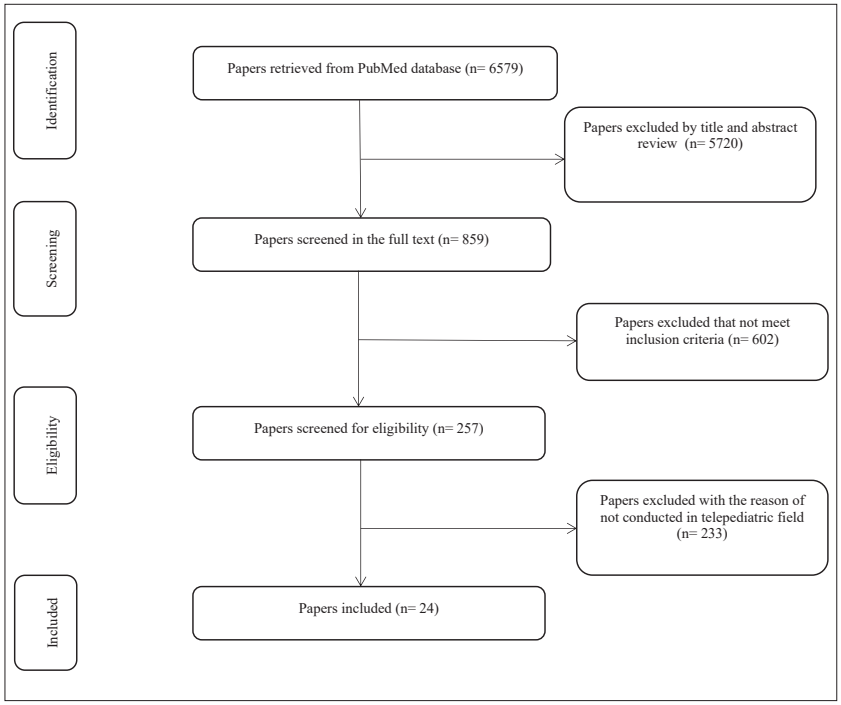

Figure 1. The process of PRISMA to find and include papers

cardiographic images could avoid 98% of referrals (25).

These results showed that use of the real-time telemedicine, used in more than half of the papers, could prevent referrals rather than store and forward as the easiest and cheapest method. This result is similar to Wootton's study that estimated travel avoidance by teledermatology (3). Since the real-time method provides a real interactive experience as a face-to-face visit for patient and remote specialist, it could prevent patients' travel to see a clinician and therefore saves time and cost (7).

When a child needs to be referred from a healthcare center in a deprived area to a pediatric specialist, Family and parents need to accompany the child as well. This can impose a lot of costs such as travel costs and time away from work on families. Studies showed that using telepediatric can reduce many of these costs by avoiding referrals (6, 14).

This review process may be helpful for the prediction of avoidable travel from remote areas of a given state to major cities. However, several factors should be taken into account when attempting to apply the outcomes of these studies to other contexts. Each study was completed in a particular geographical region at a particular time.

If health staff and physicians are well trained, ideally there should not be a significant difference between the calculated percentage of avoidable referrals from a designed research project (efficacy) and the real situation (effectiveness) involving the implementation of a telehealth application. Nevertheless, it is likely that in real life a number of barriers may influence the actual number of avoidable referrals resulting from this telehealth application. Reimbursement issues, physician or nursing resistance to the introduction of telehealth applications, and patients' reluctance are a few examples of these barriers. There is a need to focus on data from current telemedicine services to achieve more concise estimations. Researchers must also assume that the real-life situation in telemedicine will be worse than the experimental situation, by analogy with other areas of medicine.

There are very few methods that can be used to provide an estimate of avoidable referrals using telemedicine systems in real situations in any given area. Comparing the proportion of referrals from a hospital equipped with telemedicine systems to a similar hospital without a telemedicine link is one method that could address this issue. However, this method has some confounding factors that must be taken into account. For example, physicians working in both hospitals should have the same view in relation to the use of telemedicine in the management of their patients. Using a coefficient to adjust the results from a designed research project in order to reach a percentage in real life is another option. For example, the percentage of avoidable referrals in real life could be set to 70 percent of the results from a designed research project. This 70 percent could be called a coefficient for adjustment of efficacy and used to derive a value of telehealth effectiveness from a designed telehealth research project. However, this coefficient could vary across different medical specialties.

A careful review of referrals from remote clinics/hospitals by a team of experts is a third method that could be applied to providing an estimate of avoidable referrals using telemedicine systems in real situations in any given area. This team of experts could review the patients' cause of referral and ask the patients whether they would have wished to stay in the remote hospital if a telemedicine system had been implemented there. However, this method is very subjective as it relies solely on patient reports. An alternative design would provide to enable a comparison of outcomes stemming from the random allocation of patients from a single hospital to either conventional referral or telemedicine referral.

6. CONCLUSION

This study showed that telepediatric could reduce travel at least 26.5% and a maximum of 85% in different specialties. These results can be used by healthcare providers and planners to select the most appropriate pediatric specialty for successful implementation of telepediatric systems to reduce referrals.

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REFERENCES

1. Burke BL, Jr. and Hall RW. Telemedicine: Pediatric Applications. Pediatrics. 2015; 136: e293-308.
2. Sasangohar F, Davis E, Kash BA, Shah SR. Remote Patient Monitoring and Telemedicine in Neonatal and Pediatric Settings: Scoping Literature Review. Journal of medical Internet research. 2018; 20: e295.
3. Wootton R, Bahaadinbeigy K and Hailey D. Estimating travel reduction associated with the use of telemedicine by patients and healthcare professionals: proposal for quantitative synthesis in a systematic review. BMC health services research. 2011; 11: 185.
4. Hayward K, Han SH, Simko A, James HE and Aldana PR. Socioeconomic patient benefits of a pediatric neurosurgery telemedicine clinic. Journal of neurosurgery Pediatrics. 2019: 1-5.
5. Bahaadinbeigy K, Yogesan K and Wootton R. MEDLINE versus EMBASE and CINAHL for telemedicine searches. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2010; 16: 916-9.
6. Vallasciani S, Abdo B, Rauf Z, et al. Telehealth for the Assessment of Patients Referred for Pediatric Urological Care: A Preliminary Cost Savings Analysis and Satisfaction Survey. Telemedicine journal and e-health: the official journal of the American Telemedicine Association. 2019; 25: 756-761.
7. Reliford A, Adebanjo B. Use of Telepsychiatry in Pediatric Emergency Room to Decrease Length of Stay for Psychiatric Patients, Improve Resident On-Call Burden, and Reduce Factors Related to Physician Burnout. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2019; 25: 828-832.
8. Strickler AS, Palma J, Charris R, et al. Contribution of the use of

basic telemedicine tools to the care of children and adolescents with juvenile idiopathic arthritis at the Puerto Montt Hospital, Chile. Revista chilena de pediatria. 2018; 89: 59-66.

9. Martinez R, Rogers AD, Numanoglu A and Rode H. The value of WhatsApp communication in paediatric burn care. Burns : journal of the International Society for Burn Injuries. 2018; 44: 947-955.
10. Holt T, Sari N, Hansen G, et al. Remote Presence Robotic Technology Reduces Need for Pediatric Interfacility Transportation from an Isolated Northern Community. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2018; 24: 927-933.
11. Camp MW, Barnes JR, Damany M and Donnan LT. Impact of web-based clinical practice guidelines on paediatric fracture clinics. ANZ journal of surgery. 2018; 88: 232-235.
12. Cifuentes C, Romero E and Godoy J. Design and Implementation of a Telepediatric Primary-Level and Low-Cost System to Reduce Unnecessary Patient Transfers. Telemedicine journal and e-health : the official journal of the American Telemedicine Association. 2017; 23: 521-526.
13. McWilliams T, Hendricks J, Twigg D, Wood F and Giles M. Telehealth for paediatric burn patients in rural areas: a retrospective audit of activity and cost savings. Burns: journal of the International Society for Burn Injuries. 2016; 42: 1487-1493.
14. Yang NH, Dharmar M, Yoo BK, et al. Economic Evaluation of Pediatric Telemedicine Consultations to Rural Emergency Departments. Medical decision making: an international journal of the Society for Medical Decision Making. 2015; 35: 773-783.
15. Paradela-De-La-Morena S, Fernandez-Torres R, Martinez-Gomez W and Fonseca-Capdevila E. Teledermatology: diagnostic reliability in 383 children. European journal of dermatology : EJD. 2015; 25: 563-569.
16. Bator EX, Gleason JM, Lorenzo AJ, et al. The burden of attending a pediatric surgical clinic and family preferences toward telemedicine. Journal of pediatric surgery. 2015; 50: 1776-1782.
17. Labarbera JM, Ellenby MS, Bouressa P, Burrell J, Flori HR and Marcin JP. The impact of telemedicine intensivist support and a pediatric hospitalist program on a community hospital. Telemedicine journal and e-health: the official journal of the American Telemedicine Association. 2013; 19: 760-766.
18. Desai S, Williams ML Smith AC. Teleconsultation from a secondary hospital for paediatric emergencies occurring at rural hospitals in Queensland. Journal of telemedicine and telecare. 2013; 19: 405-410.
19. Akkoyun I. The advantages of using photographs and video images in telephone consultations with a specialist in paediatric surgery. African journal of paediatric surgery: AJPS. 2012; 9: 128-131.
20. Grant B, Morgan GJ, McCrossan BA, et al. Remote diagnosis of congenital heart disease: the impact of telemedicine. Archives of disease in childhood. 2010; 95: 276-280.
21. Callahan CW, Malone F, Estroff D and Person DA. Effectiveness of an Internet-based store-and-forward telemedicine system for pediatric subspecialty consultation. Archives of pediatrics and adolescent medicine. 2005; 159: 389-393.
22. Sicotte C, Lehoux P, Van Doesburg N, Cardinal G and Leblanc Y. A cost-effectiveness analysis of interactive paediatric telecardiology. Journal of telemedicine and telecare. 2004; 10: 78-83.
23. Justo R, Smith AC, Williams M, et al. Paediatric telecardiology services in Queensland: a review of three years' experience. Journal of telemedicine and telecare. 2004; 10: 57-60.
24. Bellavance M, Béland MJ, Van Doesburg NH, Paquet M, Ducharme FM and Cloutier A. Implanting telehealth network for paediatric cardiology: learning from the Quebec experience. Cardiology in the Young. 2004; 14: 608-614.
25. Widmer S, Ghisla R, Ramelli GP, et al. Tele-echocardiography in paediatrics. European journal of pediatrics. 2003; 162: 271-275.
26. Smith AC, Williams M, Van der Westhuyzen J, McCrossin R, Isles A and Wootton R. A comparison of telepaediatric activity at two regional hospitals in Queensland. Journal of telemedicine and telecare. 2002; 8: 58-62.
27. Smith AC, Isles A, McCrossin R, et al. The point-of-referral barrier - a factor in the success of telehealth. Journal of telemedicine and telecare. 2001; 7: 75-78.
28. Tsilimigaki A, Maraka S, Tsekoura T, et al. Eighteen months' experience with remote diagnosis, management and education in congenital heart disease. Journal of telemedicine and telecare. 2001; 7: 239-243.
29. Finley J, Sharratt G, Nanton M, et al. Paediatric echocardiography by telemedicine-nine years' experience. Journal of telemedicine and telecare. 1997; 3: 200-204.