

TELEMEDICINE IN PAEDIATRICS: USES, BENEFITS AND LIMITATIONS

Awokola B. I. MB BS¹, Awokola E.O. ², Ogundele O.O ³

¹*Graduate of Ibadan Medical School, Postgraduate student of Medical Informatics at the Université de Sherbrooke, Quebec, Canada (At the time of writing).*

² *Graduate Of Imo State University Owerri, PG Student Of Computer Science at the University Of Ibadan, Ibadan, Oyo State.*

³ *Obafemi Awolowo University Teaching Hospital (OAUTH), Ile-Ife,*

ABSTRACT

The newly developing field of telemedicine has the potential to benefit paediatric care by increasing access to paediatric specialists and services. Even though uses of telemedicine in paediatrics are not as established as in adult medicine, there is now increased awareness about its importance .This article explores the current uses, benefits and limitations of telemedicine in paediatrics.

Key Words: Telemedicine, paediatrics, uses, benefits

INTRODUCTION

Telemedicine in paediatrics is defined as the use of electronic communications technology to provide and support healthcare for infants, children, adolescents and young adults when distance separates the practitioner from the patient, parent and guardian or referring practitioner ¹.E-health (use of the internet in health care delivery) is included in this definition while the use of ordinary telephone communication is excluded.

American Telemedicine Association defines it as the use of medical information exchanged from one site to another via electronic communication

for the health and education of the patient or practitioner and for the purpose of improving healthcare ².

Telemedicine has significant benefits to children with special needs or children residing in underserved areas ³. This article explores the special paediatric needs that may be met by telemedicine.

USES OF TELEMEDICINE IN PAEDIATRICS

Telemedicine holds considerable promise for paediatrics and paediatricians .The following are paediatric services with known telemedicine adaptations:

that it was acceptable to patients¹².

Radiology

For the past 30 years, teleradiology programs have been in existence. The electronic transmission of images to meet the needs of paediatric care has been well researched⁴ and is routine in many centres. The challenge today is providing the above services in an effective manner over broad areas.

Cardiology

Cardiology has widely embraced telemedicine^{5,6,7,8}. Echocardiogram, ultrasonographic images are transmitted electronically and evaluated accurately in established telecardiology program.

Mental Health

Provided the setting, staff capabilities and access to information sharing is conducive, it has been found out that parents and even children are highly satisfied with psychiatric counseling delivered via telemedicine⁹. Interestingly, diagnostic accuracy seems to be excellent¹⁰.

Child Abuse

For efficient management of victims of child abuse, interdisciplinary communication must take place. This is made stressless by telemedicine¹¹. A study on the use of teleconference facilities in the evaluation of child abuse in Florida showed

Dermatology

Remote “teledermatology” consultations have become commonplace at many medical centres¹³. Special peripheral cameras called dermatoscopes has proven adequate in providing enough detail to make a dermatologic diagnosis.

Hospital care and family communication

Families separated from their infants are kept updated on their infant's condition by viewing images of their infants while they are in the neonatal intensive care unit^{14, 15}. Rate of direct discharge home from the neonatal ICU (rather than via the neonatal inpatient ward) was found to be increased in one study¹⁶.

Pathology

Telepathology is a visually intensive discipline readily amenable to telemedicine consultation especially in rural areas¹⁷. Paediatric telepathology services are more cost effective than physical transport of specimens¹⁸.

Emergency and transport services

Teleconferencing provides a way by which practitioners in a remote area can receive real-time emergency consultations¹⁹. This is particularly beneficial for infants and children in rural emergency departments in which complex

paediatric disease is seen only rarely, giving these patients the benefit of paediatric consultants where none were available previously.

Patient Education and Chronic Disease

Children who depend on medical equipment have access to improved care by use of telemedicine monitoring²⁰. The efficacy of telemedicine in patient education via teleconferencing e.g. to teach the proper use of asthma medications has been demonstrated^{21,22}.

School Health

School systems are now employing telemedicine links to extend the range of services in school-based clinics and decrease absenteeism for illness or disease management encounters^{23,24}.

BENEFITS OF TELEMEDICINE IN PAEDIATRICS

One of the most immediately visible cost savings of telemedicine is the decreased need to transport patients to paediatric centres for critical care^{6,7,19,15}. Patient/parent satisfaction is also increased³¹.

By decreasing the need for transporting patients to specialist paediatric centres and specimens to centres having pathologists, telemedicine helps to decrease cost of healthcare^{25, 26}. Resources budgeted for this can be diverted to other areas of healthcare.

Healthcare provision at home, with family members around, not only save money but also preserve healthcare quality. Access to specialist care in centres without specialist paediatricians is increased by telemedicine. All these ensure quality healthcare^{9,27,28}.

LIMITATIONS OF TELEMEDICINE IN PAEDIATRICS

The following contribute to limiting the use of telemedicine in paediatrics.

(a) Paucity of high quality studies: Even though any service can be provided via telecommunications, lack of sufficient research in the field of paediatric telemedicine has limited its applications¹⁷.

(b) Lack of Cost-benefit analyses: There is no proper cost-benefit analyses in the field of telemedicine (especially in paediatrics). Such evaluations need to be performed before a long term and widespread commitment by the paediatric community is likely to occur.

(c) Slow adoption by physicians: Physicians have been relatively slow to adopt telemedicine. In fact, where telemedicine has been used, it has frequently been a demonstration or research project³². This must change if telemedicine is to enjoy wide patronage.

CONCLUSION

Telemedicine has important uses in

accessing paediatric subspecialty services, improving communications with parents of sick and chronically ill children and extending the boundaries of the medical home. Decreased needs to transport patients over long distances, lesser cost of health and patient/parent satisfaction are benefits derived from paediatric telemedicine.

Research is limited on the clinical usage of telemedicine in paediatrics. More studies in and better acceptance of telemedicine (by physicians) removes the limits off it.

REFERENCES

1. Field M J,ed. Telemedicine: A guide to Assessing Telecommunications for Health Care. Washington, DC: National Academy Press; 1996
2. Linkous JD. Toward A Rapidly Evolving Definition of Telemedicine .Washington, DC: American Telemedicine Association; 2001.Available at www.atmeda.org/news/definition.html. Accessed October 11,2007
3. Centres for Medicare and Medicaid Services. Medicaid And Telemedicine. Baltimore, MD: Centres for Medicare and Medicaid Services, Department of Health and Human Services: 2 0 0 2 . A v a i l a b l e a t <http://cms.hhs.gov/states/telemed.asp>.

Accessed October 11, 2007.

4. Slovis TL, Guzzardo-Dubson PR .The clinical usefulness of teleradiology of neonates: expanded services without expanded staff. Paediatr Radiol. 1991, 21:333-335.
5. Casey F, Brown D, Craig BG, Rogers J, Mulholland HC .Diagnosis of neonatal congenital heart defects by remote consultation using a low-cost telemedicine link. J.Telemed.Telecare.1996, 2:165-169.
6. Finley JP, Sharratt GP, Nanton MA, et al. Paediatric echocardiography by telemedicine nine years' experience. J Telemed Telecare.1997, 3:200-204.
7. Sable C, Roca T, Gold J, Gutierrez A, Gulotta E, Culpepper W. Live transmission of neonatal echocardiograms from underserved areas: accuracy, patient care, and cost. Telemed J.1999, 5 : 3 3 9 - 3 4 7 .
8. Sable CA, Cummings SD, Pearson GD, et al. Impact of telemedicine on the practice of paediatric cardiology in community hospitals. Paediatrics.2002, 109(1). Available at: www.paediatrics.org/cgi/content/full/109/1/e3.
9. Ermer DJ. Experience with rural telepsychiatry

clinic for children and adolescents. *Psychiatr.Serv.*1999, 50:260-261.

10. Elford R, White H, Bowering R, et al. A randomized, controlled trial of child psychiatric assessments conducted using videoconferencing. *J Telemed Telecare.*2000, 6:73-82.

11. Kellogg ND, Lamb JL, Lukefahr JL. The Use of Telemedicine in Child sexual abuse evaluations. *Child Abuse Negl.*2000, 24:1601-1612.

12. Pammer W, Haney M, Wood BM, et al. Use of telehealth technology to extend child protection team services. *Paediatrics.*2001, 108:584-590.

13. Whited JD. Teledermatology. Current status and future directions. *Am. J Clin Dermatol.*2001, 2:59-64.

14. Gray J, Pompilio-Weitzner G, Jones PC, Wang Q, Coriat M, Safran C, Baby CareLink: development and implementation of a www-based system for neonatal home telemedicine *Proc AMIA Symp.* 1998:351-355.

15. Gray JE, Safran C, Davis RB, et al. Baby CareLink: using the internet and telemedicine to improve care for high-risk infants. *Paediatrics.*2000, 106:1318-1324.

16: Hopkins-Koglin O. Loved ones are only a click away for kids with cancer. *Oregonian.* September 2, 2000:C1, C5.

17. Bilalovic N, Paties C, Mason A, Benefits of using telemedicine and first results in Bosnia and Herzegovina. *J Telemed Telecare .*1998, 4(suppl 1):S91-S93.

18. Della Mea V, Cortolezzis D, Beltrami CA. The economics of telepathology-a case study. *J Telemed Telecare.*2000, 6(suppl 1):S168-S169.

19. Kofos D, Pitetti R, Orr R, Thompson A. Telemedicine in paediatric transport: a feasibility study. *Pediatrics.* 1998, 102 (5). Available at: www.pediatrics.org/cgi/content/full/102/5/e58.

20. Miyakasa K, Suzuki Y, Sakai H, Kondo Y. Interactive communication in high technology home care: videophones for paediatric ventilatory care. *Pediatrics.*1997, 99 (1). Available at: www.pediatrics.org/cgi/content/full/99/1/el.

21. Bynum A, Hopkins D, Thomas A, Copeland N, Irwin C. The effect of telepharmacy counseling on metered-dose inhaler technique among adolescents with asthma in rural Arkansas. *Telemed J E Health.*2001, 7:207-217.

22. Romano MJ, Hernandez J, Gaylor A, Howard S,

- Knox R. Improvement in asthma symptoms and quality of life in paediatric patients through specialty care delivered via telemedicine. *Telemed J E Health*.2001, 7:281-286.
23. Miller TW, Miller JM. Telemedicine: new directions for health care delivery in Kentucky schools [Letter]. *J Ky Med Assoc*. 1999, 97:170-172[Medline].
24. Mair F, Whitten P. Systematic review of students of patient satisfaction with telemedicine. *BMJ*.2000, 320:1517-1520.
25. Rylander E, Fagerberg M, Bergius H, et al. Hospital managed care of children in their homes by integrating advanced medical treatment, telemedicine and health management :an approach by the paediatric clinics at Karolinska Hospital in Stockholm, Sweden. *Telemed J*.2000, 6:295.
26. Bergius H, Eng A, Fagerberg M, et al. Hospital-managed advanced care of children in their homes. *J Telemed Telecare*.2001, 7(suppl 1):S32-S34.
27. Murdison Ka. Telemedicine: a useful tool for the paediatric cardiologist. *Telemed J*.1997, 3:179-184.
28. Gruskin A, Williams RG, McCabe ER, et al. Final Report of the FOPE II Paediatric Subspecialists of the Future Workgroup. *Pediatrics*. 2000, 106:1224-1244
29. Hersh WR, Wallace JA, Patterson PK, et al. Telemedicine for the Medicare population: Paediatric, Obstetric and Clinician-Indirect Home Interventions .Rockville, MD: Agency for Healthcare Research and Quality; 2001. Evidence Report/Technology Assessment No. 24, Supplement, AHRQ Publication No. 01-E 0 6 0 . A v a i l a b l e a t : www.ahrq.gov/clinic/epcsums/telemedsup.htm Accessed October 12 2007.
30. Hersh WR, Patterson PK, Kraemer DF. Telehealth: the need for evaluation redux. *J Am Med Inform Assoc*.2002, 9:89-91.
31. E.Strehle, N Shabde. Telemedicine and Paediatrics: An overview. *BMJ (Arch. Dis. Child)* 2006; 91; 61-63.Available at www.adc.bmj.com Accessed October 8, 2007.
32. S. Andrew Spooner, MD, MS, Edward M. Gotlieb, MD. Telemedicine: Paediatric applications. *PAEDIATRICS* Vol.113, No. 6, June 2004, pp e639-e643.

