CHAPTER 5

TECHNOLOGY TO SUPPORT MULTIDISCIPLINARY CARE AND COMMUNICATION BETWEEN DISTANT SITES

Adapted from:

Wilson SF, Collins N, Warner B, Marks R, Frick L. Benefits of Multidisciplinary Case Conferencing using Audiovisual compared to Telephone case conferencing: a randomised controlled trial. *Journal of Telemedicine and Telecare.* 2004; 10: 351-354

5.1 Background and aims

Telemedicine, using audiovisual communication, has been evaluated in numerous studies [108]. The subject of much research has been the comparison of face-to-face consultation and audiovisual conferencing. It has been suggested that an audiovisual medium may be suitable for many purposes including patient assessment and team management. Currell *et al*, in a Cochrane review of telemedicine, concluded that there was little evidence of clinical benefits in the trials they reviewed [109]. These studies did not include the use of the telephone as a comparison, even though it has gained universal acceptance as a means of communication between health professionals with far less rigorous evaluation than audiovisual conferencing.

Multidisciplinary teams have used telephone conferencing for many years to overcome geographical limitations to their meetings [110]. This has been the situation for the Macarthur Ambulatory Care Service (MACS), which is a multidisciplinary team consisting of doctors, nurses and allied health professionals who provide a single community service based at two hospitals situated 16 km apart. This team is responsible for community "hospital in the home", and cares for up to 150 patients per month requiring treatment with parenteral medication and/or multidisciplinary care. The introduction of a audiovisual conferencing link between the two hospitals was received with enthusiasm as a replacement for the existing thrice-weekly telephone conferences.

The telemedicine link was an opportunity for the author to utilise this technology to improve time efficiency, communication between team members and

ultimately the quality of patient care. The financial investment was made in expectation of greater time efficiency and better clinical outcomes, although there is little evidence to support this idea [111,112]. The study described in this Chapter was designed to determine whether there were any benefits of audiovisual multidisciplinary case conferencing when compared to telephone conferencing. The areas of interest were efficiency, quality of the care plan and clinical outcomes.

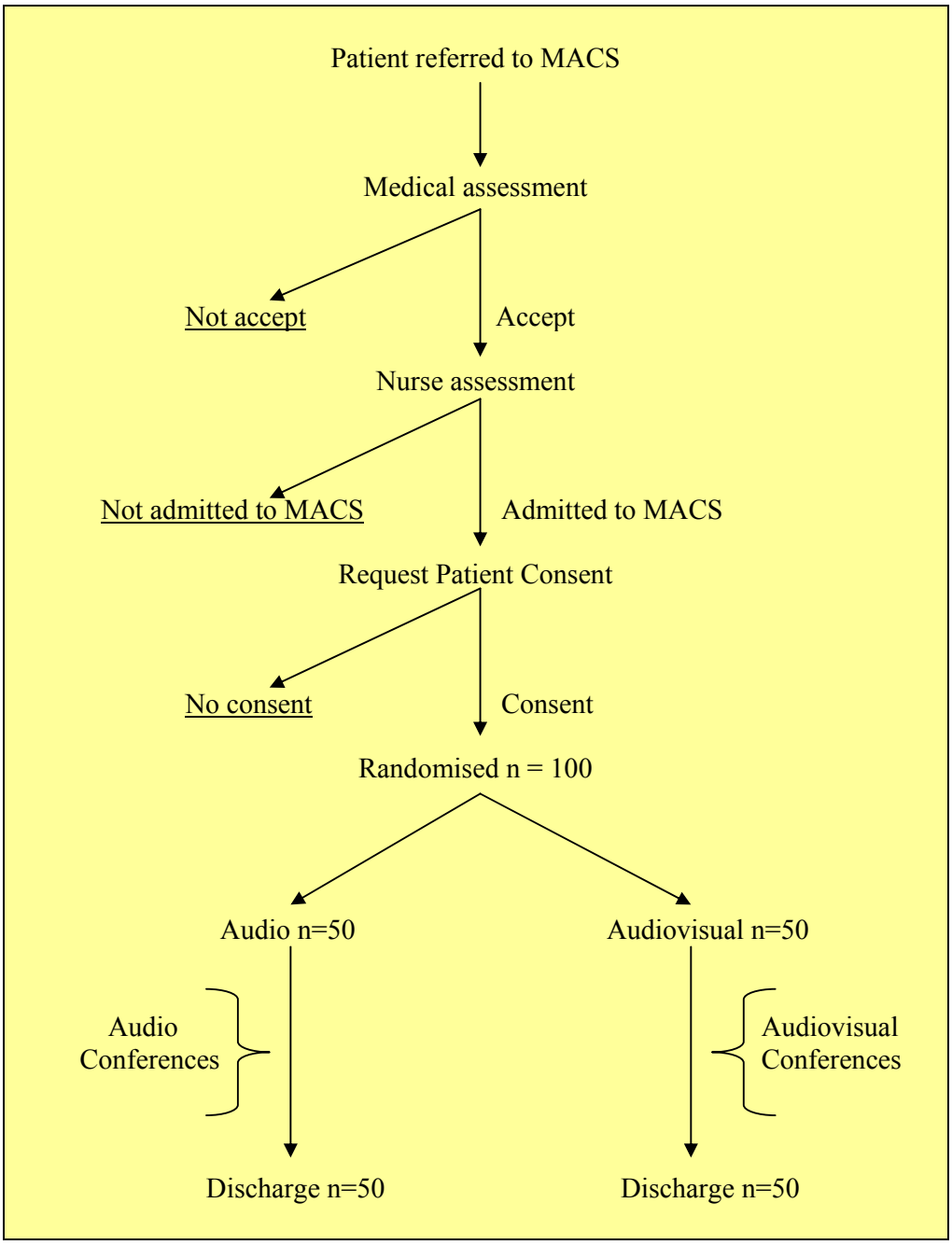
5.2 Methods

The Macarthur Health Service provides public hospital and community services to a population of 250,000 people over a geographical area of 3070 km^2. The MACS service delivers acute care in the home as an alternative to hospital. There are up to 30 patients admitted to the service at any time, with an average length of treatment of 5.1 days for 2500 patients in the year 2002 (including day-only patients). This study was granted ethics approval by the Human Research and Ethics Committee of South Western Area Health Service to perform a randomised controlled trial of telephone versus audiovisual conferencing via video.

Consenting patients referred to the MACS service at either Camden or Campbelltown Hospitals were randomly allocated at the time of assessment to either the audio conferencing or audiovisual conferencing group. The random allocation was done by an independent administrative assistant, using a table of random numbers. The first and subsequent conferences continued for the patient allocated to one of the two forms of conferencing until discharge from the

episode of care, or two months following admission. The audio link was conducted prior to the audiovisual conferencing link for each conference session.

Figure 5.1 **Flow diagram of audiovisual conference RCT**



This ensured that there was no visual contact between the two teams at each site until the second stage of the conference. Conference times were recorded by an independent observer, and files were reviewed by an independent medical practitioner blinded to the randomisation. The items reviewed from the files related to quality and outcome indicators. As patients were not present at the case conference, they were unaware of the type of conference conducted. The team was aware of the allocation of patients at the time of the first case conference and thereafter.

At the completion of the trial in July 2003, a satisfaction survey of 14 staff members involved in the trial was conducted. The remaining 15 were unavailable for interview due to changed employment or to rotation to other areas. Patients admitted for day-only procedures were not invited to participate. Equal numbers of patients were randomised to control (audio conferencing) or intervention (audiovisual conferencing) groups. The team members participating in the trial were two medical staff specialists, two medical registrars, 15 nurses, one speech pathologist, two occupational therapists, one social worker, and six medical students. The team remained consistent at both sites for both the audio and audiovisual conferences held on each individual day of the conference. The team members rotated between sites over the study period. The mean number of team members at each site was three at Camden Hospital and 5.4 at Campbelltown Hospital. The mean number of professional disciplines represented at Camden and Campbelltown respectively were nursing (1.59, 1.95), medical (1.13, 1.82), social work (0.16, 0), occupational therapy (0, 0.66), speech pathology (0, 0.32), students (0.03, 0.66) and visiting health professionals (0.11, 0.03).

The effectiveness of the intervention compared to the control was determined by the following outcome measures: number of case conferences, average length of conference, length of treatment, occasions of service, multidisciplinary team involvement, recorded level of communication, a documented management plan, the number of adverse events, and staff satisfaction.

The two hospitals had identical videoconferencing suites which were connected via ISDN at 128 kbit/s (Figure 1). The videoconferencing units were room-based (Vista Pro^{TM} & V Tel^{TM}). A floppy disk drive and a CD drive were installed for observation of JPEG images.

All results were analysed using a statistical software package (SPSS v11.5). The groups were compared using a two-tailed *t*-test for independent samples. Proportions in both groups were compared using a χ^2 analysis. All data were analysed by intention to treat.

5.3 Results

One hundred patients referred to the MACS service in the months of March and April 2003 consented to participate and were followed up until discharge, or for a maximum of two months. This represented 32% of all patients treated by the service during this time. The two groups were similar for age, sex and diagnosis (Table 5.1). There were no deaths and all patients recruited completed the trial. There was one patient in the control group who continued treatment following the two-month cut-off period for data collection. Length of treatment for this patient was considered to be 61 days for the purpose of this study. There were no technical difficulties experienced with audio or video connections during the

course of the trial. There were 38 conference sessions with 263 individual patient discussions by the team over the period of the study.

Table 5.1 **Patient demographics (n=100)**

	Audio n=50	Video n=50
Age (years)	53 (SD 19)	47 (SD 18)
Sex		
Male	25 (50%)	22 (44%)
Female	25 (50%)	28 (56%)
Casemix		
Superficial infections (cellulitis, wounds)	17 (34%)	17 (34%)
Deep infections (osteomyelitis)	2 (4%)	0
Respiratory infections (pneumonia, exacerbation of chronic obstructive airways disease)	9 (18%)	7 (14%)
Coagulation (deep vein thrombosis, pulmonary embolism)	11 (22%)	11 (22%)
Other (single diagnosis)	11 (22%)	15 (30%)

The mean results are shown in Table 5.2. The mean number of audio conferences held per patient (3.3, SD 4.4) was significantly greater than the mean number of audiovisual conferences held (1.9, SD 1.3), (mean difference 1.4; 95% CI 0.1 to 2.7; p=0.037). The mean length of treatment for the audiovisual group was 6.0 days which was significantly less than the length of treatment of 10.2 days in the audio group (mean difference 4.2 days; 95% C.I. 0.54 to 7.94; p= 0.025). If the one outlier patient was removed from the statistical analysis, the difference between the groups for the average length of treatment was still significant (p=0.04).

There were fewer occasions of service (n=9.0) in the audiovisual group compared to the audio group (n=12.5). The difference between the number of occasions of service for nursing and allied health recorded for the two groups was not significant (p=0.11). There was no difference in the length of the conference between the two groups (p=0.89).

There was a file entry in the patients' case notes after more of the audiovisual conferences (96%) than the audio conferences (91%). This difference was not significant (p=0.216).

Every patient was seen by a doctor and nurse. There was more multidisciplinary care, measured by referral to at least one other health professional, for audiovisual cases (26%) than in the control group (18%). However, this was not significant (p=0.470).

There was no difference between the groups in the number of issues recorded in the management plan (p=0.339, Table 5.2). The number of communications recorded in the notes between health professionals was not significantly different for each group (p=0.068). Adverse events recorded as part of the routine monitoring (MAP database) for all admissions to the service were of a minor nature and similar for each group (control, 5; intervention, 5). These events included medication error by three patients, one non-attendance, one non-compliance, one medical condition, one other agency/service variation, one adverse drug reaction, one delay in referral, and one delay in review.

Digital photographs were viewed for 12 patients in the audiovisual conferences between sites, while 34 photographs of patients in the audio conference group were available but unable to be viewed by the team on the telephone receiving end.

Table 5.2 **Audio vs audiovisual conferences**

Item	Mean Audio (SD)	Mean Video (SD)	Mean Diff	95% Confidence Interval	p Value
Number of conferences	3.3 (4.4)	1.9 (1.3)	1.4	0.08 to 2.68	0.037
Length of treatment (days)	10.2 (12.4)	6.0 (4.5)	4.2	0.54 to 7.94	0.025
Length of conference (min)	2.6 (1.8)	2.6 (1.0)	0.0	-0.54 to 0.62	0.893
Occasions of service – nursing and allied health	12.5 (12.8)	9.0 (7.9)	3.5	-0.75 to 7.71	0.106
Number of issues in conference plan	2.7 (0.9)	2.9 (0.9)	0.2	0.53 to -0.19	0.339
Proportion of conferences recorded in the patient's case notes	91%	96%	5%	-1% to 11%	0.216
Recording of communication with other allied health disciplines per patient episode of care	48%	68%	20%	0% to 40%	0.068
Multidisciplinary involvement in the management plan per patient episode of care	18%	26%	8%	-8% to 24%	0.470

5.4 Satisfaction survey of Telehealth participants

All 14 staff interviewed thought that audiovisual conferencing should continue, and believed that audiovisual conferencing provided better patient management than telephone conferencing. All respondents indicated their preference for face-to-face conferencing compared to audiovisual conferencing or telephone conferencing. All but one of the 14 indicated that audiovisual conferencing provided a better patient plan than telephone conferencing.

5.5 Discussion and conclusions

The present study demonstrated a significant reduction in the average length of treatment and the number of case conferences held when audiovisual case conferencing was used. Videoconferencing was popular and well accepted by the team as an alternative to telephone conferencing. However, there were no significant differences in occasions of service. One possible explanation is that the same medical and multidisciplinary input occurred for all patients accompanied by a more rapid resolution of issues resulting in discharge in the audiovisual conferencing group. In other words, patients were treated more quickly, but the cost to the provider was the same.

The present study suffered some limitations. The sample size was small and a difference in occasions of service may have been evident in a larger study. The nature of this type of study did not allow the team to be blinded to the intervention. However the team was not aware of the measures used to measure the quality of the case conference or multidisciplinary care.

There was some evidence to suggest that audiovisual conferencing resulted in a greater likelihood of the conference being recorded in the notes, although the difference was not significant (Table 5.2). The greater uptake of multidisciplinary care requires a longer study to determine if this finding is significant. It is still to be determined that this improvement in clerking and improved outcomes through multidisciplinary care is sufficient to warrant the use of audiovisual conferencing routinely. The experience of this study indicates that once audiovisual conferencing is introduced there is a high level of satisfaction by team members, which may be an important factor in team building. The sharing of images during the conference may be also important. As stated by Wootton, "The main problem in telemedicine is not a lack of technology, but rather an organizational problem of knowing how to take advantage of the technology" [113].