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ORIGINAL ARTICLE

Evaluating the Feasibility and Validity of Using Trained Allied Health Assistants to Assist in Mealtime Monitoring of Dysphagic Patients

Maria Schwarz[1,2] · Elizabeth C. Ward[2,3] · Petrea Cornwell[4,5] · Anne Coccetti[1] · Naomi Kalapac[1]

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Abstract

Growing patient numbers, within a context of finite resources, has placed increased demands on dysphagia services in acute settings. Delegating some aspects of dysphagia management to other trained professional groups, such as allied health assistants (AHA), may help speech-language pathology (SLP) service efficiencies. The primary aim of this study was to explore the feasibility and initial validity of using trained AHAs to complete structured mealtime observations of patients. The secondary aims were to explore costs and user perceptions. The study used a mixed methods design. All AHAs who participated worked in the adult acute inpatient setting and were agreeable to participate; they successfully completed training and were deemed competent to use the observation tool. To explore validity, trained AHAs (n = 7) and SLPs (n = 5) conducted independent, simultaneous mealtime observations of 50 adult inpatients, using a structured observation form. Costs of AHA versus SLP time per average assessment were compared. Consumer perceptions were examined in semi-structured interviews with the AHA (n = 5) and SLP participants (n = 3). Exact agreement between AHA and SLPs on the overall pass/fail criteria was high (94%). Where exact agreement was not achieved, the AHA had made a more conservative decision. Salary costs and time savings for the SLP were identified. Interviews identified that both SLPs and AHAs perceived multiple positive personal and service benefits. High levels of agreement in clinical decisions and positive staff perceptions support feasibility and initial clinical validity. This model may assist SP efficiencies in services with high patient demand.

Keywords Deglutition · Allied Health Assistant · Mealtime observation

Introduction

Unmanaged dysphagia can result in significant medical complications, as well as increased financial costs to both the individual and the health service [1–6]. Hence early and

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✉ Maria Schwarz
maria.schwarz@health.qld.gov.au

[1] Speech Pathology and Audiology Department, Logan Hospital, Corner of Armstrong and Loganlea Roads, Meadowbrook, QLD 4131, Australia

[2] School of Health & Rehabilitation Sciences, The University of Queensland, Brisbane, QLD, Australia

[3] Centre for Functioning and Health Research, Queensland Health, Brisbane, QLD, Australia

[4] Menzies Health Insitutue, School of Allied Health Sciences, Griffith University, Brisbane, QLD, Australia

[5] Metro North Hospital and Health Service, The Prince Charles Hospital, Allied Health Research Collaborative, Brisbane, QLD, Australia

appropriate assessment and multi-disciplinary management of dysphagia is advocated to help mitigate these issues. In the majority of settings globally the Speech-Language Pathologist (SLP) adopts the primary role within the multi-disciplinary team for the assessment and management of dysphagia [7–9]. However, studies have highlighted that the role of the SLP in dysphagia management, particularly in the acute setting, is increasing—with significant impacts on workload and practice patterns [10–14]. This has ultimately impacted the time clinicians have available to engage in other services, and their ability to provide more time intensive dysphagia monitoring strategies, such as mealtime observation.

In the process of assessing dysphagia, the SLP typically completes a clinical swallow assessment, followed by an instrumental assessment as indicated [8]. Both these assessments involve exploring patient function in a short "snapshot" of time. Research has identified that a clinical dysphagia assessment by a SLP is often conducted between meals and lasts approximately 5.54 ± 2.18 min [15]. Similarly, data from videofluroscopic assessments show that they typically involve observing swallows between approximately 3 and 8 min of screening "on time" [16–18]. Due to the relative short durations of these studies, it is recognized all factors that can affect a patient's swallowing and mealtime functioning may not have been fully examined. Additional factors may include need for assistance, attitude towards eating, seating and positioning, dentition, time spent completing meal, and behavior [19, 20] which may impact tolerance of meals also cannot be fully assessed. Therefore, mealtime monitoring is advocated for some patients [8]. In light of SLP service demands, assistance with mealtime monitoring has typically been sought from nursing staff [21–23]. However, considering that mealtimes may take as long as 43 min per person per meal [24, 25], it impacts on the ability of nursing staff to complete continuous monitoring over an entire meal.

Recently alternative models which utilize Allied Health Assistants (AHA) for task delegation have grown in popularity [26]. An AHA is an individual who assists or provides any type of support to the work of a qualified allied health professional [26]. Within allied health practice, there is increasing evidence of the value of AHAs to assist with the delegation of duties in a range of practice areas including working towards rehabilitation goals through delegated therapy, supporting and supervising activities of daily living, and monitoring progress [26, 27]. The act of monitoring function to facilitate patient independence and safety has been delegated to AHAs in other areas of allied health, such as supervising bed exercise for physiotherapists [28], therefore the role of the AHA could be feasibly extended to incorporate mealtime monitoring and communication of these observations to the SLP. The use of AHAs specifically in the area of dysphagia management, however, has received limited systematic investigation to date. In research exploring the use of telehealth to conduct assessments of patients with dysphagia, a trained AHA was used in an assistant role to help the online clinician to complete their assessment [29]. In preparation for that assistant role, AHAs were provided with basic training and orientation to the process of the clinical swallow examination in order to optimize their ability to assist the online clinician with the assessment [30].

The aim of the current study was to explore the feasibility and validity of using trained AHAs to complete structured mealtime observations of dysphagic patients previously assessed by the SLP. The secondary study aims were to determine perceptions of both AHAs and SLPs regarding this new role, as well as providing preliminary evidence regarding direct cost comparisons. The overall objective of this research was to determine if AHAs can provide valid mealtime observations which could support the SLPs overall understanding of the patient's tolerance of a meal and therefore better inform dysphagia management.

Materials and Method

Participants

There were 3 participant cohorts in this research: AHAs, SLPs, and patients. All provided informed consent prior to participation and the study was conducted with full ethical approval (HREC/14/QPAH/509). To be eligible, the AHAs had to hold a position in the adult acute setting in which the research was set, have capacity to assist with speech pathology activities within their role, have obtained supervisors approval to complete training, provide informed consent, and have completed training specific to the completion of the MTOT (outlined below). They did not require any prior training or awareness of dysphagia management to participate. All available AHAs within the service were informed about the study and participation was voluntary. A total of 7 AHAs (two males, five females) agreed to participate from the available 10 staff (8 full time equivalent positions). Ages ranges from 35 to 57 years, 5 were working as a base grade assistant, while two were senior AHAs.

Five SLPs were recruited from a department of 14 staff (13 full time equivalent positions). To be eligible for participation staff were required to provide informed consent to participate, have more than 2 years experience in dysphagia management, work primarily with the inpatient caseload in the service and have had some involvement in implementing the AHA training (such as providing

theoretical training, assisting with competency attainment and providing supervision to AHA staff). All SLPs were female, aged between 26 and 38 years with between 2 and 12 years experience managing dysphagic patients.

A total of 50 patients referred for concerns regarding dysphagia risk were recruited from the inpatient caseloads of the SLP department in a secondary metropolitan hospital. Patients were consented from the cohort of new patients referred to SLP service who: had received a clinical swallow evaluation (CSE) by a SLP within 12 hours prior to the mealtime observation and the SLP identified concern regarding the patient's ability to manage an entire meal. The clinical swallow evaluation consisted of a review of the medical history and patient record, an oromotor examination and a trial of food and fluids. Relevant strategies such as diet/fluid modifications, changes in position, or self feeding were then trialed by the SLP based on clinical judgment.

At the time of the CSE the SLP provided diet and fluid recommendations in addition to safe swallow strategies such as slow rate and fluid flush, or compensatory strategies such as chin tuck for each patient as clinically appropriate. All patients were required to provide informed consent or have a substitute decision maker available to complete the consent process. Patients who were in intensive care, had a tracheostomy in situ, were under the care of a palliative care team or had advanced cognitive deficits were excluded as they were considered to be too complex for AHA delegation. The mean age of patients was 70.7 (SD 13.42, range 29–88), with the majority (36%) being admitted with a neurological condition. Demographic details are outlined in Table 1.

Table 1 Demographic information of patient population ($N = 50$)

Demographic	*N* (%)
Gender	
Male	23 (46%)
Female	27 (54%)
Reason for admission	
Cardiac	2 (4%)
Gastroenterological	5 (10%)
Injury/fall/trauma	6 (12%)
Multiple medical	6 (12%)
Neurological	18 (36%)
Respiratory	13 (26%)
Fluids observed	
Thin	47 (94%)
Mildly thick	3 (6%)
Diet observed	
Full diet	34 (68%)
Soft diet	10 (20%)
Minced-moist diet	5 (10%)
Puree diet	1 (2%)

Procedure

The study procedure involved three stages. Firstly, the AHAs underwent 1 hour of training on how to conduct mealtime observations and use the mealtime observation tool and then completed a competency check using a purpose-built competency assessment tool. Once trained, both AHAs and SLP conducted simultaneous observations of the cohort of 50 patients. Finally following completion of the 50 observations, semi-structured interviews were conducted with AHAs and SLPs to explore perceptions of the training and service model.

AHA Training

Each participating AHA was required to attend a 1-hour theoretical training session. Participants did not require any prior knowledge or skills regarding dysphagia, therefore, all participants were provided with the same level of introductory content in this session. This session was delivered by a SLP and included content relating to: the basic theory of dysphagia; signs to suggest a patient is having difficulty during meal times; inspection of the oral cavity for residue; information regarding collecting and reading pulse oximetry measures; and documentation/reporting procedures. It also involved familiarization with the content and observation process of the Mealtime Observation Tool (MTOT). The MTOT was a purpose-built tool developed for this research by two experienced SLPs and reviewed by other clinicians working in the service. It was designed to assist mealtime observations and enable documentation of findings for later communication to the SLP to facilitate clinical decision making. Although the tool was not psychometrically validated, face validity was optimized during its development through the inclusion of items validated by both clinical experience and research evidence. Specifically, this included evidence in the literature and from clinical experience regarding the predictive features of aspiration including wet voice, voluntary cough, and cough when swallowing [7, 8, 15, 31]. The use of pulse oximetry is recognized as an adjunct to clinical assessment [15, 32], with oxygen desaturation of greater than 2% has shown to be predictive of aspiration [15, 32]. As fluctuations in oxygen saturation are observed clinically to occur during a mealtime, the decision was made to consider a drop of 4% the criteria to indicate possible mealtime difficulty, to avoid over-referral caused by detection of minor saturation changes. Similarly, to avoid over-referral due to identification of a single cough during a meal, a clinical

criterion of three or more coughs in sequence or over the course of the meal was set to help identify patients at more risk of mealtime difficulty.

The MTOT was designed as an observational tool for identifying key behaviors suggestive of dysphagia risk or mealtime difficulty during a meal. The MTOT is completed entirely by the professional completing the observation, with an overall pass/fail rating indicating presence of dysphagia risk factors (such as coughing, increased time for meal completion, or pooling of food/fluids). The MTOT consists of three sections (see Online Appendix 1). Section one allows the delegating SLP to add information regarding the diet and fluid recommendations, contact precautions, special considerations and the meal being observed. Section two prompts the AHA to conduct observations prior to the meal including ensuring the patient is alert and upright, prompting the patient to wear dentures and placing the pulse oximeter on the patient to record a baseline reading. Section three allows the AHAs to record observations during the meal including observation of coughing, difficulty chewing, oxygen saturation, amount of food and fluid consumed, length of time to finish meal, and presence of oral residue.

An immediate fail on the MTOT was recorded if three or more occasions of coughing or throat clearing were observed following eating or drinking or if baseline oxygen saturation level dropped by more than 4%. If a fail was recorded the meal was removed from the patient, the nurses were alerted that the patient needed to remain nil by mouth awaiting repeat SLP review, and results were clearly documented in the medical record by the AHA using a standard documentation template. Other observations in section three such as taking an increased time to finish food, not finishing food and drinks, or having trouble chewing did not result in an immediate fail. AHAs were encouraged at all times to raise significant concerns to the SLP immediately and seek advice regarding progressing with MTOT observation.

Following the 1-hour training, each AHA observed a SLP complete 1 mealtime observation and score the MTOT. AHAs then independently conducted 3 mealtime observations and scored the MTOT under the observation of a SLP. An AHA was determined competent using the observation tool if their MTOT results during the 3 observations matched those of the SLP. Within the training program there was opportunity for AHAs to complete additional joint observations if the AHA or SLP felt this was required.

Simultaneous Patient Observations

To examine the validity of the AHAs observations using the MTOT, both an AHA and a SLP conducted a series of 50 joint mealtime observations. The AHA and SLP conducted the observation at the same time, sitting at the patient's bedside. Both the AHA and SLP were aware to conduct the observation independently and were instructed not to compare documentation or discuss the outcome of the observations until the completion of data collection. Diet and fluid consistencies consumed by the patient and use of compensatory strategies were determined by the outcomes and recommendations set by the CSE conducted by the SLP in the 12-hour period prior to the mealtime observation session. During the mealtime observation session, the AHA and SLP simultaneously, but independently, completed the MTOT observation form based on direct observations during that session. Observations by both the SLP and the AHA documented on the MTOT form were then collected for data analysis. In this research model, once data were collected, the AHA could then discuss the observation process and the findings with the patients managing/treating SLP. It was responsibility of the managing/treating SLP to make any required clinical changes to management or conduct a further swallow review as warranted. Overall duration of the mealtime observation session was also recorded.

Staff Interviews

Following the completion of all 50 patient observations, all consenting AHAs and SLPs underwent a phone interview. The interviews were conducted within a general inductive approach to qualitative analysis [33, 34]. A semi-structured interview guide was developed to elicit information from the AHA and SLP participants regarding (a) their perception of this new role, (b) any concerns they had regarding scope of practice or patient risk, (c) perceptions of training received, and (d) perceived benefits/limitations/concerns of this new role. Prompt questions were used to help elicit further information for each question. Interviews took approximately 20 min (range 9 min–18 min) and all were conducted by the study's second author, who was experienced in conducting research interviews and had not been involved in the direct implementation of the study within the service. The interviews were audio recorded and transcribed verbatim for later analysis.

Analysis

Data were collected on the completion of training for all AHAs. From the simultaneous observations of the 50 patients, the level of agreement between the overall score (pass/fail) and the individual elements of the observation tool as recorded by the AHAs and SLPs was totaled and then analyzed using both the percentage of exact agreement (%PEA) and the level of agreement using Kappa statistics.

A priori level of $> 80\%$ exact agreement and a κ value of > 0.6 indicating substantial or greater level of agreement [35] were set as a clinically acceptable level of agreement for this activity. Where any disagreements in the MTOT decisions (overall decision or component decision) occurred between the SLP and AHA, an error analysis was conducted. As the SLP was considered the "expert" in this study design, their MTOT findings were considered as the "correct" answer for the error analysis. AHAs results which differed from the SLPs findings were considered as a potential error.

Only the direct costs associated with either a SLP or an AHA performing the mealtime assessment was of interest in this study. The time to complete the mealtime observations was averaged in minutes. Costs relating to the average clinical time spent to complete the mealtime observation was calculated using Queensland Health wage rates from 2017 for HP3.8 (for the SLP position) and the OO3.4 level for the AHA (available at https://www.health.qld.gov.au/hrpolicies/wage_rates/health-practitioners) with 30% added as on-costs. All costs were expressed in Australian dollars and rounded up to whole dollar amounts.

Interview data were transcribed verbatim and then analyzed following the procedure summarized by Creswell [34]. This process involved a general read through of all verbatim interviews, coding the interview information into descriptive 'chunks' which were further analyzed into 'themes' as they emerged from repeat reading and then developing 'narrative passages' with themes and sub-categories including pertinent quotes to highlight each example [34]. Thematic coding was performed by the first author (MS), and subsequently checked by 3 other members of the study team (EW, PC, NK). Once final themes were obtained, the summarized themes were sent to participants for review and approval [34]. No participants provided feedback requesting changes to the summaries and therefore no further modification of themes was undertaken.

Results

Training

All 7 AHAs successfully completed training. After 3 observed sessions all 7 AHAs reported they were comfortable with the mealtime observation procedure and the MTOT and were determined by the SLP to be able to use the MTOT. Although there was opportunity for AHAs to complete additional joint observations if needed, this was not required for any participant.

AHA and SLP Agreement on the MTOT

The SLP-AHA pair attending for each observation varied. The 5 participating SLPs completed an average of 7 observations (SD 5.4), while the 7 participating AHAs completed an average of 10 observations (SD 11.3). When completed by the SLP, the MTOT result indicated 41 of 50 (82%) as having passed the mealtime observation. Of the 9 patients that failed; the SLPs failed 5 due to observed coughing and 4 due to multiple concerns (Table 2). Examination of the medical history of the patients who the SLPs passed/failed, revealed the highest rate of failure was observed in patients with gastroenterological concerns, respiratory conditions and those admitted post injury/fall or trauma (Table 2). All patients who were determined by the SLP to have failed the MTOT were placed nil by mouth and referred back to their managing/usual SLP for ongoing management.

Comparisons of the overall result from the MTOT recorded by the SLP with that recorded by the AHA revealed 94% exact agreement ($k = 0.82$) indicting high degree of agreement. This consisted of exact agreement between the SLP and AHA for 38 patients identified as having "passed" and 9 observations in exact agreement with identified "failures". Disagreement between the SLP and the AHA decisions was identified on only 3 (6%) of patients and in all cases the AHA was noted to have made a more conservative decision (i.e., rating the observation as a "fail" while the SLP rated it as a "pass"). Analysis of the reasons for the AHAs "fail" decision revealed the AHAs had noted 2 instances of noted coughing and 1 instance due to observed desaturation. All 3 patients had known respiratory compromise and these cough/desaturations were not considered by the SLPs as indicators of aspiration as regular coughing was observed prior to commencement of oral intake.

The breakdown of the SLP-AHA level of exact agreement on the specific items on the MTOT can be found in Table 3. Partial data (individual item results) from one patient were lost due to a data entry error; however, remaining results (which included the overall pass/fail rating) from this patient were included in analysis. Ratings of coughing noted to have the lowest level of agreement (80%). In the 10 cases where disagreement was observed the SLP stated nil coughing where the AHA reported coughing in 5 cases and in 5 where the SLP stated coughing and AHA reporting nil coughing. Importantly when disagreement was evident, this did not affect the pass/fail outcome (i.e., coughing was observed less than three times throughout the meal). Exact agreement on all other specific items was greater than 90%.

Table 2 Failure reason on MTOT in patient populations

	Pass	Fail	Percent fail rate (%)[a]	Failure reason
Neurological (n = 18)	17	1	6	Multiple concerns
Respiratory (n = 13)	9	4	31	Coughing and multiple concerns
Injury, fall or trauma (n = 6)	5	1	17	Coughing
Multiple medical conditions (n = 6)	6	0	0	Not applicable
Gastroenterological (n = 5)	2	3	60	Coughing and multiple concerns
Cardiac (n = 2)	2	0	0	Not applicable

[a]All pass and fail ratings are based on the overall pass/fail rating provided by the speech pathologist as this was considered the 'true' rating based on expert opinion

Table 3 Percent Exact Agreement (PEA) between the Allied Health Assistant (AHA) and Speech Pathologist (SP) on the mealtime observation tool (MTOT) rating criteria

	AHA (n = 50)	SP (n = 50)	Total ratings in agreement[b]	Kappa	PEA (%)
Overall result			47	0.82	94
Overall decision (pass/fail)					
Pass decisions	38	41	38		
Fail decisions	12	9	9		
	AHA (n = 49)[a]	SP (n = 49)[a]	Total ratings in agreement[b]		PEA (%)
Individual item result[b]					
Coughing present	14	14	39		80
Chewing difficulty present	3	2	47		96
Increased time to finish meal	2	1	46		94
Residue present	0	0	49		100

[a]One section of results removed from analysis due to missing data on AHA MTOT record form

[b]Total ratings of agreement include agreement on both presence and absence of indicators described

Time and Cost Data

The mean time to complete the mealtime observation session was of 27.5 min (SD 8.3, range 15–50) per patient. To complete a MTOT of approximately 30 min a SLP would cost $30, while a registered nurse would cost $28, compared to an AHA costing approximately $19. This allows an approximate cost saving of $11 per observation when compared to a SP and $9 compared to a registered nurse. Once this clinical model was implemented in clinical practice there would be approximately 5–10 min of SLP time discussing and reviewing the MTOT results with the AHA, hence it could conservatively be assumed that this would provide the SP with 20 min to complete other clinical duties. Cost and time associated with training was not included in analysis as this was considered part of usual professional duties for both SLPs and AHA (i.e., attending professional development opportunities).

Staff Perceptions

Due to staffing changes over the course of the project (participants leaving the organization or moving to other positions), 2 SLPs (female, with more than 5 years experience) and 1 AHA (senior female) were unavailable to participate in the post data collection interviews, leaving 3 SLPs and 6 AHAs available to be interviewed. Three key themes emerged from the interviews of the SLPs and AHAs seeking their perceptions on AHAs completing mealtime monitoring in the acute hospital setting. The first theme was centered on "training" which was the dominant theme and reflected the perceived benefits of training, and the high quality of the training procedures. The second theme related to scope of practice and highlighted the importance of role awareness and scope limitations for the AHAs, as well as the limitations of AHA delegation. Finally, the third theme related to process and operational components which focused primarily on the practicalities

of conducting the MTOT, including concerns regarding equipment use and documentation.

Training

The dominant theme to emerge from the interviews was the quality and benefits of the training structure used in this study which improved AHA skill and confidence. This theme highlighted the value of having both theoretical and practical components incorporated in the training program. As well as demonstrating the importance of side-by-side observations at the beginning of the training to improve AHA confidence, minimize concerns regarding missing key components and allowing time to familiarize the AHA with a new clinical area.

> AHA1- "I felt I guess more comfortable having the speech pathologist there watching the mealtime observations as well…just while I was learning"; AHA 4- "I was really nervous when I first started doing it by myself. And now I'm not"; SLP 1 "the newer AHAs…might have struggled with confidence a little bit…but I think once they had one or two…mealtime observations…they were fine."

In addition, the theme of training affirmed that the training was at an appropriate level for AHAs with varying levels of experience. *AHA 2 "I felt that they were very well done…we sat down and we watched the clinicians do it and then the clinicians kind of sat there with us…made me feel quite, we were on the same track with patients, so that was really good."* The training theme also demonstrated that with appropriate training the AHA's role can be expanded and this is beneficial for both the AHA and SLP. In particular, several AHA's expressed feeling valued and satisfied through their ability to take on new tasks. *AHA 1 "I guess satisfying being able to provide that service to the speech pathologists…and improve the…care that our patients are receiving"; AHA 2 "It's a nice feeling to know that you've maybe helped somebody"; AHA 2- "because there are a lot of things that AHAs could contribute…we just need up-skilling and training"; AHA 5 "the mealtime observation can take a while…so they (SLP) can go on to do other things."*

Scope of Practice

The second main theme, termed "scope of practice" centered on the AHA being aware of their role limitations, as well as the SLP being conscious of the type of patients AHAs were delegated to complete mealtime observations. Both AHAs and SLP highlighted that while AHA delegation can be expanded there are limitations to their scope of practice, which were clearly identified and maintained by the AHAs. *AHA 3 "our scope is not nearly as broad as you guys (SLP)"*; *AHA 2 "we've got to put the halt on probably a long time before they (SLP) would"*; *SLP 1 "they (AHA) would be more cautious and therefore would give you a higher fail rate."*

The AHAs also reported that they were initially cautious about the extended scope of practice given the inherent risk of dysphagia management, but felt that their confidence was greatly improved by the training they received. *AHA 1 "just worrying about…missing something"*; *AHA 4 "I think if I didn't have the proper training then it would have been a lot different outcome…if you were sent there and not enough training I think I would have panicked."* SLPs focused on scope of practice from a delegation perspective, highlighting that they are conscious of the type of patients who may be appropriate for delegation. *SLP 2 "There will certainly be patients that I won't allocate to an AHA …feeling that they're inappropriate."*

Process and Operational Context

The third theme, "process and operational context" was noted to be broad and included both inter-professional relationships, as well as more practical components such as documentation and using equipment. In particular the interviews highlighted the importance of having a strong working relationship and collegial support between the SLP and AHAs, which many AHA's reported improved their confidence and assurance in the model.

> AHA 4 "And also they're very helpful and if you're in doubt you can just ring them and um they're there for you. So that's another really good aspect that you're not out on your own you know"; SLP 3 "I think it's also important just to remind them that if they're unsure about something then they can always call us (SLPs)"

Equipment issues were raised by several AHAs particularly with regards to oxygen meters, which highlights that such clinical tasks represent a new area for many AHA and may require further focus in the training domain. *AHA 1- "technology issues with things like oxygen meters…so I guess a very good learning experience as well"*; *AHA 6 "was completely new to using that equipment…a bit more training around managing those sort of things."*

Documentation and the importance of a structured form was raised by the SLP, while the AHA's focused more on practical concerns such as where to file documentation in the medical record. *SLP 2 "I think that it (form) talks the AHA through things quite thoroughly and triggers all of those potential flags"*; *AHA 1 "bit of confusion…where the information's meant to go in the progress notes."*

Discussion

The current findings support the study aims, identifying that trained AHAs were able to complete mealtime observations with high levels of agreement with SLP decisions regarding patient mealtime safety. In addition, both SLPs and AHAs perceived that with a solid training and implementation framework, delegation of mealtime observations for patients with dysphagia in the acute setting was feasible and valid. In contrast to nurse led mealtime observation, the data presented here support that within structured model that incorporates staff training, delegation of mealtime observations to AHA staff is safe and valid.

Overall, a low level of disagreement was observed between the AHA and SLP rater decisions, and all errors in judgment were created by more conservative decisions made by the AHA. It is acknowledged that conservative decisions could lead to over-referrals which can contribute to the clinical load of the SLP. However, within the current study the potential over-referral rate was only 6%. This could easily be compensated for within the time saved by the SLP not directly completing the mealtime observations. Furthermore, within a fully functioning clinical model (and not a controlled research design), the AHA and SLP would be able to discuss the results of the observation, allowing the SLP to consider the MTOT results with their own knowledge of their patient, to inform their clinical decision regarding further management. Under-identification did not occur, and hence the patient safety of this model was supported. While a full cost analysis of this service model was not conducted, having an AHA perform mealtime observations can contribute to time and cost savings for SLP. To complete a MTOT of approximately 30 min, the AHA would cost $11 less than an SLP per assessment and $9 less than nursing staff. The SLP then has approximately 30 min per delegated assessment to allocate to other aspects of SLP service delivery that may become de-prioritized in acute services due to dysphagia management demands [9, 11, 14, 15].

The participant interviews revealed that the AHAs felt the training and support provided within this model were integral to helping them achieve the necessary skill development and confidence to complete this newly delegated task. In a systematic review of studies investigating the role of assistants in healthcare, it was identified that standard processes, a collaborative learning model, and competency assessment support the success of training programs [36]. Hence, the characteristics of the training program, use of the MTOT observation tool, the focus on collaboration and collegial support during learning and delegation, and the final competency sign off from the training SLP are potential key factors contributing to the overall success of the current model. The notion of clear role delineation and building trust in delegation models between professionals has also been identified as key factors in the success of AHA delegation models [37]. In the current study, SLPs reported increased confidence in delegating to the AHA knowing they had been trained and would work within their scope and raise concerns if identified. Similarly, the AHAs felt supported by the SLP, identified positive personal and professional outcomes and were able to discuss concerns or issues due to strong working relationships and knowledge of their role limitations.

The results of this study provide initial evidence for the validation of AHA completed mealtime observations, however, this study should only be considered as initial feasibility data and further research to fully validate and cost this model is now warranted. The MTOT was developed specifically for this research and as such is currently not a validated tool. Therefore, any use of this tool outside of a research context should be monitored closely, and formal validation and testing of this sort of tool is now required. It should also be noted that although a clinical cohort of 50 patients was recruited, the majority of these patients were observed during a mealtime trial of unmodified diet and fluids with or without compensatory strategies, and/or potentially following upgrading from more restricted diets. Clinically this would translate to using the AHA to confirm patient mealtime management status prior to discharging a patient from SLP services, or to check the status of patients with mild dysphagia who have significant co-existing morbidities (e.g., significant respiratory deficits) which could impact mealtime capacity/tolerance. It is, however, acknowledged that the accuracy of the AHA observations may differ with other patient populations. This issue needs further investigation to better inform the use of AHAs and mealtime monitoring accuracy with more severely dysphagic patient populations.

Interpretation of the true impact of the training component of the study was also limited by lack of formal evaluation of AHA knowledge pre and post training. Further, evaluation of the training component and its adequacy is also limited by the nature of the clinical population studied (low level of acuity). Requiring only three joint observations prior to AHA competency sign off may also not be appropriate in all settings, as AHAs come from a variety of skills and previous experiences. Furthermore, the study design did not include a comparator group of non-trained AHAs, which further limits any conclusions regarding the adequacy of the training component. Finally, variation in numbers of observations completed by each AHA and SLP and completion of side-by side observation may impact level of agreement. Future investigations on the clinical outcomes and impact on decision making for

patients post MTOT would strengthen these initial findings. For services considering this model of care, a full formal economic analysis, consideration time for training and impacts of over-referrals would also be valuable.

Conclusion

Using AHAs to complete mealtime observations was found to be comparable to having a SLP complete the observation. Consistent training and the availability of SLP support and guidance in the delegation process appear to be important contributors to high levels of agreement. This study provides initial support for the role of AHAs in dysphagia management and their potential for increased task delegation in the acute hospital setting. In addition, this study offers a method of maintaining service delivery models including dysphagia monitoring without increasing the demands on SLPs. Further validation of this clinical model is required with patient cohorts with more significant swallowing impairment.

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Compliance with Ethical Standards

Conflict of interest The authors declare that they have no conflict of interest.

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Maria Schwarz B.SpPath (Hons)

Elizabeth C. Ward B.SpThy (Hons), Grad Cert Ed., PhD

Petrea Cornwell B.SpPath, PhD

Anne Coccetti B.SpPath (Hons)

Naomi Kalapac B.SpPath