



Speech-Language Pathology Diet Texture Medical Directive: Impact on Accuracy and Timeliness of Diet Order Entry



Directives médicales de l'orthophoniste concernant la modification des textures alimentaires : impact de la précision et de la rapidité de l'entrée des directives

KEY WORDS

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Abstract

In Ontario, Speech-Language Pathologists (S-LPs) can use medical directives to order, modify, and discontinue diet textures. This study evaluated the use, safety, and timeliness of a S-LP medical directive in an acute care inpatient setting. Chart reviews (n=1574) were completed for patients seen over a one month period in three consecutive years: 1) one year prior to implementation (2008), 2) the month of implementation (2009), and 3) one year post-implementation (2010). The interprofessional teams' perceptions regarding the usefulness of the medical directive prior to (n=151) and one year post-implementation (n=154) were surveyed using a questionnaire. One year post-implementation, the use of the directive was high (98.2%) and the number of diet texture orders that were correctly entered on the first attempt was higher one year post medical directive (89.5%) when compared to baseline (80.6%). The timeliness of orders was significantly improved one year post-implementation, on average, 4.6 hours less than before implementation of the directive. S-LP ratings across all questions for timeliness, time consumption, and error rate were, on average, 61.7% more positive post-implementation. The ratings for the interprofessional team (excluding S-LPs) was not significantly different between the two time periods. An issue was identified with S-LPs entering diet orders when no therapeutic diet was specified on the chart (15.5%). Overall, there was a positive impact from the introduction of a S-LP medical directive.

Abrégé

En Ontario, les orthophonistes peuvent utiliser des directives médicales pour ordonner, modifier et cesser la modification des textures alimentaires. Cette étude a évalué l'utilisation, la sécurité et la rapidité des directives médicales des orthophonistes dans une unité de soins aigus. Une analyse des dossiers médicaux de patients suivis sur une période d'un mois (n=1574) a été effectuée pendant trois années consécutives : 1) un an avant l'implantation (2008), 2) le mois de l'implantation (2009) et 3) un an après l'implantation (2010). Les perceptions des équipes interprofessionnelles concernant l'utilité des directives médicales avant l'implantation (n=151) et un an après (n=154) ont été examinées en utilisant un questionnaire. Un an après l'implantation, l'utilisation des directives était élevée (98,2 %). Le nombre de directives de modification de textures entrées correctement au premier essai était plus élevé un an après l'implantation des directives médicales (89,5 %), lorsque comparé au point de comparaison obtenu avant l'implantation des directives médicales (80,6 %). La rapidité des directives s'est sensiblement améliorée un an après l'implantation avec une moyenne de 4,6 heures en moins qu'avant l'implantation des directives. Les évaluations des orthophonistes sur les questions de rapidité, du temps nécessaire et du taux d'erreurs, étaient, en moyenne, 61,7 % plus positives après l'implantation. Les évaluations des équipes interprofessionnelles (orthophonistes exclus) ne montraient pas de différence significative entre les deux périodes. Un problème a été identifié lorsque les orthophonistes entraient une directive alors qu'aucune modification de texture n'était spécifiée au dossier médical (15,5 %). Globalement, l'implantation de directives médicales par les orthophonistes a un impact positif.

Dysphagia (swallowing disorder) is commonly assessed and treated in acute care practice. Reported incident rates of dysphagia range from 51-78% for acute stroke patients, 55% in acute geriatric unit patients, and 82% in patients with Parkinson's Disease (Cabre et al., 2010; Kalf, De Swart, Bloem & Munneke, 2012; Martino, et al., 2005). It is within the scope of practice for Speech-Language Pathologists (S-LPs) in the province of Ontario to assess and manage swallowing disorders, including making recommendations to initiate, discontinue, or modify a diet texture (College of Audiologists and Speech-Language Pathologists of Ontario, 2007). Findings from the S-LP's assessment may indicate if the patient has normal swallowing function and for these patients typically a regular texture diet would be recommended. This is consistent with Hinds and Wiles (1998) finding that when a patient had a normal swallowing screening, 98% of these patients were not recommended for therapy (which included diet texture modification). If dysphagia is present, the S-LP may recommend a modified diet texture (puree, minced, or dental soft) or modified liquids (nectar or honey thick) (Garcia, Chambers, & Molander, 2005; O'Gara, 1990; Pardoe, 1993; Penman & Thomas, 1998). When swallowing is severely impaired, the S-LP may recommend nothing by mouth (nil per os [NPO]) and alternative means of nutrition and hydration are considered by the interprofessional team (Marik & Kaplan, 2003). Reasons for modified textures typically address the efficiency of swallowing or attempt to reduce the risk of aspiration (the passage of foreign material into the airway) (Baijens & Speyer, 2009; Foley, Teasell, Salter, Kruger, & Martino, 2008; Hamilton et al., 2012; Rosenbeck, Robbins, Roecker, Coyle, & Wood, 1996; Troche, Sapienza, & Rosenbeck, 2008). While modified diet consistencies have benefits, they also have been found to be associated with reduced energy and protein intake (Wright, Cotter, Hickson, & Frost, 2005), as well as reduced intake of fluids (Whelan, 2001). In addition, 48.3% of surveyed S-LPs indicated they felt patients had a strong dislike of honey thick liquids (Garcia, Chambers, & Molander, 2005). These issues with safety, suboptimal oral intake, and preference emphasize the importance of timeliness in diet texture change for patients assessed by S-LPs. In Ontario hospitals, orders for all treatments, such as diet texture, are legislated by the Public Hospitals Act (1990) as the responsibility of physicians, dentists, midwives, and registered nurses (RNs) in extended class. Prior to August 2009, the S-LPs at the study site (a tertiary academic acute care hospital) made recommendations written as a "suggestion" and were not implemented until authorized by a physician or physician delegate in writing. This practice potentially led to delays in implementing the appropriate diet texture and therefore

imposed a safety concern for patients that continued to consume foods and liquids that they were at risk of aspirating. Given the negative sequelae of inappropriate diet textures, this practice could also impact patients' satisfaction and confidence in their care provision. The impact of delays of S-LP orders has not previously been investigated; however, the impact of delays in registered dietitian (RD) orders for diets and enteral feeds have been shown to significantly prolong length of stay, lower albumin levels, and lessen weight gain at discharge (Braga, Hunt, Pope, & Molaison, 2006). For these reasons, the S-LPs decided to develop a medical directive to address this concerning gap in practice.

The Federation of Health Regulatory Colleges of Ontario (2007) indicates regulated health professionals, including S-LPs, can receive a medical directive to order diet texture changes (such as initiating a diet texture, modifying the texture, or discontinuing oral nutrition) when patients meet the criteria defined by the medical directive. They define a medical directive to include a process where a regulated health professional can receive advance authorization from a physician or physician delegate to perform the ordered procedure under specific conditions without a direct assessment by the physician or physician delegate at the time.

When modifying diet textures, the College of Audiologists and Speech-Language Pathologists of Ontario (2007) practice standard suggests that "the composition of the diet itself is most likely to be formulated by a dietitian". The S-LP works collaboratively with the RD who makes recommendations about supplements and therapeutic diets (e.g. regular, 1800 kcal, healthy heart). Wildish (2001) outlined the process for RDs to obtain a medical directive to order diet and enteral feeds. In the Wildish study (2001), RDs conducted a quality review and reported that, in a one-year period, 469 orders were written by the RDs and 88% of these orders were implemented within 24 hours. Imfeld et al., (2012) found that providing RDs access to enter signed diet orders in their electronic record significantly reduced transcription error rates by 15% and increased timeliness to implement orders by 3.4 hours on average. These studies, focusing on RD practice, suggest that a medical directive is feasible and access to entering orders may improve speed and accuracy.

In 2009, the S-LPs at the study site (a tertiary academic acute care hospital) developed a medical directive that allowed trained and authorized S-LPs to initiate, discontinue, or modify a diet texture for acute care inpatients following receipt of a referral from a physician or physician delegate

to assess swallowing. The S-LP was required to write the diet texture order in the physician orders of the paper chart and was also required to enter the order in the electronic patient record (EPR) unless the therapeutic diet type had not been specified in previous diet in EPR or in the physician orders by a physician, physician delegate, or registered dietitian. The S-LP would not be permitted to use the medical directive if the patient was NPO for an acute gastrointestinal issue, prior to a test or procedure, or if the patient/substitute decision maker refused recommendations. To further enhance safety, additional standard phrases were included for specific recommendations. For example, if the S-LP recommended a diet texture for an NPO patient, the S-LP would add "MD, MD delegate, or RD to specify therapeutic diet type". If the S-LP ordered NPO, the written order was required to include "medications and fluid status/intake to be reviewed by MD or MD delegate". The medical directive received approval from the hospital clinical operations committee and the medical advisory committee as is standard required practice at our hospital. In preparation for implementation of the directive, all S-LPs in acute care were expected to complete an educational module developed by the research team. To ensure ongoing competency, S-LPs were also required to pass a quiz annually as well as complete at least five orders per year in order to be authorized to use the medical directive. Coincidentally, at the same time, the registered dietitians also implemented a similar medical directive, which also included the ability to order therapeutic diets. The only other additional health professions that wrote orders for diet texture were physicians and physician delegates.

While it is not uncommon for S-LPs to have a medical directive to order diet textures, the impact and use of a medical directive for diet texture change by S-LPs has not been studied.

Purpose

The purpose of the current study was two-fold: (i) to evaluate the impact (use, safety, timeliness) of a medical directive for S-LPs in acute care to initiate, modify, and discontinue a diet texture and, (ii) to evaluate interprofessional teams' perceptions of safety, efficiency, and quality of patient care related to diet texture changes recommended by the S-LP.

Methodology

Study Design and Timeline

A retrospective chart review was completed on all consecutive patients seen by S-LPs at a tertiary academic acute care hospital for the month of August

in three consecutive years: 2008 (one year prior to implementation of a medical directive), 2009 (the month of implementation), and 2010 (one year post-implementation). Patient names and medical record numbers were collected from the workload measurement reporting tool for any patient seen by the S-LP for greater than 15 minutes of assessment. The review included audit of scanned paper documents and the electronic patient record.

The interprofessional teams' perspectives of the S-LP practice were assessed by employing a self-administered paper survey. The surveys were conducted at two time points: Time 1, the month prior to implementation the medical directive in July 2009 (n=151); and Time 2, one year after implementation of the medical directive in August 2010 (n=154).

Data and Outcomes Collection

Chart review

All eligible patient charts were reviewed by one study team member to extract the data of interest for each of the three time periods. Care was taken to ensure there were no errors in either data extraction or management. Data was entered into an electronic spreadsheet for subsequent data analysis. Information was collected on the following outcomes: date and time for both written and correctly entered electronic order, written diet texture order, diet texture ordered in EPR, how the order was written (by medical directive or by "suggestion"). If the time of the order in EPR was more than 15 minutes earlier than the written order, the data was not included in the study. Timeliness was measured as the time interval between the written order and the time to enter correctly in EPR. If the time interval was a negative value (to a maximum of 15 minutes between when order was written and entered) the number was converted to zero. If the S-LP entered the order, the following data were collected and analyzed for accuracy: therapeutic diet prior to and after change, supplement prior to and after change, diet change type (initiation, upgrade, downgrade, mixed, and discontinuing oral diet).

Survey Study Tool

A questionnaire was developed by the research team for evaluation of the interprofessional teams' perceptions of safety, efficiency, and quality of patient care related to diet texture changes recommended by the S-LP. Once a week for 3 weeks during the data collection phase, hospital volunteers provided paper copies of the questionnaire to 29 inpatients units in the hospital and collected all completed questionnaires. When distributing the questionnaires, where

possible, the volunteer informed staff on each unit about the survey. An e-mail notification about the survey was also sent to all hospital speech-language pathologists and registered dietitians and they were encouraged to complete the survey.

The survey consisted of a demographics section (profession, years of experience) and closed-ended questions regarding perceptions of safety, efficiency, and quality of diet texture changes recommended by the S-LP. These factors were rated using a 5-point Likert scale (ranging from 1=strongly disagree to 5= strongly agree). The second questionnaire, administered one year later (2010), was identical with the exception of an additional question that asked individuals if they had completed the initial survey in the previous year. Responses were entered into a password-protected database file. All data was expressed as collated group data for each professional group.

Study Sample

For the chart review, the workload measurement tool identified 1,574 patient visits with 15 minutes or more of S-LP assessment time from the three time periods of interest that were eligible for inclusion in the study. The inpatient interprofessional team, consisting of nurses, physicians, RDs, and S-LPs on 29 inpatient units were included as the sample of interest for the study.

Data Management

Data was imported into SPSS version 16.0 for subsequent management and statistical analysis. Data obtained from the chart review were expressed as mean \pm standard deviation for hours from writing the order to entering the order in EPR for all orders as well as by type of order (e.g. downgrading the texture). Data were expressed as percentage frequencies for orders correctly entered, never entered correctly, and errors when entering diets in EPR.

A one-way analysis of variance (ANOVA) was used to determine differences in hours to enter in EPR for the three time periods (August 2008, one year pre-implementation; August 2009, the month of implementation; and August 2010, one year post-implementation of the medical directive).

A two-way ANOVA was used to determine differences between the time to enter Medical Directive in EPR (hours) based on the type of order (initiate, upgrade, or downgrade) for 2009 and 2010 time periods. The small number of orders that were for a "mixed" texture or for an "oral diet to NPO" order, precluded inclusion of this data in

subsequent analysis.

For survey data, descriptive analysis (percentage frequencies) was completed for all demographic characteristics of survey participants. Chi-square or Fisher's exact tests were used for categorical data to determine differences within groups (interprofessional team, excluding S-LP only) over time (Time 1 pre- versus Time 2 post-implementation of the medical directive) for each of the survey questions.

For all statistical measures differences between groups were reported as significant if $p \leq .05$.

Results

Chart Review

Of the 1,574 eligible patient visits from the three study time periods, 351 (22.2%) had new diet texture orders written by the S-LP (2008, $n=98$; 2009, $n=139$; 2010, $n=114$). In the month of implementation, just over half (54.0%, 75/139) of S-LP orders were written with the medical directive but by one year after implementation almost all (98.2%, 112/114) were written with the medical directive. Of all S-LP orders written with the medical directive, the S-LP subsequently entered the order in the EPR at a frequency of 61.3% (46/75) in 2009 and 51.8% (58/112) in 2010.

The time from when the S-LP wrote the order to when any professional entered this into EPR was, on average, 8.1 ± 14.2 hours in 2008. This time was significantly less ($p=.01$) one year after (2010) implementation of the medical directive (3.5 ± 13.1 hours – combined data for suggest and medical directive); an over 50% decrease in the time taken to enter orders (Figure 1). When the S-LP entered the order, it was entered in 0.3 hours (range from 0.0 to 4.7 hours) in 2009 and 4.9 hours (range from 0.0 to 123.4 hours) in 2010. For orders such as initiating a diet when the patient was NPO and, therefore, receiving no food or liquids by mouth, another professional (specifically physician, nurse practitioner, or RD) was needed to provide the therapeutic diet type before a S-LP could enter the order directly into EPR. The average time to enter these orders in EPR took more time than when the therapeutic diet was already available from a current diet in EPR. In fact, initiating diet texture order, on average, resulted in an additional 7.2 hours delay compared to downgrading (7.3 hours for initiate versus 0.1 hours for downgrade orders) a diet texture in 2009 (Table 1). In 2010, this was an average difference of 5.4 hours (5.7 hour for initiate and .3 hours for downgrade orders). The time to enter medical directive orders correctly in EPR to initiate or upgrade an oral diet

texture were significantly longer than for downgrading oral diet texture in both 2009 ($p = .000$) and 2010 ($p = .01$). At baseline (2008), the majority (80.6%) of S-LP orders matched the EPR order. This rate was almost 10% higher the month of implementation (89.9%) in 2009 and remained at this level in the audited month one year later (2010). The number of occurrences where orders were entered incorrectly and required correction was less than 5% and was similar across the 3 time periods (Table 2). In 2008, 16.3% of S-LP's written orders were never entered correctly into EPR, this decreased to 8.8% in 2010. For orders written with the medical directive that had EPR entry errors (specifically never entered correctly or entered incorrectly then corrected), 40% (2009) and 81.8% (2010) required another professional to specify the therapeutic diet before the S-LP could enter the texture. There were no significant differences across the three time periods for any of these measures.

For orders entered into EPR by the S-LP, there were no therapeutic diet errors in 2009. In 2010, a S-LP removed a therapeutic diet (controlled fat, low cholesterol, low saturated fat) for 1 of 58 patients (1.7%) and a S-LP added a therapeutic diet when none was specified for 15.5% (9/58) of orders that the S-LP entered (see Figure 2). In 2010, among the orders where a texture was added without a written therapeutic diet, just over half (55.6%, 5/9) were either starting a limited amount of oral intake or upgrading the texture from clear fluids. In 2009, there were only two (4.4%) errors with supplements when the S-LP changed the diet texture. This included one occasion when the S-LP ordered supplements without a written order and on another occasion the S-LP did not change the thickness of the supplement to match the diet texture. In 2010, there were two patients (3.4%), that the S-LP deleted the supplement when changing the texture.

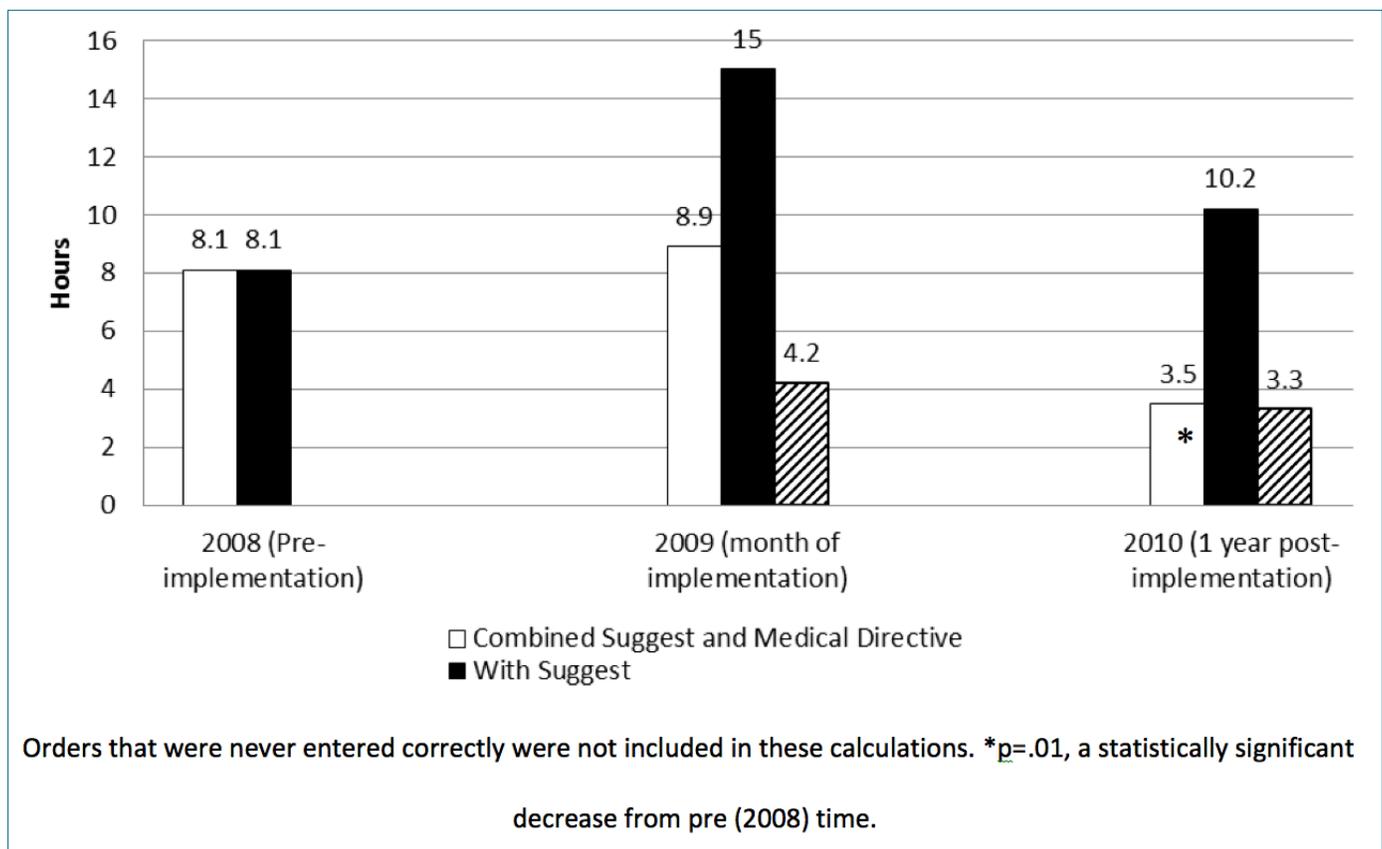


Figure 1. Average Time to Enter Orders in EPR (Hours)

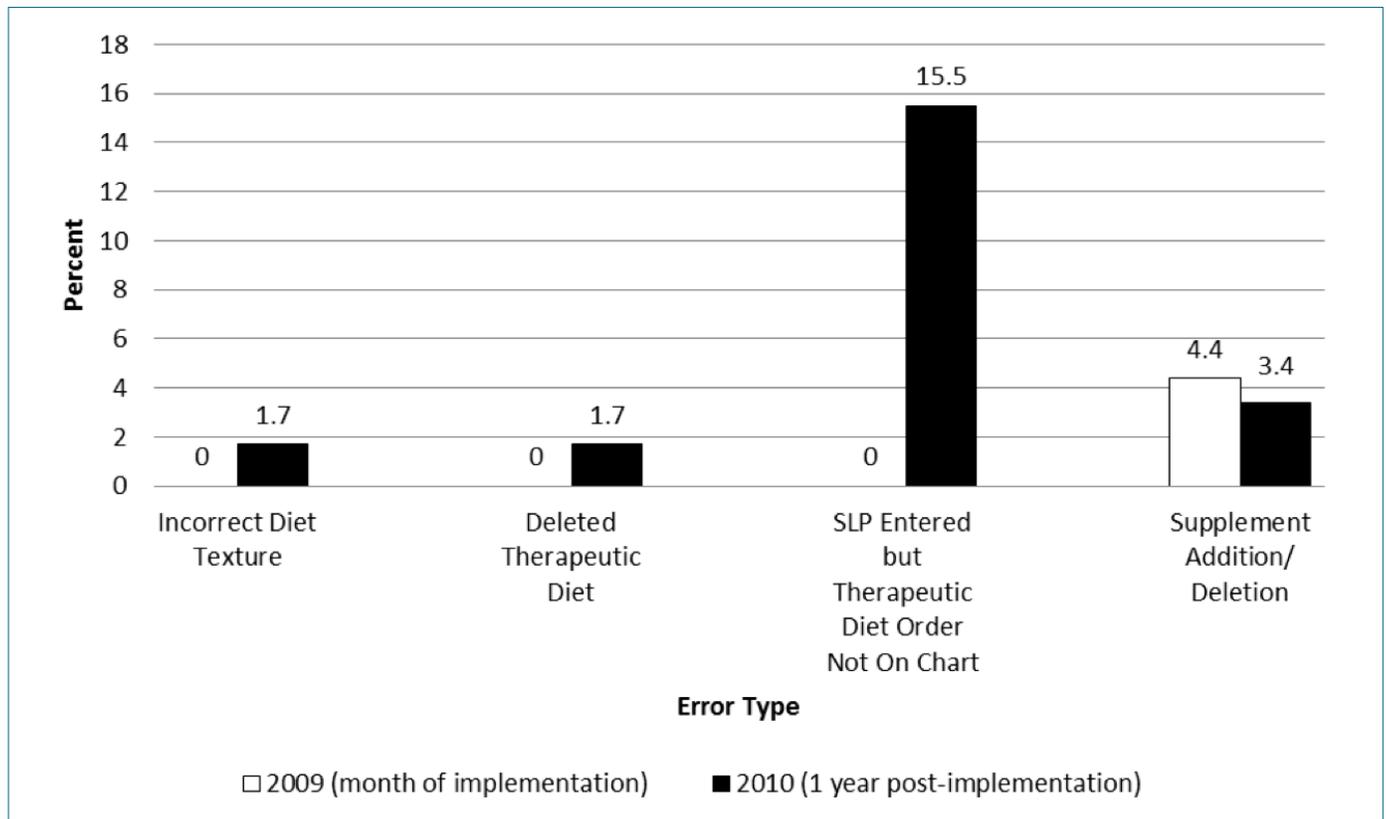


Figure 2. Percentage of Errors Entering Diet Orders in EPR by S-LP

Table 1. Average Hours to Enter Medical Directive Orders Correctly in EPR by Type of Diet of Order

	Initiate Diet Texture	Upgrading Oral Diet Texture	Mixed*	From Oral Diet to NPO	Downgrading Oral Diet Texture	p value
2009	7.3 ± 9.7 (0.0-29.3) n=27	3.9 ± 14.1 (0.0-68.3) n= 28	0.2 ± 0.2 (0.1-0.3) n=3	0.1± 0.1 (0.0-0.3) n=3	0.1 ± 0.2 (0.0-0.9) n=14	.01
2010	5.7 ± 19.7 (0.0-124.3) n=47	2.3 ± 5.9 (0.0-4.3) n=45	0.6 n=1	0.6 ± 1.1 (0.0-2.1) n=4	0.3 ± 0.4 (0.0-1.6) n=15	.01
2009+2010 combined data	6.4 ± 16.1 (0.0-124.3) n=74	2.9 ± 9.8 (0.0-68.3) n=73	0.3 ± 0.3 (0.1-0.6) n=4	0.4 ± 0.8 (0.0-2.1) n=7	0.2 ± 0.3 (0.0-1.6) n=29	.01

Data is presented as mean ± standard deviation (range in brackets) for hours to enter directly to initiate, upgrade, downgrade, oral to nil per os and mixed (includes *upgrade solid or liquid with downgrade of solid or liquid) regardless of professional that entered the order. Orders that were never entered correctly were excluded from this calculation.

Table 2. Accuracy of Diet Textures Entered Regardless if Order Written with Medical Directive or With a Recommendation

	2008 (n=98)	2009 (n=138)	2010 (n=114)
Entered Correctly	80.6% (79)	89.9% (124)	89.5% (102)
Error then Entered Correctly	3.1% (3)	2.9% (4)	1.8% (2)
Never Entered Correctly	16.3% (16)	7.2% (10)	8.8% (10)

Data is presented as percentage (number in brackets) of orders entered correctly, initially entered incorrectly and then corrected, and those orders never entered correctly at all.

Survey Results

Questionnaires were completed by S-LPs and the interprofessional team one month prior (July 2009) and again one year (August 2010) following implementation (see Table 3 for respondent demographics and Table 4 for number of respondents and number of medical directive orders by program). S-LP responses to the questions were analyzed separately from the rest of the interprofessional team (Figures 3 and 4). On average, responses to all questions by S-LPs were more positive than non-SLPs. There was a higher degree of agreement or disagreement following the implementation of the medical directive for S-LPs. For S-LPs, there was a mean difference across all six questions of 61.7% (range 40.0% to 83.3%). RDs responses were similar to S-LPs in that their responses were more positive post-implementation. There was an average difference of 29.7% across all questions (range 7.3% to 50.0%) for RDs. For the grouping of nursing, the average difference between baseline and post-survey was 13.3% (range -6.8 to 63.9) with the most negative response relating to the need to change process while the most positive related to their perception of error rates. The physician grouping responses had a difference of -12.3% post survey (range -71.4% to 28.6%). The lowest negative difference was regarding how confusing the process was in which all chose the "neutral" response in the post-survey. The most positive was about the safety of the process. The survey responses of the interprofessional team, excluding the S-LPs, had an average difference of 2.5% (range -6.2% to 8.2%) across all questions. The responses were more favorable for all statements except for the statement about the process in which fewer (6.2%) disagreed or strongly

disagreed that a change was needed when surveyed post-implementation of the medical directive. For all ratings by the interprofessional team, there was no significant difference in ratings for all measures before and after the medical directive. Given the limited numbers of S-LP respondents that completed the survey at baseline (n=5) and post-implementation (n=6), statistical analysis could not be reliably performed on their response.

Discussion

Obtaining approval for a medical directive in a hospital can be a time consuming process and there are a number of steps required prior to the directive being approved and implemented into practice. However, once approved, the additional effort to initiate the medical directive is minimal. The S-LPs participated in an hour education session to learn the appropriate use of the directive. They completed a written quiz to evaluate their knowledge and had opportunities to ask questions of the implementation team when they arose. All subsequent new staff were provided the same orientation process. According to one study, there are varying degrees of success with use of directives and a variety of factors influenced whether a medical directive was regularly used by RNs (Avarado, 2007). These included nursing confidence and willingness to assume responsibility, the amount of new learning required, additional paperwork, perceived usefulness of the directive, physician support, and frequency they encounter patients that required the directive. While these factors may have influenced the S-LPs in the study, these concerns were not specifically identified by the S-LPs nor highlighted in the education materials prior to implementing the directive. The S-LPs appeared eager to implement the directive.

Table 3. Number of Survey Respondents by Profession

	Number of Respondents (%)		P value
	July 2009 The month prior to implementation (n= 151)	August 2010 One year post- implementation (n=154)	
Profession			
Medical*	7 (4.6%)	2.9% (4)	0.78
Nursing**	121 (80.1%)		
Occupational Therapy	0 (0.0%)		
Registered Dietitian	10 (6.6%)		
Speech-Language Pathologist	5 (3.3%)		
Ward Clerk	3 (2.0%)		
Did not indicate	5 (3.3%)		
Gender			
Female	132 (87.4%)	128 (83.1%)	0.00
Male	15 (9.9%)	21 (13.6%)	
Did not indicate	4 (2.6%)	5 (32.5%)	
Years of Experience			
Less than 1 year	10 (66.2%)	6 (39.0%)	0.00
Between 1 and 3 years	33 (21.9%)	30 (19.5%)	
Between 3 and 5 years	15 (9.9%)	14 (90.0%)	
More than 5 years	65 (43.0%)	71 (46.1%)	
Did not indicate	28 (18.5%)	33 (21.4%)	

*Medical includes staff physician, physician assistant and/or medical resident

**Nursing includes APN, RN, RPN, RN student combined

Table 4. Survey Responses by Program and Number of Orders by Program

Programs	Number of Orders					Number of Survey Responses	
	One year prior to implementation (August 2008)	The month of implementation (August 2009)		One year post-implementation (August 2010)		Pre-Implementation (July 2009)	Post-Implementation (August 2010)
	Suggestion	Suggestion	Medical Directive	Suggestion	Medical Directive		
Arthritis / Ortho (1 unit)	0	0	5	0	1	0	1
Cardio-vascular (4 units)	5	11	3	0	7	27	20
General Internal Medicine (6 units)	28	35	35	1	44	27	27
Intensive Care (4 units)	3	7	2	1	8	29	17
Neuro Science (3 units)	31	0	30	0	34	18	21
Oncology (6 units)	6	0	0	0	1	19	13
Surgical (5 units)	21	4	0	0	9	13	25
Transplant (2 units)	4	7	0	0	8	1	6
Multiple						14	21
No Response						3	3
Total	98	139		114		151	154

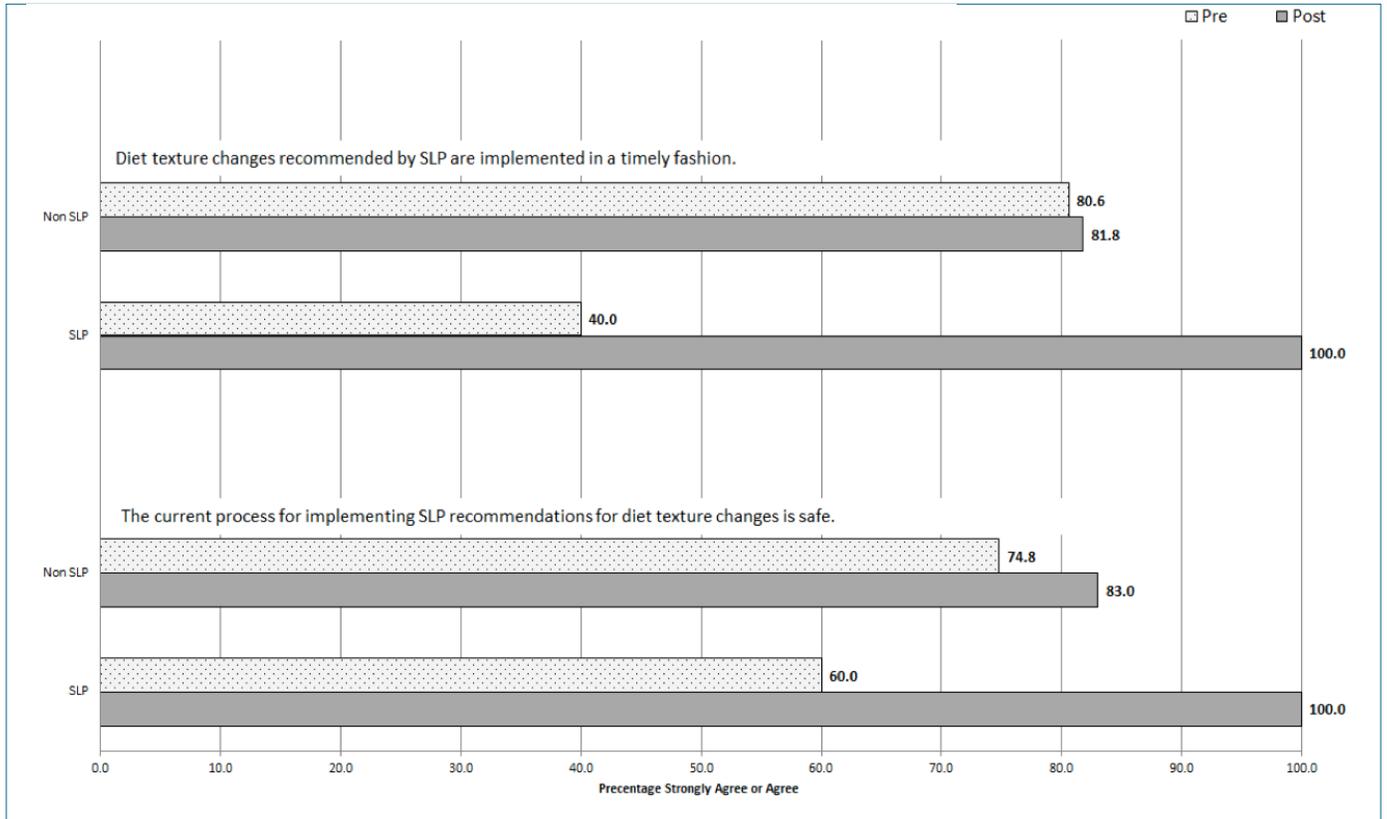


Figure 3. Survey Responses: Percentage Strongly Agree and Agree

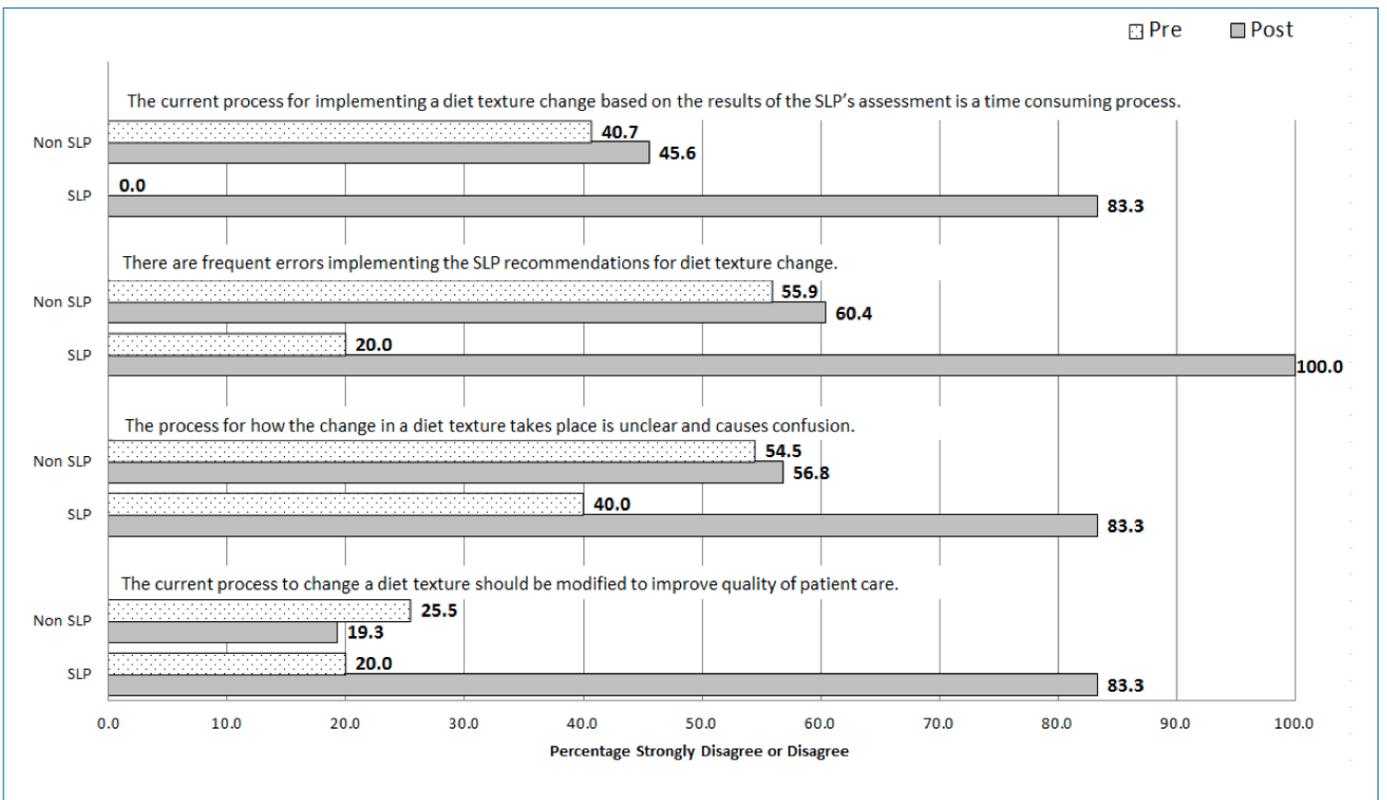


Figure 4. Survey Responses: Percentage Strongly Disagree & Disagree

One year after implementation, almost all orders written by the S-LP used the medical directive. This evidence strongly supports a successful implementation and uptake of this initiative. It was not expected that all orders would be written with the medical directive since not all patients can meet the specific criteria in order to use the directive (for example, no active gastrointestinal issue). Although it was uncertain what factors enabled the S-LPs to use the directive with such success, it is likely, given the results of the survey responses of the six S-LPs, that S-LPs perceived they could safely, effectively, and efficiently implement the medical directive as well as improve quality of patient care. S-LPs were able to capitalize on the benefits of implementation of the medical directive with minimal risk or disruption to their clinical care. In considering the enablers identified by Alvarado (2007), the S-LPs had frequent opportunities to use the directive and the positive ratings on the survey suggested a possible perceived usefulness. Specific factors impacting the high level of use of the medical directive would require further investigation.

Part of the motivation for implementing this directive was the amount of time it took for S-LP recommendations to be implemented (prior to directive). Time for orders to be entered in EPR significantly improved with the implementation of the directive regardless of the type of order written. This improvement could result in patients receiving appropriate meals in a more timely fashion, which in turn could reduce risk of aspiration or other negative sequelae resulting from inappropriate diet texture being ingested.

With a reduction in time from written order to implementation, patients could receive an upgraded consistency sooner. An upgrade in consistency, for example from puree to dental soft, may be more appealing to patients and improve caloric intake of food and liquid (Garcia et al., 2005; Whelan, 2001; Wright et al., 2005). In the current study, the timeliness was not consistent across all types of changes. Not surprisingly, diet orders that required input from other professionals to order the therapeutic type required more time, on average, than diets that did not require additional input.

Often S-LPs write orders to affirm that the same diet should be continued. In an attempt to capture new orders, only EPR orders entered no more than 15 minutes prior to the written order was used. This data management strategy worked for 2008 data, but for 2010 it was observed that S-LPs were entering a diet texture in EPR greater than 15 minutes prior to the written order. It was questioned if the S-LP entered the diet in EPR prior to starting to write the

clinical note and order. Based on the criteria to exclude these orders, we may have overestimated the amount of time required between order entry and implementation for the 2010 data collection period.

One year after implementation of the medical directive, it was noted that some orders written by General Internal Medicine physicians for "SLP to assess swallowing" also included an order for the type of therapeutic diet that the S-LP could enter if appropriate after the assessment (e.g. "NPO. S-LP to see then 1800 kcal diet if appropriate"). This allowed the S-LP to enter the diet promptly after the assessment. While the physicians did not consistently write orders for S-LP to see with a prescribed therapeutic diet type, it would be interesting to determine if encouraging this practice would further shorten the time and allow S-LPs to enter appropriate diet orders efficiently.

The percentage of orders that were never entered correctly was less one year following implementing the medical directive compared to prior to the directive. Errors still occurred post medical directive implementation and the frequency was higher than expected. It was not possible to determine baseline rates for errors in supplements and therapeutic diets prior to the medical directive. In 2010, among all the orders entered by the S-LP, there were only two supplement errors but 15.5% of diet texture orders entered by S-LPs did not have a therapeutic diet specified on the chart or previous order. When these error rates were shared with the S-LPs, one reported that they were not aware of this requirement of having a written therapeutic diet order and suggested that their RD had told them the documentation was not necessary. A few others informally reported that they were not aware that the therapeutic diet type was still needed to be written when a patient was ordered clear fluids or limited amounts of food (e.g. one cup puree per meal). This is consistent with the finding that almost half of the orders that were entered without a therapeutic diet type were either starting limited amounts of oral intake or starting clear fluids. In an attempt to address errors, modifications were made to the in-service materials and quiz. To ensure continued competence, a mandatory annual refresher session was also added for all S-LPs who use the medical directive. Informally, RDs reported that supplements and therapeutic diets were frequently deleted by other professionals when changing texture prior to the medical directive. RDs who typically were the most involved in supplements and therapeutic diet orders, held more positive attitudes following the implementation of the medical directive suggesting these errors may actually be at a lower frequency than at baseline.

It is interesting that errors with therapeutic diet were not observed during the month the directive was implemented. It is questioned if individuals were more attentive with the use of the directive in the first month after initiating the directive, or if the recency of the medical directive education had an impact. This highlights the importance of ongoing monitoring of the accurate and appropriate use of the directive once it has been implemented.

The number of individuals indicating they had previously completed the perception questionnaire was very low. It is questioned if this number was accurate. The question was placed on the back of the page with the comment section which may have influenced respondents' likelihood to tick off the box indicating previous survey completion. The survey responses by S-LPs were all more positive on average than at baseline. For the rest of the interprofessional team that responded to the survey, the results for the two time periods were not significantly different. While this does not support a perceived need for the medical directive, it also did not suggest increased safety risk. The one item ("the process needs to be changed") was lower for the interprofessional team following the directive, although not statistically different. With the implementation of the S-LP medical directive, there were a number of new rules regarding which health profession could enter a diet under various circumstances. This may have contributed to the lower ratings. Alternatively the respondents may not have noticed a difference with implementation of the medical directive. This may be particularly true as some programs that had high volumes of responses to the survey did not have a high number of S-LP orders during the audited period. For example the oncology program had 19 responses at baseline and 13 post implementation but no orders (neither by suggestion or medical directive) during the sampling periods.

Limitations of the study include that a limited number of physicians responded to the survey (7 at baseline and 5 post-implementation). In addition, in the post-survey all respondents in the physician group were residents, therefore they may not have had experience with the process at baseline. Of the eligible S-LPs, the survey was completed by only 50% at baseline and 60% post-implementation.

In conclusion, this study demonstrated that an acute care hospital was able to implement the diet texture medical directive effectively with a high degree of uptake by S-LPs and that using a medical directive significantly improved the time for patients to receive the appropriate diet. The medical directive was valued and perceived to

improve the quality of patient care provided by the S-LPs. The diet texture medical directive can offer positive and important implications for clinical practice and improved patient care. Future studies could focus on evaluating how to optimally incorporate a therapeutic diet order into referrals to S-LPs in order to minimize therapeutic diet errors and expedite diet change orders with the expectation that this practice may further improve the quality of care of patients with swallowing disorders.

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