Objective: to evaluate the accuracy of nursing home (NH) staff in documenting two Minimum Data Set (MDS) items that are used to identify residents at risk for undernutrition, low oral intake and food complaints, using standardized observation and interview assessment protocols implemented by research staff.

Design and Methods: MDS information related to low oral intake (item K4c: <75% of most meals) and complaints about the taste of food (item K4a) was compared to independent evaluations of low oral intake and food complaints for a random sample of 75 residents in two proprietary NHs within the same month that a complete MDS assessment was due for each participant. Direct observations were conducted by research staff during nine mealtime periods for 3 consecutive days according to a standardized mealtime observational protocol to estimate low oral intake; and, two one-on-one interviews with residents were conducted on two consecutive days using standardized questions to assess the stability of food complaints.

Results: Research staff documentation based on direct observation and resident interviews showed a significantly larger number of residents being identified as potentially at risk for undernutrition due to low oral intake (73%) and/or stable complaints about the taste of food (32%) as compared with NH staff documentation of MDS items K4c (44%) and K4a (0%), respectively, within the same month. A total of 47% of the participants expressed stable complaints about some aspect of the NH food service (eg, variety, appearance, temperature).

Conclusion: The documentation of low oral intake and food complaints on the MDS was inaccurate and resulted in a significant underestimate of residents with either of these risk factors for undernutrition. (J Am Med Dir Assoc 2002; 3: 140–145)

Keywords: nursing homes; assessment; oral intake; food complaints; MDS

Undernutrition is a common and costly problem among nursing home (NH) residents. The current federally mandated approach used in NHs to screen all residents for potential nutritional problems is the Minimum Data Set (MDS) assessment. Specifically, the following eight MDS items serve as “triggers” that indicate a potential problem: recent weight loss, presence of a pressure ulcer, parenteral or intravenous (IV) feeding, syringe feeding, mechanically altered diet (ie, soft solids, pureed foods), therapeutic diet (ie, low salt, no concentrated sugars), complaints about the taste of many foods, and leaves 25% or more of food uneaten at most meals. If any one of these eight conditions is present, then the resident should be “triggered” for a follow-up nutritional assessment according to the MDS-Resident Assessment Protocol (RAP). For example, it is recommended that follow-up assessments be conducted to address the resident’s ability to feed herself or himself, adequacy of staff to provide feeding assistance, chewing and/or swallowing problems, resident’s ability to state preferences and/or complaints, and potential medical causes (eg, dementia, depression), just to name a few. The completion of the MDS and corresponding RAPs is intended to guide individualized care plans and appropriate nutritional interventions.

MDS items related to nutritional status, in particular poor oral intake, have been determined to be reliable and valid based on a recent, cross-sectional, observational study in which these items were completed by a trained research nurse...
and compared to anthropometric and bioelectrical measures of nutritional status. A separate study that evaluated the validity of the MDS nutritional triggers showed that most NH residents in the small sample of participants (n = 41) who had a body mass index indicative of underweight (BMI 20 kg/m²) and/or undernutrition (BMI 18.5 kg/m²) had one or more of the eight MDS triggers present. However, the presence of low oral intake, which was based on a 4-day estimated dietary record completed by the dietician for residents, was the single best way to identify NH residents with insufficient energy or protein intake. No other individual MDS trigger or combination of the eight triggers improved the detection of residents with insufficient energy or protein intake.

Unfortunately, three recent studies have shown that NH staff documentation reflected a significant overestimate of residents’ oral intake, as compared to estimates made by research staff based on direct observations during mealtime or weighing residents’ trays, by an average of 15% or higher for the majority of residents. Moreover, one of these studies also showed that the lower the intake for individual residents, the more likely NH staff were to overestimate intake.

The MDS-recommended process of assessment for both low oral intake and food complaints is to “consult resident records and ask the resident if he or she has experienced these symptoms in the last seven days.” Specifically, the MDS User’s manual states that “it is important to ask the resident directly” and “observe the resident while eating.” The purpose of this study was to evaluate the accuracy of NH staff in completing two MDS items that are used to identify residents at risk for undernutrition, low oral intake and food complaints, using standardized interview and observational assessment protocols implemented by research staff.

METHODS

Subjects and Setting

A random sample of 75 residents in two proprietary NH facilities, who were due a complete MDS assessment, participated in this study. Certified nurse aide (CNA)-level staff-to-resident ratios in the two NHs, as reported by the directors of nursing, were typical of industry standards (9 to 10:1 during the 7 AM to 3 PM shift and 12 to 15:1 during the 3 PM to 11 PM shift). Participants were required to be long-stay and free of a feeding tube. Written informed consent was obtained from each participant’s legal guardian, or “responsible party,” and assent was obtained from the residents. Consent procedures were approved by the University of California, Los Angeles Human Subjects Protection Committee Internal Review Board.

Assessment

Evaluation of Intake

The MDS User’s Manual defines poor oral intake as “leaves 25% or more of food uneaten at most meals (ie, two out of three meals a day).” Food and fluid intake during mealtime was independently evaluated by trained research staff through direct observations according to a standardized protocol for 3 consecutive week days (ie, nine meals) within 1 week during the month that the MDS was due for that resident. A 3-day assessment period has been used by multiple groups for estimation of total intake among older adults. Total percentage of food and fluid consumed was estimated for each meal (ie, all food and fluid items on the resident’s meal tray) based on standardized direct observations, which were conducted by trained observers, during mealtime. In addition, photographs of each participant’s meal tray were taken before and after each observed meal in order to conduct reliability estimates of the percentage consumed of each food and fluid item and total percent intake for each of nine meals. Estimates based on the photographs were conducted by trained research staff members who were different from the direct observers. Both the direct observation and the photography methods have been shown to be reliable and valid methods for estimating food and fluid intake during mealtime for NH residents. Interrater reliability among research staff members was established at 0.946 (P < .001) for a subset of 20 mealtime observations. The agreement between the intake percentage estimates based on the direct observations and the estimates conducted by different research staff members based on the photographs for the participants in this study was high (r = 0.89, P < .001). Based on this independent evaluation by research staff, a resident was considered to be at risk for undernutrition due to low oral intake if his or her total percent intake was less than 75% for six or more of the nine meals in the 3-day evaluation period (ie, 2 out of 3 meals per day).

Evaluation of Food Complaints

The MDS User’s Manual vaguely defines food complaints as: “the sense of taste can change as a result of health conditions or medications. Also, complaints can be culturally based”—eg, someone used to eating spicy foods may find nursing home food bland.” The MDS Resident Assessment Protocol (RAP) guidelines related to nutritional problems acknowledges that “an inability to make food and mealtime preferences known can result in a resident eating poorly, losing weight, and being unhappy.” As part of the follow-up RAPs related to identifying potential causes of undernutrition, it is suggested within the MDS to pose the following question: “Is the resident capable of telling the staff that he or she has a problem with the food being served?—eg, finds it to be unappetizing or unattractively presented?”

An attempt was made by research staff to conduct a standardized, one-on-one interview with each participant in order to measure both food preferences and complaints. Specifically, the following five standardized questions were asked to assess food complaints, each of which required a simple yes or no response: “Do you like the food here? Do you like the taste of the food? Is there enough variety/food choices? Does the food look good/appetizing to you?, and, Are food and fluid items served at the appropriate temperature (eg, milk is cold, coffee/tea, eggs are hot)” This interview was conducted twice (on 2 separate consecutive days) during the same 3 days that oral food and fluid intake was being monitored for each participant to assess stability of responses, because participants were not excluded from the interview based on cognitive status criteria.
Questions were asked immediately following one of the meal-time periods. The interview methodology used in this study has been more specifically described elsewhere.\textsuperscript{13}

**MDS Information**

Demographic, medical, and functional information was retrieved from each participant’s medical record. Each participant’s height was obtained from the chart, and independent assessments of body weight were conducted by research staff to calculate body mass index (BMI) values. The proportion of participants with a BMI less than 20, which is indicative of undernutrition, was identified.\textsuperscript{14} MDS information related to all eight triggers for undernutrition for each participant was retrieved from the resident’s medical chart at the end of the month once it had been completed by NH staff. In addition, follow-up RAPs that resulted from an MDS nutritional trigger being present were also retrieved from each participant’s chart. The MDS-derived Cognitive Performance Scale (CPS) score was calculated for each participant.\textsuperscript{15} The CPS total score ranges from 0 (cognitively intact) to six (severely impaired).

MDS information related to the presence or absence of (1) resident complaints about the taste of many foods (MDS item K4a) and (2) leaves 25% or more of food uneaten at most meals (MDS item K4c) was then compared to research staff estimates based on (1) standardized interviews with residents about the taste of food based on one of the five direct interview questions, “Do you like the taste of the food here?” and (2) estimates of intake based on standardized direct observations during mealtime and photographs of meal trays.

Participants were divided into three groups based on the interviews: (1) those who expressed stable complaints about the taste of food on two separate interviews (ie, a “no” response on both interviews); (2) those who expressed in a stable manner that they liked the taste of the food (ie, a “yes” response); and, (3) those who expressed complaints about the taste of food but in an unstable manner (ie, a “yes” response on one interview and a “no” response on the other interview). The first two groups were compared to NH staff documentation of MDS item K4a. Total food and fluid intake percentages were calculated for each resident according to direct observations and the photographs of meal trays. All participants were again divided into two groups: (1) intake below 75% for most (ie, six or more) of nine meals, and (2) intake equal to or above 75% for most of nine meals. These two groups were compared to MDS item K4c.

**Analyses**

Cross-tabulations were conducted between NH staff MDS documentation and research staff assessments of the presence or absence of low oral intake and/or stable complaints about the taste of food. Chi-square values were calculated to determine differences in the proportion of individuals for whom low intake or food complaints was present based on the two assessment methods (ie, research staff versus MDS documentation). Kappa values were calculated for each of the two comparisons to test the level of agreement between NH and research staff assessments.

**RESULTS**

**Participants and Setting**

Table 1 shows the demographic, medical, and nutritional characteristics of the 75 participants. The participants were predominately female (83%) and white (97%). They were moderately cognitively impaired as indicated by the preva-
ience of physician-recorded chart diagnoses of dementia (49%) and the MDS-derived CPS score (2.74 ± 1.71). The prevalence of physician-recorded chart diagnoses of depression was 33%. The BMI of participants showed that 44% (33) had values indicative of undernutrition (BMI < 20). The majority (75%) of the participants were on a therapeutic or mechanically altered diet and/or had chart orders to receive a daily nutritional supplement (65%).

Comparison Between MDS Documentation and Research Staff Assessments

Comparisons between MDS and research staff assessments showed that research staff documentation based on standardized direct observations during mealtime, photographs of meal trays, and interviews with residents resulted in a significantly larger number of residents being identified as at risk for undernutrition due to low oral intake and/or complaints about the taste of food as compared to NH staff documentation of MDS items K4a and c, respectively, within the same month (Table 2). Specifically, a total of 55 (73%) participants were identified as at risk for undernutrition due to low oral intake based on the 3-day assessment by research staff (ie, direct observations during mealtime), and NH staff failed to identify 27 (49%) of these individuals, according to MDS documentation of low oral intake (item K4a) within the same month (chi-square = 4.00, P < 0.05; χ² = 0.192, P < .05). Participants who had low oral intake, according to research staff direct observations during mealtime, also had a significantly lower BMI (21.29 ± 4.42) as compared to participants who had intake above 75% for most meals (BMI = 24.41 ± 5.29, t = −2.28, P < 0.05).

None of the participants were documented by NH staff on the MDS as having food complaints; statistics could, therefore, not be conducted for this comparison. A total of 65 (87%) participants were able and willing to complete two interviews. Of those who completed two interviews, 21 (32%) expressed stable complaints about the taste of the food (ie, a “no” response on two interviews to the question, “do you like the taste of the food here?”), whereas an additional 21 (32%) expressed in a stable manner that they liked the taste of the food (ie, a “yes” response on two interviews to this same question). The remaining 23 (35%) were unstable in their responses to the interview question. Of the five interview questions related to food complaints, however, a total of 31 (47%) participants expressed stable complaints about some aspect of the food service (ie, taste, variety/choices, appearance, temperature), with an average of 1.2 (± 1.5) and a mode of three stable complaints per participant. Residents who expressed stable food complaints about at least one aspect of the food service were significantly less cognitively impaired as compared with residents who expressed in a stable manner that they liked the food service (CPS total score 2.0 ± 1.4 versus 3.1 ± 1.7, respectively; t = 2.76, P < 0.01). NH staff assessed 100% of those identified through standardized resident interview as expressing stable food complaints. A total of 23 (31%) participants had both low intake and stable food complaints. There was no difference, however, in the average total percent intake (across all nine meals) of the participants with stable food complaints (21) as compared to the average total percent intake of those (21) who reported in a stable manner that they liked the taste of the food (56% ± 15% versus 50% ± 17%, respectively), with both groups consuming well below 75% of each meal, on average.

The majority (75%) of residents in the sample were either on a mechanically altered or therapeutic diet. The number of stable food complaints expressed by residents on special diets (n = 56) was 1.0 (± 1.4) versus 1.8 (± 1.8) for those few (n = 19) on regular diets. The average percentage of foods and fluids consumed during mealtime for those on special diets was 51.9% (± 15.8%) as compared to 52.7% (± 16.1%) for those on regular diets. No residents in the sample were syringe fed, and only one was intermittently IV fed. NH staff rated 15 percent of residents as having a pressure ulcer, while 21% were rated as having a recent weight loss. Of the small group of residents who did not have any MDS nutritional trigger documented by NH staff (n = 8 who received no follow-up RAP related to nutrition), independent assessments by research staff showed that all of these residents had low oral intake and most (n = 5) expressed stable food complaints. The average number of days between research staff assessments and MDS completion by NH staff was 14.2 (± 11.4).

DISCUSSION

The results of this study showed that MDS documentation of low oral intake and food complaints resulted in a significant underestimate of residents with either of these risk factors for undernutrition as compared to research staff estimates based on standardized observation and interview protocols. These findings are consistent with the results of previous studies, which have shown that NH staff significantly overestimate residents’ oral intake during mealtime. Previous studies did not, however, evaluate the accuracy of MDS documentation of food complaints.

Most residents in this study were triggered on the MDS for potential nutritional problems because of the presence of special diet orders (ie, mechanically altered or therapeutic diets). However, the specific MDS-based nutritional triggers
that are determined to be present influence the subsequent individualized care plan. Inaccurate documentation of low oral intake and/or food complaints (as being absent) could, therefore, translate into the absence of important follow-up assessments, such as an evaluation of the resident’s need for feeding assistance. Upon review of the follow-up nutrition RAPs for participants in this study, for example, there was little to no change in the nutritional care plan if special diet orders, which accounted for the majority (75%), served as the trigger. In contrast, the presence of low oral intake (45%) and/or weight loss (21%) as triggers was more likely to result in modified care plans that involved weekly monitoring of intake and/or body weight and an evaluation of feeding assistance need. Interestingly, the lack of attention to food complaints (ie, no MDS documentation of complaints) for participants in this study seemed to correspond to a lack of attention to residents’ ability to communicate, which was rarely addressed (ie, only 25% of the participants had any information about their ability to communicate their preferences as part of their nutrition RAP).

Attention to the need for a feeding assistance evaluation when a NH resident is identified as having low oral intake is important in light of recent evidence that mealtime feeding assistance will significantly improve oral food and fluid intake in many residents who eat less than 75% of most of their meals.16 This same study also showed that there was an association between lack of responsiveness to feeding assistance and the presence of food complaints. Specifically, residents who did not increase their oral intake in response to feeding assistance expressed significantly more complaints about food quality as compared to those who did increase their intake in response to feeding assistance. In the current study, however, both those who expressed food complaints and those who reported that they liked the food had an average total percent intake well below the MDS-defined 75% criterion in the context of usual NH care, which may have consisted of inadequate feeding assistance.

The fact that so many residents with low oral intake and/or stable food complaints had chart orders to receive mechanically altered and/or therapeutic diets suggests that the appropriateness of diets for this population should be more closely evaluated.17,18 Furthermore, while it might be difficult to improve overall food quality (eg, taste, variety) because of institutional cost limitations, it may be possible to discontinue or alter diet orders for some residents who have low intake and express complaints. The difference in cognitive impairment level among residents who expressed stable complaints as compared to those who expressed in a stable manner that they liked the food suggests that the quality of the food service may be more important to residents who are less cognitively impaired. Another study has shown that cognitive status influenced the effectiveness of an intervention to increase fluid intake in that less impaired residents were more likely to increase fluid intake when the quality of beverages was improved (ie, variety of beverages from which to choose and compliance with preferences).19

There are several potential reasons why MDS documentation of low oral intake and food complaints was significantly different from research staff estimates of these two triggers for potential undernutrition. First, it has been suggested in previous studies that at least part of the problem is that nurse aides have too many competing tasks during mealtime (eg, meal tray delivery, feeding assistance, and documentation of daily intake values in the chart) to be completed for too many residents per aide.16,20 Staffing resources during mealtime, thus, potentially influence the accuracy of chart documentation as well as the adequacy of feeding assistance care for individual residents.8,10,16,20–22

Second, even though the MDS manual is intended to be a standardized assessment tool, there are not specific instructions as to how to determine the presence of low intake and food complaints among NH residents other than to “consult resident records, observe the resident while eating, and ask the resident directly.”25 In other words, there are no specific instructions as to what to observe during mealtime or what questions to ask of the resident. Furthermore, while both facilities in this study reported that they had a standardized approach for estimating food and fluid intake during mealtime, there was not a system in place in either facility for monitoring the accuracy of nurse aide estimates. Such a monitoring system, for example, would involve supervisory NH staff conducting “quality control” checks on a regular basis of a sample of residents’ intake values and comparing their values with nurse aide values in the chart, then providing feedback to nurse aides regarding errors.

The complete absence of food complaints being documented in residents’ charts could reflect an assumption by NH staff that the facility dietitian, who is typically responsible for the assessment of residents’ food preferences upon admission to a facility, will also assess residents’ food complaints. It could also reflect a common erroneous assumption among NH staff that most residents are unable to reliably answer questions. There is, in fact, recent evidence from multiple studies that a substantial portion of NH residents with mild to moderate cognitive impairment remain capable of reporting their satisfaction and preferences with respect to a variety of daily care areas.13,23,24 It is most likely that the major barrier to the assessment of food complaints is the lack of a standardized protocol to follow that outlines the specific questions that should be asked of residents. The results of this study strongly suggest that no questions were asked of any residents in the sample related to food complaints.

MDS information related to low oral intake and food complaints can potentially be useful for developing individualized care plans and nutritional interventions (eg, feeding assistance) that might effectively address these problems. However, standardized interview and observational assessment protocols, such as those used in this study, need to be used by NH staff to assess the presence or absence of these problems, both of which were found in this study to be common and underreported among NH residents. The accurate reporting of these problems is the first step in determining
if interventions can be developed to improve oral intake or residents’ satisfaction with NH food service.

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