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Research Article

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Do Nursing Staff Accept no Artificial Nutrition and Hydration for Terminal Patients?

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Abstract

Background: Hospice care remains a difficult task in clinical practice. Whether it is necessary to provide sufficient amount of artificial nutrition and hydration (ANH) to a terminal patient when the patient's body system deteriorates and is unable to absorb is an important issue for hospice care and is affected by Taiwanese medicine and food culture. Especially, there are quite different viewpoint in Taiwanese food culture for terminal patients from metropolitan to rural area.

Objective: To explore the perspectives of clinical nursing staff in providing artificial nutrition and hydration to terminal patients when the patient's body system deteriorates and examine factors affecting Taiwanese food culture.

Methods: A cross-sectional study with 393 clinical nursing staff from a teaching hospital in the central metropolitan area and eastern rural area, and the subjects were enrolled from March 2018 to March 2020. Taiwanese Food Cultural Recognition Scale and Clinical Artificial Nutrition and Hydration Scale were analyzed by using SPSS Statistics 22.0 for independent sample t-test, one-way ANOVA, Scheffe posterior comparison, and hierarchical regression.

Results:

1. Clinical nursing staff in urban areas showed better recognition of Taiwanese food culture (7.11 ± 1.67;6.90 ± 1.96) and better acceptance of ANH (101.84 ± 8.76 ; 99.24 ± 9.06) than those in rural areas.
2. Clinical nursing staff in urban areas had better recognition of and a more positive attitude towards non-ANH than those in rural areas ($p < 0.01$**). Moreover, clinical nursing staff in urban areas had better recognition of the homology of medicine and food (p=0.02*) recognized by Taiwanese medicine and food culture.
3. Clinical nursing staff in rural areas had a more positive attitude towards accepting non-ANH, in "physical function" and "digestive function" ($p < 0.001$***; $p < 0.01$**).
4. There is a significant difference between clinical nursing staff's affiliated institution/years of work experience and their recognition of non-ANH. Clinical nursing staff had a more positive attitude towards non-ANH if they participated in courses and training and had a better understanding of the concept of hospice care and of the timing as well as decision-making for ANH.
5. Those who participated in courses and training and had a better understanding of the concept of hospice care showed better recognition of the customs, family values and homology of medicine and food and were more likely to accept ANH.

Conclusions: Providing artificial nutrition and hydration as part of hospice care should be cautious. Caregivers should pay more attention to improve their hospice care skills, maintain a positive attitude when facing death at the end stage and provide comfort care, and all of these help to provide a reference for giving artificial nutrition and hydration to terminal patients and relevant decision-making.

Keywords: Terminal patients; Artificial nutrition and hydration (ANH)

Highlights

1. Due to regional differences, clinical nursing staff had a more positive attitude in non-AHN in Taiwan.
2. The patient's body system deteriorates for hospice care which is affected by Taiwanese medicine and food culture.

Introduction

Eating is a very important part of Taiwanese culture. The importance of eating is fully explained in the proverb "Food is the paramount necessity of the people" and Taiwanese slang "Nothing is more important than eating". Withdrawal of Artificial Nutrition and Hydration (ANH) from terminal patients is a great shock for family members in terms of Taiwanese food culture. Family members always think that non-provision of tube feeding or intravenous injection to terminal patients will starve them to death since these patients are not able to take food orally. For these family members, withdrawal of ANH means giving up, which will cause great conflict and struggle in them. Western medical care does not advocate ANH as a routine treatment for terminal patients. Excessive nutrient supplementation will not improve the physical conditions of patients and may even increase physical burden to the patients due to excessive hydration through intravenous injection, resulting in ascites and edema. Furthermore, continuous intravenous injection also will interfere with discharging of patients for in-home care [1-4].

This article investigates the impact of Taiwanese food culture, good appetite is a blessing and homology of medicine and food, on clinical nursing staff and considers food nutrition a part of medical treatment. With regard to the attitude of non-ANH to terminal patients, the difficulties as well as obstacles encountered when withdrawing ANH in clinical practice, also reveal the expectations of terminal patients and their family. This issue is a challenge [5-14,15,20,21] faced by clinical nursing staff everyday and is worth further investigation. Intervention with hospice care from the perspective of Taiwanese food culture allows further investigation of the relationships between local customs, family values and homology of medicine, food, and ANH as well as of the factors relating to these relationships, which can provide a reference for future educational strategy for clinical practice.

Method

Study Design and Subject

A cross-sectional, descriptive study and convenient sampling was used for selecting clinical nursing staff from a teaching hospital in the central metropolitan area and eastern rural area as the samples, and the subjects were enrolled from March 2018 to March 2020. The inclusive criteria include those who have a clear conscious, normal cognition function and the capacity to make juridical acts. Those who can communicate in Mandarin or Taiwanese and are capable of clear expression and agreed to be interviewed. The exclusion criteria include vulnerable groups (under the age of 20) and pregnant women. This study used the statistical software G-Power 3.1 to estimate sample size and α value was set at 0.05, the power was set at 0.8, the effect size was 0.5 and the maximum estimated number of effectiveness evaluation was 128 subjects. Hence, 500 questionnaires of this study were distributed, and 393 valid questionnaires, with a valid rate of 78.6%.

Study Tools and Reliability

Cases were enrolled based on a self-administered structured questionnaire survey, and the content of the questionnaire was formulated according to clinical experiences, Chinese food culture and literatures. Furthermore, comments from five clinical experts in specific fields including specialist physicians, clinical nursing experts and social workers were consulted for the revision of the Exploration of ANH in Terminal Patients, which was used as the study tool and the content of the questionnaire includes two parts: The first part basic attributes includes: Demographic variables, care experience, and education/training. The second part is the self-administered Exploration of Administration of ANH in Terminal Patients Questionnaire and includes two scales: 1. The Taiwanese Food Cultural Recognition Scale includes local customs (4 questions), family values (4 questions), and homology of medicine and food (4 questions), and an answer of yes scores 1 point and an answer of no or don't know scores 0 points. The higher the score, the more positive the recognition of Taiwanese Food Culture. 2. The Clinical Profile non-ANH Scale includes physical function (7 questions), nutrition/absorption (15 questions), and digestive function (5 questions). Principal component analysis (PCA) was used as the construct validity of this questionnaire based on factor analysis, and three fixed factors was set to be extracted. A factor loading of 0.4 was the cut-off point and the scores were categorized according to the level of loading. The questions include positive and negative narratives, and 5-point Liker's scale (1-5 points) was used for scoring, and a higher score indicates more of a positive attitude towards accepting ANH. Content validity index (CVI) was used for determining the expert validity of the scale and the CVI value was 0.97. Twenty nursing staff were invited for forecasting and the internal consistency of the scale was analyzed by using Cronbach's α and the KR-20 was 0.85.

Data Collection Process

The study received ethical approval from the hospital's institutional review board (IRB: CMUH107-REC1-032), and the researcher gave the explanation in person at the locations that enrolled the subjects. The questionnaire was distributed after the

respondents filled out the informed consent form and case data was collected anonymously. Each location was assigned with a contact person to assist in recovery of the questionnaire and to contact the researcher for collection of the returned questionnaire.

Data Analysis

Research data was analyzed by using SPSS Statistics 22.0 for independent sample t-test, one-way ANOVA, Scheffe posterior comparison, and hierarchical regression.

Results

Basic Attributes of Research Subjects

Three hundred and ninety-three nursing staff participated in this study as research subjects. The majority of the subjects were females (94.4%) with an average age of 30.34 ± 6.89, had a university degree (71.2%), were single (66.2%) and most of the subjects were Buddhists or Taoists (50.4%). Care Experience: Most of the subjects were at the hematology and oncology unit or hospice care unit (27.2%), had 2-10 years of work experience (57.0%), had previous experience in hospice care (96.2%), and had been asked by terminal patients or their family members to give nutrition injection or intravenous injection in the last month (64.9%). Education/Training: Most of the subjects had participated in hospice care courses and training (62.3%), had a general understanding of hospice care (65.9%), and had a general understanding of the timing and decision-making for giving ANH (48.6%) (Table 1).

Table 1: Basic attributes（N =393)

Variable	All Hospital N=393		Urban Hospital N=207		Rural Hospital N=186		*P*
	n	%	*n*	%	*n*	%	
Gender							.28
Male	22	5.6	14	6.8	8	4.3	
Female	371	94.4	193	93.2	178	95.7	
Age	30.34 ± 6.89		29.46 ± 6.47		31.32 ± 7.23		.02*
20-29 Yrs	222	56.5	127	61.4	95	51.1	
30-39 Yrs	125	31.8	61	29.5	64	34.4	
Over 40 Yrs	46	11.7	19	9.2	27	14.5	
Education							< .001***
Junior college	113	28.8	33	15.9	80	43.0	
≧ University	280	71.2	174	84.1	106	57.0	
Marriage							< .001***
Single	260	66.2	154	74.4	106	57.0	
Married	133	33.8	53	25.6	80	43.0	
Belief							< .001***
Buddism/Taoism	198	50.4	87	42.0	111	59.7	
Christian/Catholic	16	4.1	7	3.4	9	4.8	
None	179	45.5	113	54.6	66	35.5	
Units							< .001***
Chest Medicine	58	14.8	26	12.6	32	17.2	
Gastroenterology	48	12.2	24	11.6	24	12.9	

Nephrology	25	6.4	9	4.3	16	8.6	
Intensive Care Unit	80	20.4	12	5.8	68	36.6	
General Ward	75	19.1	72	34.8	3	1.6	
Oncology/Hospice	107	27.2	64	30.9	43	23.1	
Years of experience							.03*
□ 2 Yrs	63	16.0	40	19.3	23	12.4	
2-10 Yrs	224	57.0	118	57.0	106	57.0	
□ 11-15Yrs	106	27.0	49	23.7	57	30.6	
Education / Training							.01**
None	148	37.7	91	44.0	57	30.6	
Yes	245	62.3	116	56.0	129	69.4	
Experience care terminal Pts							.63
None	15	3.8	7	3.4	8	4.3	
Yes	378	96.2	200	96.6	178	95.7	
Concept of terminal care							.89
Very disagree	5	1.3	1	0.5	4	2.2	
Disagree	28	7.1	16	7.7	12	6.5	
Nature	101	25.7	55	26.6	46	24.7	
Agree	193	49.1	102	49.3	91	48.9	
Very agree	66	16.8	33	15.9	33	17.7	
ANH Decision Making							.50
Very disagree	4	1.0	1	0.5	3	1.6	
Disagree	47	12.0	27	13.0	20	10.8	
Nature	151	38.4	75	36.2	76	40.9	
Agree	161	41.0	86	41.5	75	40.3	
Very agree	30	7.6	18	8.7	12	6.5	
Have ever been request ANH in past month?							.72
None	138	35.1	71	34.3	67	36.0	
Yes	255	64.9	136	65.7	119	64.0	

*p < .05 ** p < .01 *** p < .001, Two-tailed.

Basic attributes found that there are statistically significant differences in age, education, marital, religious belief, units, years of experience, and education/training. Clinical nursing staff in rural areas showed over 40 years (14.5% ;9.2%), were Married (43.0%;25.6%), subjects were Buddhists or Taoists (59.7%;42.0%), had over 11 years of work experience(30.6%;23.7%), and Education/Training: have participated in hospice education/training (69.4%;56.0%) than those in urban areas. On the contrary, clinical nursing staff in urban areas showed university degrees (84.1%;57.0%), at the hematology and oncology unit or hospice care unit (30.9%;23.1%) than those in rural areas (Table 1).

Exploration and Analysis of the Differences between Urban Areas and Rural Areas in Administration of ANH in Terminal Patients

Clinical nursing staff had better recognition of Taiwanese food culture (7.11 ± 1.67 ; 6.90 ± 1.96) and better attitude towards accepting non-ANH (101.84 ± 8.76 ; 99.24 ± 9.06) when compared with those in rural areas. The t-test results showed a significant difference between the research subjects' recognition of and attitude towards the administration of ANH in terminal patients (t=8.18, p<0.01**), indicating clinical nursing staff in urban areas had better recognition of and attitude towards giving ANH to terminal patients when compared with those in rural areas. Further analysis of the recognition of Taiwanese food culture for clinical nursing staff in urban areas showed a significant difference in homology of medicine and food (t=5.01, p=0.02*), suggesting clinical nursing staff in urban areas had better recognition of homology of medicine and food when compared with those in rural areas. Significant differences were found in physical function and digestive function for clinical nursing staff in rural areas accepting ANH (t=24.68, p<0.001***; t=8.81, p<0.01**), indicating clinical nursing staff in rural areas had a more positive attitude towards accepting physical function and digestive function when compared with those in urban areas (Table 2).

Table 2: Differences between urban and rural analysis of the recognition of Taiwanese food cultural and Receiving non-ANH attitude toward terminally patients (N=393)

Variable	Urban Hospital ***N*=207** M ± SD	Rural Hospital ***N*=186** M ± SD	***P***
Recognition of Taiwanese Food Cultural	7.11 ± 1.67	6.90 ± 1.96	0.26
customs	2.76 ± 0.76	2.68 ± 0.94	0.38
family values	1.28 ± 1.15	1.38 ± 1.22	0.42
homology of medicine and food	3.07 ± 0.90	2.84 ± 1.07	0.02*
Accepting Non-ANH Attitude	101.84 ± 8.76	99.24 ± 9.06	＜0.01**
physical function	29.57 ± 4.68	22.78 ± 4.94	＜0.001***
Nutrient absorption	55.91 ± 5.39	59.23 ± 6.66	0.12
digestive function	16.36 ± 2.87	17.22 ± 2.84	＜0.01**

*p <0.05 ** p <0.01*** p <0.001, Two-tailed.

As shown in the Taiwanese Food Cultural Recognition Scale that the three items that received the highest scores under the "customs" and "homology of medicine and food" question sections from the two groups of clinical nursing staff are " Hydration through intravenous injection will cause an increased burden on patients and result in ascites and edema (0.87 ± 0.33; 0.90 ± 0.29), Hydration can prevent dry mouth or dehydration in patients (0.86 ± 0.34; 0.90 ± 0.29), Terminal patients can try ANH or hydration treatment for a limited time (within a short period of time) as a reference for making decisions for medical treatment (0.85 ± 0.35; 0.81 ± 0.39). For clinical nursing staff in urban areas, the three items that received the lowest scores under the "customs" and family values" question sections are "Tube feeding is an appropriate choice if the patient has difficulty in taking food orally" (0.22 ± 0.41), "Tube feeding and intravenous injection of nutrition is not necessarily associated with the length of life" (0.32 ± 0.46) and "Supplementation of nutrition and hydration is required if the patient cannot eat, cannot take food orally, has no appetite or has difficulty swallowing" (0.34 ± 0.47). For

clinical nursing staff in rural areas, the three items that received the lowest scores under the "family values" section are "Tube feeding is an appropriate choice if the patient has difficulty in taking food orally" (0.22 ± 0.40), "Supplementation of nutrition and hydration is required if the patient cannot eat, cannot take food orally, has no appetite or has difficulty swallowing" (0.32 ± 0.46) and "Intravenous injection is a good way to supplement hydration and nutrition when the patient has difficulty swallowing or coughs or vomits at the time of eating" (0.38 ± 0.48) (Table 3).

Table 3: The Taiwanese Food Cultural Recognition Scale (N =393)

Item	Content	Urban Hospital *N*=207			Rural Hospital *N*=186		
		M ± SD	%	Ranking	M ± SD	%	Ranking
	Total score (0-12 points)	7.11 ± 1.67	59.25		6.90 ± 1.96	57.50	
Customs (1-4 points)		2.76 ± 0.76	69.00		2.69 ± 0.94	67.25	
1	Hydration through intravenous injection will cause an increased burden on patients and result in ascites and edema	0.87 ± 0.33		1	0.90 ± 0.29		1
2*	IV drip is what keeps the patient from being discharged.	0.80 ± 0.40		4	0.63 ± 0.48		6
3*	Tube feeding and intravenous injection of nutrition is not necessarily associated with the length of life.	0.32 ± 0.46		11	0.39 ± 0.49		9
4*	All terminally ill patients should receive the Provision of ANH	0.77 ± 0.42		5	0.75 ± 0.43		4
Family values (1-4 points)		1.28 ± 1.15	32.00		1.38 ± 1.22	34.50	
5*	Intravenous injection is a good way to supplement hydration and nutrition when the patient has difficulty swallowing or coughs or vomits at the time of eating.	0.34 ± 0.47		9	0.38 ± 0.48		10
6*	Tube feeding is an appropriate choice if the patient has difficulty in taking food orally	0.22 ± 0.41		12	0.20 ± 0.40		12
7*	Supplementation of nutrition and hydration is required if the patient cannot eat, cannot take food orally, has no appetite or has difficulty swallowing	0.34 ± 0.47		10	0.32 ± 0.46		11
8	Dying people usually don't feel hungry, because dehydration can cause physiological changes that can have a pain-relieving effect	0.39 ± 0.48		8	0.48 ± 0.50		7
Homology of medicine and food (1-4 points)		3.07 ± 0.90	76.75		2.84 ± 1.07	71.00	
9	Hydration can prevent dry mouth or dehydration in patients	0.86 ± 0.34		2	0.90 ± 0.29		1
10	From the point of view of TCM health preservation, for terminally ill patients, "do not force food if not hungry, do not force drink if not thirsty; do not force food if not hungry, the spleen will be tired, if not thirst and force drink, the stomach will be distended."	0.68 ± 0.46		6	0.70 ± 0.45		5
11	Declining body function, the patient's spirit, and energy can no longer play their due role. Sickness won't heal. (traditional Chinese medicine)	0.68 ± 0.46		7	0.43 ± 0.49		8

12	Terminal patients can try ANH or hydration treatment for a limited time (within a short period of time) as a reference for making decisions for medical treatment.	0.85 ± 0.35		3	0.81 ± 0.39	3

As shown in the Clinical Profile of ANH Scale, the three items that received the highest scores under the "physical function nutrition/absorption" section from high to low are "Preparing for death is a difficult task accompanied with emotional ups and downs" (4.42 ± 0.71; 4.22 ± 0.73), "Terminal patients do not want to eat and caregivers will experience extreme anxiety and stress watching patients gradually lose weight" (4.39 ± 0.65; 4.16 ± 0.69), and "Doctors should switch their goal from helping patients to restore their health to ease their pain when dealing with physical decline in terminal patients" (4.34 ± 0.84; 4.14 ± 0.88). For clinical nursing staff in urban areas, the three items that received the lowest scores under the "digestion function" and "physical function" sections are "the nasogastric (NG) tube should be replaced every 1 to 3 months to prevent obstruction and affect digestion/absorption" (2.96 ± 0.96), "there's no need to give ANH if giving ANH is helpless to patients' digestion and absorption" (3.00 ± 1.04), " When the body function declines, ANH given by intravenous injection can stabilize the patient's condition." (3.12 ± 0.87). For clinical nursing staff in rural areas, the three items that received the lowest scores under the "physical function" section are " When the body function declines, ANH given by intravenous injection can stabilize the patient's condition" (2.88 ± 0.95), "When the body function of terminal patients declines, medical staff believe that if the patient can be saved, they must strive to save him/her. So that his/her family members will not regret it in the future and the staff will not violate medical ethics." (3.03 ± 0.95), "Patients should be fed by a gastric tube if they cannot take food orally due to body system deterioration and they should not be hungry" (3.10 ± 0.99) (Table 4).

Table 4: The Clinical Profile of non-ANH Scale (N =393)

Item	Content	Urban Hospital N=207			Rural Hospital N=186		
	Total score (27-135 points)	M ± SD	%	Ranking	M ± SD	%	Ranking
		101.84 ± 8.76	75.43		99.24 ± 9.06	73.51	
Physical Function (8-40 points)		29.57 ± 4.68	73.93		22.78 ± 4.94	56.95	
1*	When the body function declines, ANH given by intravenous injection can stabilize the patient's condition.	3.12 ± 0.87		25	2.88 ± 0.95		27
2*	Patients should be fed by a gastric tube if they cannot take food orally due to body system deterioration and they should not be hungry.	3.45 ± 0.90		20	3.10 ± 0.99		25
3*	When the body's function declines and does non-ANH, the result could be deadly.	4.03 ± 0.92		10	3.65 ± 1.04		16
4*	Do not provide near-death terminal patients with ANH, the patient will be starved to death.	3.95 ± 1.02		12	3.64 ± 1.07		17
5*	Continuing to provide ANH means that the terminal patients have not been given up.	3.71 ± 0.91		18	3.24 ± 0.99		22
6*	Providing ANH to terminal patients is an action of filial piety and care.	3.56 ± 0.90		19	3.25 ± 0.88		21
7*	When the body function of terminal patients declines, medical staff believe that if the patient can be saved, they must strive to save him/her. So that his/her family members will not regret it in the future and the staff will not violate medical ethics.	3.34 ± 0.96		21	3.03 ± 0.95		26

8	Preparing for death is a difficult task accompanied with emotional ups and downs	4.42 ± 0.71		1	4.22 ± 0.73		1
Nutrient Absorption (14-70 points)		59.91 ± 5.39	79.87		59.23 ± 6.66	84.61	
9	Asking "Have you eaten?" shows care for others and an emphasis on nutritional supplements.	3.85 ± 0.74		14	3.92 ± 0.72		11
10	Food as a remedy, supplementing food nutrition is considered as part of medical treatment.	3.97 ± 0.68		11	3.99 ± 0.73		9
11	Terminal patients can be eating will make their family feel at ease.	4.24 ± 0.62		4	4.14 ± 0.69		4
12	Terminal patients do not want to eat and caregivers will experience extreme anxiety and stress watching patients gradually lose weight	4.39 ± 0.65		2	4.16 ± 0.69		2
13	Receiving an IV drip at the hospital will make the patient feel safe.	3.27 ± 1.00		22	3.46 ± 0.94		18
14	Assisting terminally patients to eat is a way for family members to express their concerns. If the patient cannot eat, the family members will have a psychological burden and loss	3.86 ± 0.78		13	3.80 ± 0.65		13
15	The dietary needs of terminal patients are no longer physiologically necessary.	3.80 ± 0.98		16	3.75 ± 0.85		14
16	Doctors should switch their goal from helping patients to restore their health to ease their pain when dealing with physical decline in terminal patients	4.34 ± 0.84		3	4.14 ± 0.88		3
17	The right amount of IV drip is an effective treatment for both patients and their families psychologically.	3.78 ± 0.74		17	3.75 ± 0.93		15
18	Comfortable oral care can relieve dry mouth and avoid excessive water supply.	4.06 ± 0.85		8	3.96 ± 0.68		10
19	Overtreatment is inappropriate for terminal patients.	4.23 ± 0.82		5	4.07 ± 0.72		5
20	When the terminal patient's dietary needs decline, resulting in weight loss, family members still have expectations and requirements for ANH.	3.84 ± 0.69		15	3.84 ± 0.69		12
21	When the body function of terminal patients has declined and cannot be absorbed, providing too much ANH will cause a physical burden.	4.22 ± 0.73		6	4.04 ± 0.70		7
22	Terminal patients died of organ failure, not because of insufficient water or food	4.09 ± 0.89		7	4.00 ± 0.77		8
Digestive Function (5-25 points)		16.36 ± 2.87	65.44		17.22 ± 2.84	68.88	
23	Inserting a nasogastric tube will make the patient not feel like eating	4.06 ± 0.69		9	4.05 ± 0.68		6
24	There's no need to give ANH if giving ANH is helpless to patients' digestion and absorption	3.00 ± 1.04		26	3.18 ± 1.01		24

25	A nasogastric tube will make the patient feel bad and unwilling to go out and eat with others	3.14 ± 1.03	24	3.38 ± 0.92	20
26	The nasogastric (NG) tube should be replaced every 1 to 3 months to prevent obstruction and affect digestion/absorption	2.96 ± 0.96	27	3.19 ± 0.90	23
27	ANH will prolong the dying process and should let go and return to natural death.	3.20 ± 0.97	23	3.41 ± 0.86	19

*There are 7 reverse questions.

Basic Attributes and Clinical Profile of Non-ANH (ANH) to Terminal Patients

There is a significant difference between research subjects' affiliated institution/years of work experience, participated courses/training, concept of hospice care, timing and decision-making for ANH, and their recognition of as well as attitude towards non-ANH(F =7.69, p<0.001***; F =4.81, p<0.00**; t= -4.70, p<0.001***; F = 14.60, p<0.001***; F = 9.94, p<0.001***). Findings of Scheffe posterior comparison: Clinical nursing staff in the oncology and hospice care unit showed better understanding than the staff in the ICU, and the staff with 11 to 15 (inclusive) years of work experience showed better understanding than those with less than 1 year of work experience. In terms of the concept of hospice care and the timing and decision-making for ANH, the number of the nursing staff who had a full understanding was higher than that of the staff who had a general understanding.

Further investigation of the basic attributes and the differences in the recognition of and attitude towards non-ANH of the two groups of clinical nursing staff shows: The age and marital status (F= 3.38, p =0.02*; t = -3.21, p<0.00**) showed a significant differences between clinical nursing staff in rural areas and those in urban areas. Scheffe posterior comparison indicated that clinical nursing staff over the age of 40 had a better recognition of and better attitude towards non-ANH when compared with those at the age between 20 and 29, suggesting older nursing staff had better recognition of and a more positive attitude towards non-ANH (Table 4).

Prediction of Non-ANH Based on Differences between Urban Areas and Rural Areas

To understand the basic attributes of clinical nursing staff and whether Taiwanese food culture is a factor affecting the attitude towards accepting ANH, the researcher analyzed the recognition of Taiwanese food culture and the attitude towards accepting ANH by hierarchical regression. The basic attributes of clinical nursing staff including affiliated institution, years of work experience, participation in courses/training, concept of hospice care and the timing and decision-making for giving ANH were controlled in Model 1, and the basic attributes of clinical nursing staff mentioned above plus customs were controlled in Model 2, the basic attributes of clinical nursing staff mentioned in Model 1 plus customs and family values were controlled in Model 3, and the basic attributes of clinical nursing staff mentioned in Model 1 plus customs, family values and homology of medicine and food were controlled in Model 4.

The basic attributes of clinical nursing staff in urban and rural areas both had an explanatory power of 10% for non-ANH. The explanatory power was 12% for non-ANH for clinical nursing staff in rural areas with customs included, which was significantly higher than the explanatory power of 9% for nursing staff in urban areas. The explanatory power was 21% for non-ANH with customs and family values included, which was significantly higher than the explanatory power of 10% for clinical nursing staff in urban areas. In addition, the explanatory power was 22% for non-ANH with customs, family values and homology of medicine and food included, which was significantly higher than the explanatory power of 13% for clinical nursing staff in urban areas and among which participation in courses/training and the concept of hospice care were positively significant. The result indicates that those who participated in courses and training, had a better understanding of the concept of hospice care and had better recognition of the customs, family values and homology of medicine and food were more likely to accept ANH (Table 5).

Table 5: Prediction of Accepting Non-ANH Attitude Based on Differences between Urban Areas and Rural Areas (N =393)

Model	Urban Hospital N = 207								Rural Hospital N = 186							
	Model 1		Model 2		Model 3		Model 4		Model 1		Model 2		Model 3		Model 4	
Control variable	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*	*β*	*t/p*
Education / Training	.76	1.04	.80	1.07	.06	.79	.03	.49	.19	2.62**	.18	2.56*	.10	1.55	.08	1.24
Concept of terminal care	.30	3.51**	.30	3.50**	.30	3.45**	.28	3.29**	.13	1.43	.07	.82	.14	1.54	.15	1.65
ANH Decision Making	- .00	-.05	- .27	- .09	- .02	- .30	- .02	- .29	.13	1.44	.15	1.73	.04	.47	.03	.39
Independent variable																
customs			- .00	- .27	- .00	- .13	.00	.04			.17	2.42*	.18	2.66**	.18	2.67**
family values					.11	1.65	.10	1.55					.32	4.61***	.31	4.48***
homology of medicine and food							.19	2.90**							.12	1.87*
Hierarchical regression																
F	8.71		6.52		5.81		6.43		7.88		7.53		10.95		9.88	
R^2	.10		.09		.10		.13		.10		.12		.21		.22	
ΔR^2	.10		- .01		.01		.03		.10		.02		.09		.01	
p	< .001***		< .001***		< .001***		< .001***		< .001***		< .001***		< .001***		< .001***	

*p <0.05** p<0.01*** p <0.001, Two-tailed.

Discussion

I. Dilemma of Customs and Medical Ethics

Although clinical nursing staff have sufficient clinical experience and education/training in ANH, their knowledge in Taiwanese food culture seems insufficient for helping terminal patients. The study conducted by Chiu [16] indicates that nearly one-fourth of the nursing staff faced the dilemma of clinical ethics relating to intake of nutrition and hydration by terminal patients, but less than one-tenth of these patients were provided with ANH according to the evaluation conducted by health care personnel and based on the needs of patients' family members following medical team interventions. Family members will experience psychological burden and loss when the patient's body system deteriorates and becomes unable to eat or loses weight, and most of them think when the patient is unable to eat or take food orally, has no appetite or has difficulty swallowing, he or she will die in hunger and they want to give ANH to the patient. They may even think when the patient has difficulty taking food orally, feeding by a gastric tube is an appropriate choice and continuous feeding the patient with nutrition and hydration means they did not give up on the patient [1]. It is common for clinical nursing staff to think the basic physical needs and care is to provide ANH, which results in an ethical dilemma in clinical practice due to conflicts.

It is worth noting that although 96.2% of the clinical nursing staff participated in this study had prior experience in hospice care, 64.9% of them were asked by the terminal patients or family members to give nutrition injection or intravenous injection in the last month, while only 62.3% of these staff participated in hospice care-related courses or training. Wu et al. [3] indicated in their study that there was no significant differences between provision ANH and non-ANH in terms of prolonging survival or improving clinical symptoms in terminal patients. However, the observational study conducted by Morita et al. [23] clearly showed a significant difference in terminal patients received dehydration treatment during the last three weeks of their lives (p=0.002), and terminal patients received ANH had a significantly higher incidence of limb edema, ascites and pleural effusion (44% *vs* 29%, $P = 0.039$; 29% *vs* 8.4%, $P<0.001$***; 15% *vs* 5.4%, $P = 0.016$, respectively). Therefore, excessive administration of ANH in terminal patients indeed will seriously increase physical burden.

II. Discussion on Family values and Ethical Dilemma

Further investigation indicates that 16.8% of the nursing staff fully understood the concept of hospice care, suggesting only one-sixth of the clinical nursing staff fully understood the concept of hospice care, and 7.6% fully understood the timing and decision-making for ANH. These results are similar to that reported by Ke [5] and Hsiao [16], one-fourth of the nursing staff encountered the ethical dilemma associated with the intake of nutrition and hydration by terminal patients and only less than one-tenth of the patients clinically were able to receive ANH according to their actual needs.

Many people lament about that family values has deteriorated as time evolves and think supplementation of nutrition and hydration is required if their loved ones cannot eat, cannot take food orally, have no appetite or have difficulty swallowing, or think intravenous injection is a good choice for supplementation of nutrition and hydration if the patient has difficulty swallowing and coughs or vomits at the time of eating. Many family members are bound by traditional family values when facing the death of their loved ones and worry about they will be unfilial if they do not resuscitate their loved ones. As a result, family members will ask doctors to try their best to resuscitate the patient [1] because they do not want to be blamed for. Even more, whether family members have tried all they can spent all their money to resuscitate the patient at the end of his or her life is considered as an indicator of family relationship. With the high-tech medical technology and precision instrument, these machines can keep patients alive but ineffective medical treatment will only add more physical and psychological pain and burden to the dying patients.

III. Taiwanese Food Culture and Homology of Medicine and Food

Taiwanese food culture attaches great importance to the concept of food is the paramount necessity of the people and nothing is more important than eating, and filial practices as well as family value are the core of traditional Chinese ethics. Due to such cultural context and under the influence of family and human relations, food represents the relationship between interpersonal interaction and society. Taiwanese food culture emphasizes that healthy diet is the first priority. Medicinal cuisine combines medicine with food and treats medicine as food while endows food with medicinal effects. Medicine shares the power of food and food helps to enhance the effect of medicine. Therefore, the interaction of the two helps to create the highest nutritional value of food and medicine and provides the functions of disease prevention and health maintenance to strengthen the functions of the body.

Blum *et al.* [2] pointed out that neither enteral nutrition nor parenteral supplementation can improve the symptoms and physical functions of terminal patients when the patient's body system deteriorates. On the contrary, continuous supplementation of nutrition and hydration may cause numerous side effects in terminal patients, including pulmonary edema caused by excessive fluid retention in the body, skin damage, increased activity intolerance, and even increased difficulty breathing and dyspnea, which are consistent with the results of this study. Ge Hong [24], a famous physician in the Jin Dynasty, wrote in Baopuzi. Neipian: "The way to stay healthy..... is not to eat too much, not to drink too much because of thirst. Eating too much will result in accumulations and gatherings and drinking too much will lead to accumulation of phlegm in hypochondrium...." and in Baopuzi. Philosophy of Health Living: "Don't eat if you are not hungry; don't drink if you are not thirsty. Eating when not hungry will force the spleen to work and drinking when not thirsty will cause bloating" [25], which are consistent with the argument that aggressive nutritional supplementation may or may not improve the effectiveness of anticancer therapy and definitely will not prolong the life of terminal patients [5,16].

IV. Differences between Urban Areas and Rural Areas and ANH

Significant differences were found in age and marital status between clinical nursing staff in rural areas and those in urban areas. Moreover, clinical nursing staff in rural areas who participated in courses and training and had a better understanding of the concept of hospice care and of customs, family values and homology of medicine and food were predicted to have a more positive attitude towards non-ANH when compared with those in urban areas.

Clinical nursing staff with many years of work experience and understood the concept of palliative care were more likely to relate to and realize the meaning and value of their lives during the process of providing hospice care, and this result is similar to that found by other researchers [17,18]. Studies have indicated that those who were older had a higher level of education and had

longer years of work experience had better knowledge resources as well as better skills in utilizing the resources. Nursing staff who worked at the oncology or hospice unit had more experience in care [18,19,21] and also diligently cultivated clinical talents [13]. In particular, clinical nursing staff who had participated in hospice care training had a more positive attitude towards non-ANH in terminal patients when the patient's body system deteriorates [15,21,22], and a significantly positive correlation was observed when clinical nursing staff had a better understanding of the concept of hospice care and the timing and decision-making for ANH, they had a more positive attitude towards accepting ANH [5,14,15,21,22].

Participation in courses/training and the concept of hospice care are important predicting factors non-ANH. Further investigation of the differences between medical specialties: 1. The objects receiving care at the oncology and hospice care unit are mainly end-stage terminal patients and terminal patients. Therefore, medical teams not only help control physical symptoms but also are involved in many aspects, including mental and social level, update on disease condition and message conveyance, which all practically provide assistance and effectiveness specifically for terminal patients and family members [1,18]. 2. The gastrointestinal tract of the patients treated at the gastroenterology and the hepatobiliary unit is unable to digest and absorb due to the progress of the disease and organ system failure. Forced feeding of terminal patients will cause an increased digestive burden to patients and accelerate the progress of cachexia instead [15]. 3. The kidneys of the patients in the nephrology unit are unable to excrete excess water and effectively eliminate metabolic wastes from the body due to renal failure, and hence the patients will experience systemic symptoms such as fatigue, nausea and vomiting, loss of appetite, limb edema, and asthma. In severe cases, renal failure can also lead to electrolyte imbalances in the body and long-term hemodialysis or peritoneal dialysis may be required to sustain life. Therefore, special attention is required for the administration of ANH at the gastroenterology and hepatobiliary unit and the nephrology unit and this point of view is similar to that of the nursing staff in the oncology and hospice care unit [15]. 4. ICU nursing staff and family members in the intensive care medicine unit generally believe that the basic physical needs and care are to provide ANH for the patient, and the intensive care unit still belongs to emergency care and the treatment of the patient's symptoms is also more inclined to actively rescue the patient. Therefore, studies have found that ANH should continue to be provided even if life support therapy such as ventilation and dialysis is terminated [21].

Hence it is evident that clinical nursing staff lack relevant competencies in palliative care. In clinical practice, the members of a hospice care team are capable of independent thinking and judgment and may discuss the pros and cons of ANH as well as ethical dilemma encountered in clinical practice with physicians, so as to reduce the psychological burden and confusions of family members [1,3,4,6,10,13,14,22], which will affect the conveyance of the knowledge relating to the administration of ANH in terminal patients when the patient's body system deteriorates and help to bring out professional care competence. Therefore, insufficient recognition and unfamiliar attitude of nursing staff on hospice care along with insufficient knowledge of relevant practices in hospice care will affect the quality of hospice care provided to the terminal patients [4,5,13]. For education/training, nursing staff should improve their competency in ANH for terminal patients to ensure frontline health care workers are capable of providing sufficient description and explanation of specific nutrition and hydration issues to patients and family members and utilizing ethical principles to analyze the pros and cons of ANH, so as to assure patients will receive the greatest comfort and least physical and mental pain [1,3,4,13,14,17,22].

In reality, for hospice care, caregivers should try their best to provide comfort care instead of giving ANH [8,13]. Strengthening education and training on hospice and end-of-life care and focusing on nursing skills of clinical nursing staff, improving the knowledge of ANH in terminal patients when the patient's body system deteriorates, respecting the natural changes of terminal patients' bodies, improving family members' understanding of the disease and providing patients with appropriate guidelines for ANH are the correct ways to show respect and help patients [3,7,8,9,14].

Conclusions and Suggestions

Clinical nursing staff had a more positive attitude towards non-ANH if they participate in courses and training and have a better understanding of the concept of hospice care. According to the research findings and current clinical status, we propose the following suggestions for reference: 1. For nursing education, current hospice care and advance care planning focus on promoting hospice care education, which can improve the nursing staff's confidence in the knowledge of and attitude towards hospice care. Patients should be provided with the pros and cons of ANH on a case-by-case basis, so that patients will feel comfortable with dignity and find peace at the end of their lives. 2. In terms of clinical practice and nursing research, traditional Taiwanese customs and the use of medicinal cuisine should be taken into consideration to help terminal patients and their family members make the decision to reduce the administration of ANH, so that the patients can receive the best hospice care.

Limitations of the Study

This study is a cross-sectional study that further explores patients' and family members' attitude towards accepting organ system failure as well as reducing administration of ANH in terminal patients to provide a more efficient hospice care.

The questionnaires used in this study are self-administered questionnaires and the construct of the questionnaires have been subjected to literatures search, expert reliability/validity and factor analysis. However, if in-depth identification and item analysis can be conducted specifically for the reliability of the questionnaires and criterion validity can be performed for the content of the questions included in the scales, through rigorous reliability and validity testing, we hope that the development of self-administered scales will be better in line with the basis of construction and research value.

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Author statement

All authors contributed to the study's conception and design. Zhi Yun Li and Chiu-Lan Ssu collected and analyzed the data. Ya Ling Chang and Yuanmay Chang interpreted and discussed the data and were involved in preparing the final version of the findings. The first draft of the manuscript was written by Ya Ling Chang, and all authors commented on previous versions of the manuscript. All authors read and approved the final manuscript.

Conflict of interests

The authors declare that they have no competing interests.

Ethics approval and consent to participate

The China Medical University Hospital Research Ethics Committee (approval number: CMUH107-REC1-032) approved the study. Informed consent was obtained from all individual participants included in the study.

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