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Gender Differences in Nutrition Knowledge, Attitude, and Practice among Elderly People

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Malnutrition is an important public health concern among elderly people. According to the WHO, malnutrition may be a contributing factor to the development of cardiovascular and cerebrovascular disease, diabetes, osteoporosis, and cancer among others. Prior research documents that nutrition knowledge deficits and poor attitude and practices are prevalent in elderly Taiwanese. The purpose of this study was to identify several factors (e.g. age, education, marital status, money for living expense, physical and mental health) that impact on nutrition knowledge, attitude and dietary practice among elderly Taiwanese men and women. Data from the 2004-2008 Nutrition and Health Survey in Taiwan (NAHSIT) (Data file: D00090) in the Survey Research Data Archive, Center for Survey Research, Research Center for Humanities and Social Sciences, Academia Sinica was used for analysis. The participants were 258 elderly people with an age range of 72.88±6.09. Multiple regression tests were incorporated to examine predictors affecting nutrition knowledge, attitude, and dietary practice of the elderly males and elderly females. The results did not identify any key factors that influence nutrition knowledge for older male and female people. Age was noted to be an independent predictor in nutrition attitude for male but not female elderly people. Both education and marital status had an effect on nutrition attitude and dietary practice for older men. On the other hand, only education affected nutrition attitude and dietary practice for older women. Mental health was an independent predictor for nutrition attitude. Money for living expenses had a significant effect on nutritional dietary practices for older women.

Keywords: Elderly people, gender difference, nutrition knowledge, attitude, practice

Population ageing has become a worldwide critical public health problem. Taiwan was classified as an aging society in 1993 [14]. Since that time the percentage of people aged 65 years and older has continued to increase. In 2013, the percentage reached 11.5%. The aging index, which indicates the aging level of a population, has reached 80.5%. This index has increased by 33.9 percentage points in the recent decade. By 2017, the population ratio of elderly people in Taiwan is expected to grow to 14%, at which point Taiwan will qualify as an aged society. The population percentage of elderly people in Taiwan is estimated to reach 19%-20% by 2025, thus qualifying Taiwan as a super-aged society. By 2025 problems such as inadequate

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long-term care facilities, pension plan financial instability, and lack of ageing in place programs are expected to become increasingly severe [14]. In the context of this annually increasing percentage of elderly population, the goal of extending live spans must be matched with successful methods of preserving the quality of their health and independent daily living. Optimally functioning elders can thus continue to contribute to society and avoid being a premature drain on its resources. Advancements in medical science should not be solely focused on extending the number of years in the lives of elderly people without an accompanying consideration for the quality of their lives, because this would increase an avoidable burden on society and families.

The Department of Health (currently, the Ministry of Health and Welfare) commissioned the Academia Sinica to conduct the Elderly Nutrition and Health Survey in Taiwan (NAHSIT, 1999-2000) on Taiwanese aged 65 years and older (a questionnaire was distributed to 1,937 participants) [18]. The results indicated that the elderly people lacked sufficient nutritional knowledge. The survey noted a disproportionately high number of females with low education levels who lived in geographically remote areas such as the central and eastern mountain regions and in the Penghu Islands. The elderly Taiwanese surveyed had a general lack of knowledge about the effects of diet and nutrition on diseases and human health. They were found to have particularly incorrect opinions concerning the effects of fats, cholesterol, fiber, calcium, iron, and smoked foods.

Regarding their nutrition attitudes, most elderly people surveyed did not share modern nutritional views about dietary quality or supplements. Most of the elderly people surveyed mistakenly believed that they could avoid health problems if they simply ate sufficient quantities of food without regard to the nutritional quality of food [9; 15].

On the subject of their dietary practices, most of the elderly people believed and followed popular but illogical or unhealthy food choices. The elderly people believed the traditional taboo that cold, sour and spicy foods would irritate the stomach and should be avoided. They were uninformed on the dangers of consuming large amounts of organ meats, shrimps, crabs, lard and other high-fat, high-cholesterol fried foods such as bacon and sausages. In addition the elderly rarely avoided highly salted pickled, fermented, high-starch or

high-sugar content processed foods. On a good note, more than 90% of the elderly people surveyed had regularly eaten three meals a day [17].

More than 50% of the elderly people surveyed rarely paid attention to nutrition information on products they used. More than 90% of those surveyed believed that the attached nutrition messages related to food health were just advertising gimmicks to increase sales. Additional research on the relationship among nutrition knowledge, nutrition attitudes, and dietary practices reveals that elderly people with more factually correct nutrition knowledge are less inclined to believe popular but untrue health claims and beliefs about dietary supplements and are more likely to adopt positive eating attitudes. These properly informed elderly people are more inclined to regularly eat three meals a day and are less likely to practice irrational traditional food taboos. They are also more likely to avoid high-fat, high-cholesterol, pickled, and fermented foods [11]. The 1999-2000 NAHSIT analyzed the 24-hour dietary recall of people aged 65 years and older to explore the distribution, total intake, and caloric values of various types of food eaten, as well as to determine the primary sources of the three primary nutrients (carbohydrates, fats, and proteins), vitamins, and minerals for elderly people [7; 17]. The results indicated that compared with younger adults, the people aged 65 years and older had consumed more grains, root crops, seafood, vegetables, and fruits but had consumed less fat, poultry, livestock, other sources of protein, snacks, alcohol and spices. The elderly people in this study consumed twice as much salt as did the younger adults. Generally, the elderly people differed from younger adults regarding the food sources of their nutrients [30]. Although elderly people consumed excessive sodium, they also consumed less poultry, livestock, and related animal fats. The elderly consumed more dairy products, vegetables, and fruits than younger adults did. On the whole, the elderly people exhibited healthier diets than did younger adults. However, the dairy products, vegetables, and fruit intake of elderly people must still be increased to alleviate their calcium and fiber deficiencies. These deficiencies also indicated that elderly males and elderly females differed substantially on their nutrition knowledge, attitudes and dietary practices [18].

Numerous empirical studies have addressed a considerable difference between elderly males and elderly females on their nutrition [8; 23]. The results of the Quebec Medicare Database (1793, 67-84-year-old participants) showed that higher education, diet knowledge, number of daily meals and perceived physical

health tended to have higher diet quality among older men. Older women with higher education, better diet knowledge, greater number of daily meals and hunger associated with diet were also linked with higher diet quality [23].

Most of the relevant studies have indicated that gender-specific differences exist in many factors of eating and dieting, for example, education, marital status, household composition, socioeconomic status, social support, geographic and environmental characteristics [1; 8; 16]. Kiefer and colleagues (2005) suggested women have a higher awareness and better knowledge of nutrition and nutrient intake than men. However, women had higher rates of dieting and eating disorders directed at controlling their weight. These eating behaviors and attitudes towards nutrition might be affected by psychological and socio-cultural factors.

There is a need for better understand of the related predictors affecting nutrition knowledge, attitude and dietary practice between older men and women. The aim of this study was to identify how several factors (e.g. age, education, marital status, money for living expense, physical and mental health) effect nutrition knowledge, attitude and dietary practice among older men and women.

METHODOLOGY

-Participants and Ethics

A quantitative research method was applied. We analyzed the questionnaire data of the people aged 65 years and older that were gathered in the original 2004-2008 NAHSIT (D00090) surveys performed by the Survey Research Data Archive, Center for Survey Research, Research Center for Humanities and Social Studies, Academia Sinica. This survey started on February 1, 2005 and ended on December 31, 2008 [19].

The 2004-2008 NAHSIT (D00090) project applied a multistage stratified cluster sampling method. Taiwan was divided into five geographic sectors (North, Central, South, East, and rural). In addition, three cultural groups were analyzed as they each had unique daily living and dietary practices (e.g. the Hakka community, mountain residents, and Penghu communities). A total of 6,189 independent samples in 48 townships, 3,086 of whom were male and 3,103 were female, were interviewed. The survey response rates were 63% from the male interviewees and 66% from the female interviewees [20].

The sample population was designated as a permanent resident in Taiwan, who was aged 0-6 and 19 years and older (0 years old was defined as being less than 1 year old). Those persons whose age was 7 to

18 inclusive were not part of this NAHSIT sample as they were used for an adolescent nutrition survey. The population included all the registered, nonregistered, consanguineous, and non-consanguineous residents (foreign spouses included) but not those in military units, hospitals, nursing homes, schools, vocational training centers, dormitories, and prisons [20]. The household permanent residents were defined as follows: (a) residents who have actually resided or are expected to reside in Taiwan for 3 months; (b) residents who have lived or eaten in the interviewed households for an average of 4 or more days each week; (c) people who reside in the region without a household registration there; (d) residents with Taiwanese or foreign spouses. Pregnant women, lactating women, patients diagnosed with Alzheimer' s disease or infectious diseases listed in the mandatory communicable disease reporting system, and patients with severe illnesses were excluded from the survey. Patients with severe illnesses were defined as those that exhibited no self-awareness, were diagnosed with nearly irreversible severe diseases, and had adopted nonconventional eating methods (e.g., those that were diagnosed with cancer, were undergoing dialysis, were in vegetative states, or had received enteral bypass surgeries) [20].

The participants of this current study comprised 258 people aged 65 years and older, 124 of who were male and 134 of who were female who completed a nutrition knowledge, attitude, and practice questionnaire. This research was approved by the Research Ethics Committee of National Taiwan University (NTU-REC No.: 201407ES014).

-Measures

This study applied the questionnaire survey data from the 2004-2008 NAHSIT (D00090). The questionnaire items included household data, demographic information, household recipes, personal dietary records, 24-hour dietary recall, diet questionnaires, questionnaires on the history of diseases, physical and mental functionality scales, physical activity scales, questionnaires on nutrition knowledge and attitudes and dietary practices, and various levels of physical and mental health questionnaires (according to age) [20]. On the basis of the goal of this study, the research instrument consisted of the following three dimensions.

Personal demographic and background information, for example, age, gender, education level, marital status, and whether the household income is sufficient to pay monthly living costs and other expenses.

Physical health was presented by the Self-report health scale and used one single question item as " How would you rate your current health?" with reply alternatives: very good, quite good, neither good nor poor, quite poor, and poor. Each participant scored between 1 and 5 points; a lower score indicated that the participant was healthier. The reliability of self-rated health is good in all subgroups studied [12].

Mental health used the Brief Symptom Rating Scale (BSRS) that is a psychiatric symptom assessment to clarify and provide the psychological healthcare services required by various individuals. The scale consists of five items to be answered by the participant [10]. A 5-point Likert scale is applied (0 = none; 1 = mild; 2 = moderate; 3 = severe; 4 = extremely severe). In this study, each participant scored between 0 and 14 points; a lower score indicated that the participant was healthier [10].

Knowledge, attitude, and practice model questionnaire: The knowledge dimension consists of four parts. The first part consists of 10 items; the second part consists of 10 items; the third part is divided into a question group for male participants and one for female participants, each of which comprises six items; and the fourth part comprises six items. The nutritional attitude section comprises 19 items and applies a 3-point Likert scale (1 = agree; 2 = neutral; 3 = disagree). The dietary practice section consists of 24 items and applies a 3-point Likert scale (1 = rarely; 2 = occasionally; 3 = frequently). No reliability and validity verification has been conducted on this questionnaire. Therefore, this study determined the reliability and validity of this questionnaire [20].

Data Analyses

The Statistical Package for Social Sciences (SPSS) 18.0 was employed for a data analysis [25]. Descriptive statistics and multiple regression tests were incorporated to examine predictors affecting in nutrition knowledge, attitude, and dietary practice of the elderly males and elderly females. Multiple regressions were conducted to determine the best linear combination of age, education, marital status, money for living expense, physical and mental health for predicting nutrition knowledge, attitude, and dietary practice. In this study, the author checked the Tolerance VIF values in the Coefficients table. They did not have multicollinearity because the Tolerance values are close to 1.

RESULTS

The average age of the surveyed elderly people was 72.88 years. The numbers of elderly males and elderly females were approximately equal. Regarding marital status, married elderly people constituted the greatest majority of the participants, followed by single and then widowed elderly people. For the education levels, the elderly people that had graduated from elementary schools constituted the greatest majority of the participants, followed by those that had graduated from high schools and those that had graduated from universities. Characteristics of sample are summaries in Table 1 (see Appendix-I). The KAP total mean score is 93.84±12.76 (knowledge=2.65±3.94, attitude=39.33±7.96, practice=51.86±5.84).

The first model summary Table 2 showed the R square is 2.9% of the variance in nutrition knowledge for older male and 5.5% for older female. This combination of variables did not significantly predict nutrition knowledge for older males ($F_{(6, 114)}$=0.558, p=0.763) and female ($F_{(6, 123)}$=1.183, p=0.320).

Variable	Female			Male		
	B	SE B	β	B	SE B	β
Age	.079	.060	.118	.037	.057	.061
Education	.090	.122	.069	.069	.097	.065
Marital status	-.045	.286	-.015	-.205	.241	-.080
Living cost	.736	.557	.130	-.199	.485	-.039
Physical health	.000	.000	-.056	-.354	.362	-.092
Mental health	-.301	.180	-.151	-.162	.243	-.064
R^2		.055			.029	
F		1.183			0.558	

*p <.05; **p <.01; *** p <.001

Table 1. Multiple Regression Analyses for Variables Predicting Males and Females' Nutrition Dietary Knowledge

The second model presented the R square is 20.4% of the variance in nutrition attitude for older male and 29.4% for older female. This combination of variables significantly predicted nutrition attitude for older males ($F_{(6, 114)}$=4.855, p<0.000) and females ($F_{(6, 123)}$=8.524, p<0.000). Among older men, the model showed higher age (β =0.259, p=0.003), education (β =0.227, p=0.008), and marital status (β =-0.265, p=0.002) to be positive determinants of nutrition attitude. Among older women, education (β =0.280, p=0.001) was a

positive determinant of nutrition attitude and mental health (β =-0.225, p=0.005) was a negative determinant of nutrition attitude (Table 3).

Variable	Female			Male		
	B	SE B	β	B	SE B	β
Age	.120	.096	.096	.357	.117	.259**
Education	.670	.194	.280**	.537	.199	.227**
Marital status	-.834	.454	-.146	-1.540	.494	-.265**
Living cost	-1.656	.885	-.159	-.448	.992	-.039
Physical health	-.001	.001	-.106	.984	.740	.113
Mental health	-.824	.286	-.225**	-.324	.498	-.057
R^2		0.294			0.204	
F		8.524***			4.855***	

*p <.05; **p <.01; *** p <.001

Table 2. Multiple Regression Analyses for Variables Predicting Males and Females' Nutrition Dietary Attitude

The third model showed the R square is 17.1% of the variance in nutrition dietary practice for older male and 26.4% for older female. This combination of variables significantly predicted nutrition dietary practice for older males ($F_{(6, 114)}$=3.923, p=0.001) and females ($F_{(6, 123)}$=7.354, p<0.000). The model showed higher education (β =0.315, p<0.000) to be positive determinants of nutrition dietary practice and marital status (β =-0.175, p=0.002) to be negative determinants of nutrition dietary practice in older men. Among older women, education (β =0.314, p<0.000) was a positive determinant of nutrition dietary practice and living cost (β =-0.295, p=0.001) was a negative determinant of nutrition dietary practice (Table 4).

DISCUSSION

The aim of this study was to explore predictors affecting nutrition knowledge, attitudes and dietary practices differences between elderly males and elderly females. The results do not point to any key factors influencing nutrition knowledge for older male and female peoples. Age was an independent predictor in nutrition attitude for male elderly people, but not for females. Both education and marital status had an effect on nutrition attitude and dietary practice for older men. On the other hand, only education affected nutrition

attitude and dietary practice for older women. Mental health was an independent predictor for nutrition attitude. Money for living expenses had a significant effect on the nutrition dietary practices for older women.

In general, consumers are aware that nutrition knowledge is much greater than reading and understanding the label on a food product [2]. Nutritional knowledge involves understanding how to balance a healthy diet

Variable	Female			Male		
	B	SE B	β	B	SE B	β
Age	.034	.076	.035	.065	.082	.069
Education	.585	.155	.314***	.511	.139	.315***
Marital status	-.119	.361	-.027	-.698	.345	-.175*
Living cost	-2.389	.704	-.295**	-1.308	.693	-.165
Physical health	.000	.001	-.035	-.071	.517	-.012
Mental health	-.091	.228	-.032	.134	.348	.034
R^2		0.264			0.171	
F		7.354***			3.923**	

*p <.05; **p <.01; *** p <.001

Table 3. Multiple Regression Analyses for Variables Predicting Males and Females' Nutrition Dietary Practice

with activity to attain ideal body fat. It includes comprehension of proper food storage and preparation and on how the proper intake of minerals and vitamins maintains homeostasis and prevents disease. Nutritional knowledge allows persons to avoiding food additives that can lead to ill health [29]. This study found that elderly people had no predictor attributed to the attainment of nutrition knowledge. The possible roles of nutrition knowledge were considerably a partial mediator of the socio-demographic variation in nutrition dietary practice [27; 28]. Nutrition knowledge is affected by multiple socio-demographic factors but this is rarely acknowledged [21].

Education was a predictor of nutrition attitude and dietary practice among older men and women in this study. Education is known to enhance a person's ability to understand, preserve, and remember information [26]. Higher educated elderly people tended to have better understand and respond to many

types of health information. They were motivated to prepare and consume healthy and balanced meals to enhance good health. However nutrition knowledge alone may not be adequate to have proper attitude or dietary practices, because attitude and behaviors are also critical to overall healthy eating. This study confirmed that nutrition education is necessary but it may not be sufficient to attain optimal behavior and attitude among elderly people.

In this study, marriage was negative associated with nutrition attitude and dietary practice in older men, but not older women. In contrast to previous studies, marriage was not predictive of nutrition attitude and dietary. Previous evidence showed that marriage is particularly beneficial for older men [4]. Single men are at particularly high risk of low intake, and widowers are at risk because they often lack skill in the process of choosing and preparing nutrient-rich foods [5]. In contrast, women tend to prepare the family meals and they also have longer life spans. When older women do become widowed or divorced they are less inclined to prepare food and cook meals for themselves however their past cultural food preparation activities have benefits for their ongoing nutrition attitude and dietary practice [22]. However, this finding may show that older men without marriage relationship could possible likely to be food involvement or were food mavenism [24]. These people like to help others, share food knowledge, and cooking techniques.

Living cost was a predicator in this study to nutrition dietary practice. Lack of money may limit ability to access nutrients and adversely affect health. Older women are especially socioeconomically vulnerable after the death of a spouse and are at risk of inadequate food intake and under-nutrition [13]. For example, higher intakes of all flavonoid subclasses may be associated with lower depression risk, particularly among older women [3]. In addition, when older women lost their partners they may be at risk for poor nutritional intake as they adjust poorly to cooking just for themselves [6].

The findings of this study demonstrated gender differences in nutrition attitude and dietary practice for elderly Taiwanese. However, some limitations of this study considered using second hand data from a dataset with moderate response rate; data on physical health was limited to one single question that may have added a measurement error. Selected data with nutrition knowledge, attitude, and dietary practice may potentially lead to an underestimation of explanation for nutrition problems.

CONCLUSION

In this study, the perceptions of elderly people towards nutrition are exemplified in their attitude and actions regarding nutrient intake. Elderly people should optimize their dietary practices by integrating all related knowledge, attitude, and actions together. The present study has shown that age, education, marital status, income, and mental health are related to the elderly Taiwanese' s nutrition attitude and dietary practice. Proper nutrition education and intervention are needed to motivate nutrition attitude and dietary practice for decreasing the risks of sustaining various chronic diseases of elderly people.

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Appendix-I

Table 4. Characteristics of The Participants (N=258)

Variables		N	%	M	SD
Age	65 above	258		72.88	6.09
Gender	Male	124	48.1		
	Female	134	51.9		
Marital status	Married	2	0.8		
	Widowed	175	67.8		
	Divorced	4	1.6		
	Separated	3	1.2		
	Single	72	27.9		
	Others	1	0.4		
Education	Primary school and below	188	73.1		
	Junior high school	21	8.2		
	Senior high school	28	10.9		
	University and above	20	7.8		
Living cost	Enough	20	7.8		
	Just enough	137	53.1		
	Some problems	76	29.5		
	Very difficult	18	7.0		
	Don’t know	2	0.8		
Physical health	Very good	5	1.9		
	Quite good	33	12.8		
	Neither good nor poor	59	22.9		
	Quite poor	121	46.9		
	Poor	40	15.5		
Mental health		258		0.61	1.8
KAP	Total score	258		93.84	12.76
	Knowledge	258		2.65	3.94
	Attitude	258		39.33	7.96
	Practice	258		51.86	5.84