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Nutritional Intake And Affecting Factors Of Edelry People Living At Nursing Home

Ravika Khaila Arrum[1], Dewi Marhaeni Diah Herawati[2]✉ , Lazuardi Dwipa[3]

[1,2,3]Universitas Padjadjaran, Indonesia
✉ dewimdh@yahoo.com, Tlp: +628126033975

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ABSTRACT

The incidence of malnutrition in elderly at nursing homes has reached 20%. Malnutrition is caused by inadequate nutritional intake which is affected by multiple factors, including internal factors and external factors. The purpose of this study was to determine the nutritional intake and affecting factors which support nutritional intake adequacy of elderly people living at Tresna Werdha Budi Pertiwi Nursing Home. The design of study was descriptive mixed method with sequential explanatory approach. The quantitative analysis was conducted to determine the amount nutritional intake, while the qualitative analysis was performed to explore the internal and external factors which involved adequate nutritional intake of the elderly people. The subjects were 20 elderly people recruited by a total sampling method living at the Tresna Werdha Budi Pertiwi Nursing Home, who met the inclusion and exclusion criteria. The nutritional intake was assessed using 24 hours food recall by nutritionist and its comparison with the Indonesian nutrition recommendation. Meanwhile, the internal and external factors were explored through in-depth interviews . The average nutritional intake of the elderly people was insufficient to meet the RDA standards, except for vitamin A. The internal affecting factors included early satiety, xerostomia or dry mouth and poor chewing ability. The external affecting factors included unbalanced portion sizes, poor food variety and eating alone. The elderly people living at the nursing home had inadequate nutritional intake, except for vitamin A. The internal factors which had negative effects were early satiety and xerostomia, while the external factors included unbalanced portion sizes, poor food variety and eating alone.

Keywords: Elderly;Affecting Factors;Nutritional Intake Adequacy;Nursing Home.

INTRODUCTION

Indonesia had population surge and life expectancy improvement that reached the age of 72 (Pusat Data Informasi Kemenkes RI, 2016). These improvements results in alteration of population structure with increased number of elderly in the future. The gradual increase of elderly population annually leads to significant problems related to the quality of life in this population. The aging process, in addition to poor nutritional intake, could cause declining in musculoskeletal mass and functions which raise the incidence of falls in the elderly (Amarya et al., 2015). Frailty condition is one of the major health problems in the elderly caused by poor nutritional status which often found in female elders (Serra-Prat et al., 2016). Undernutrition could weakened immunity which would make elderly population susceptible to diseases (Bourke et al., 2016).

Malnutrition is one of the world's health issue affecting 1 in every 3 people and women, which dominated the Indonesian population, are more affected than men (Rocha et al., 2016). This condition could be prevented by consuming adequate nutrients, including carbohydrate, protein, fat and micronutrients required by the body (Whitney and

Rolfes, 2019). In elderly population, special attention should be paid in micronutrient consumption, such as vitamin A, B1, D, C, calcium, and iron (Mahan and Raymond, 2017).

Nutritional intake adequacy is affected by internal and external factors (Harris, 2017). Internal factors consist of satiety as well as chewing and swallowing abilities, while external factors includes variety of food, portion size and sharing a meal. Poor nutritional intake associated with early satiety, chewing difficulties, xerostomia (dry mouth), limited variety of food, excess or insufficiency in portion size, and eating alone.

Early satiety occurred because of the aging process which reduce the secretion of hunger-inducing hormone and prolong gastric emptying resulting early satiety (Guyton and Hall, 2016). Other internal factors such as chewing ability also play important role in the eating process. Deterioration of oral health including loss of teeth and reduction of saliva production could disrupt chewing ability and the eating process. The decline in saliva production also causes dry mouth and affects the sense of taste which could lead to declining nutritional intake generally.

Increasing portion size is one of the external factors which theoretically could improve nutritional intake. The variety of food is also an external factor which affects the nutritional intake. A wide variety of food from within each group of food and cooked with different methods would improve personal nutritional intake. Finally, sharing a meal theoretically could have conflicting impacts. If people are sharing a meal with someone they love, the nutritional intake increase by up to 50%. Meanwhile, if people are sharing food with stranger or people who are perceived negative, it would disrupt their nutritional intake (Harris, 2017).

Undernutrition at nursing homes, in 2015, as high as 20% was reported in Sweden (Bolmsjo et al., 2016). A similar research from Iran showed lower incidence of 10.3% (Nazemi et al., 2015). Information related to the factors affecting nutritional intake adequacy in elderly people living at nursing home was still limited. A study conducted in Medan estimated that the incidence of undernutrition in elderly people reached 7.5% (Boy, 2019), while a study in Denpasar estimated as high as 10% of elder were undernourished (Sudiantara et al., 2015). Other research in Tresna Werdha Kendari Nursing Home showed 30.5% of elderly people had poor nutritional status (Nurfantri and Yuniar, 2017).

The prevalent of undernutrition in elderly had become a major problem in elderly living in nursing homes. Therefore, it is important to conduct a research which explore issues related to nutritional intake of the elderly people living in nursing home and the reason behind them. The purpose of this study is to assess nutritional intake in elderly and factors affecting nutritional intake adequacy in Tresna Werdha nursing home. We hope that this study could become a reference when arranging nutritional status improvement and nutritional intake adequacy program at nursing homes.

METHOD

This study have descriptive with mixed method approach design with sequential explanatory strategy. The first stage involved quantitative study with post positivism paradigm and the second stage involved qualitative study with interpretivism paradigm. The quantitative study was conducted to assess the nutritional intake, while qualitative study was conducted to explore factors affecting the nutritional intake adequacy.

This research was conducted at Tresna Werdha Budi Pertiwi Nursing Home in Bandung (Indonesia) which was a nursing home supervised by Geriatric Division of Internal Medicine Depertment in Dr.

Hasan Sadikin General Hospital/Faculty of Medicine, University of Padjadjaran. Tresna Werdha Budi Pertiwi Nursing Home was a nursing home model in Bandung.

Ethical committee of Padjadjaran University had approved this study (No. 515/UN6.KEP/EC/2018). The recruitment process of the subjects and data collection were done in July – August 2018. Twenty subjects were recruited by total sampling technique which fulfil the inclusion and exclusion criteria based on subjects' medical record in the nursing home's clinic upon consenting to participate in this study. The inclusion criteria was elderly people living in Tresna Werdha Budi Pertiwi Nursing Home which consumed food provided by the nursing home. Tresna Werdha Budi Pertiwi Nursing Home residents who had memory impairments, history of metabolic disease such as diabetes and hypertension, as well as refused to participate in this study were excluded.

The nutritional intake data were collected using *simple 24 hour food recall* by nutritionist from district's primary healthcare center. The data were then analyzed using Nutrisurvey 2007 and compared with Indonesian Nutrition Recommendation (INR). The mean nutritional intake in every age group were calculated and compared with INR based on age group. Nutritional intake assessment includes macronutrient intake such as energy, carbohydrate, fat, protein, fiber, and water, as well as micronutrient intake such as iron, vitamin A, vitamin B1, vitamin C, and calcium.

Qualitative data were collected through in-depth interview using interview guide by asking 12 questions. The qualitative data was transcripted and analysed by coding and categorization using content analysis. The researcher guarantee trusthworthiness since the data collection until the data analysis. Methods and data resources were triangulated to keep the research credibility. Member check was performed after the transcription was done and was researcher's responsibility. Peer debriefing was done under supervision. This research was conducted at Tresna Werdha Budi Pertiwi Nursing Home in July – August 2018 with 20 participants.

RESULT AND DISCUSSION

Table 1. Characteristic Of Subjects

No		Subjects (n)	Percentage (%)
1	**Age (years)**		
	< 65	1	5
	65 – 80	11	55
	80+	8	40
2	**Duration of stay (years)**		
	< 5	7	35
	5 – 10	8	40
	11 – 15	3	15
	15+	2	10
3	**Sex**		
	Male	0	0
	Female	20	100
4	**Body Mass Index**		
	< 18,5	2	10
	18,5 – 22,9	6	30
	23 – 24,9	5	25
	25 – 29,9	5	25
	> 30	2	10

The study subjects were all female mainly in the 65 – 80 years age group and 5 – 10 years duration of stay at the nursing home.

All of the subjects participated in this study had nutritional intake inadequacy based on Indonesian Nutrition Recommendation (INR). This phenomenon happened in all age group. Intake inadequacies were found almost in every nutrient, except for vitamin A.

Table 2. Macronutrient Intake Based On Age Group

		Energy (kkal)		Carbohydrate (gram)		Protein (gram)		Fat (gram)		Fiber (gram)		Water (mL)	
No	**Age**	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	< 65	583,7	583,7	76,9	76,9	15,5	15,5	24	24	2,4	2,4	269,4	269,4
2	65 – 80	344,3	891,5	58,3	142,2	7,3	33,9	8,6	33,9	1,6	5,1	26,39	426,9
3	80+	292,8	777,7	58,9	133,8	4,4	20	5,7	29,7	2,3	4,8	110,9	597

Table 2 showed description of macronutrient intake in elderly, which above-80-years age group had minimum value of protein, fat and water intake lower than the rest of the age groups.

Table 3. Macronutrient Intake Based On Age Group

No	Age	Iron (mg)		Calcium (mg)		Vitamin A (mcg)		Vitamin B1 (mg)		Vitamin C (mg)	
		Min	Max	Min	Max	Min	Max	Min	Max	Min	Max
1	< 65	1,9	1,9	196,9	196,9	991,3	991,3	0,1	0,1	3,1	3,1
2	65 – 80	1	8,5	17	390,8	288,6	1331,1	0,1	0,2	0,6	20,9
3	80+	0,7	3,2	17,2	187,6	162	1128,1	0,1	0,2	3,1	124,1

Table 3 showed description of micronutrient intake in elderly, which did not have a specific pattern for every age group.

Table 4. Macronutrient Intake Of Subjects Compared To Indonesian Nutrition Recommendation (INR)

Age	Energy (kkal)		Carbohydrate (g)		Protein (g)		Fat (g)		Fiber (g)		Water (mL)	
	Mean	INR	Mean	INR	Mean	INR	Mean	INR	Mean	INR	Mean	INR
< 65	583,7	1900	76,9	285	15,5	57	24	53	2,4	28	269,4	2300
65 – 80	596,4	1550	96,7	252	14,9	56	16,6	43	2,7	22	151,4	1600
80+	529,4	1425	80,1	232	12,3	55	17,9	40	2,7	20	229,9	1500

Table 4 showed a description of macronutrient intake in elderly people, which all of them had nutritional intake below INR.

Table 5. Micronutrient Intake Of Subjects Compared To Indonesian Nutrition Recommendation (INR)

Age	Zinc (mg)		Ca (mg)		Vitamin A(mcg)		Vitamin B1(mg)		Vitamin C (mg)	
	Mean	INR	Mean	INR	Mean	INR	Mean	INR	Mean	INR
< 65	1,9	12	196,9	1000	991,3	500	0,1	1	3,1	75
65 – 80	4,75	12	138,9	1000	663,7	500	0,15	0,8	2,5	75
80+	1,75	12	148,3	1000	754,7	500	0,15	0,7	11,1	75

Table 5 showed a description of micronutrient intake in elderly people, which all except vitamin A intake were below INR standards.

Qualitative study found several factors which affect nutritional intake adequacy, including:

1. External Factors

1.1 Variety of Food

Tresna Werdha Pertiwi Nursing Home residents had 3 meals per day. Breakfast at around 05.00 until 06.00 in the morning, lunch at around 11.00 – 12.00, and dinner at around 04.00 in the afternoon. The typical menu provided consist of rice and side dishes 3 times a day, while vegetables only served once a day, usually at lunch.

Fruits were rarely served at the nursing home, only served if given by visitors or the residents bought fruits themselves. Various side dishes were provided by the nursing home. Protein sources such as chicken, fish, egg, tempeh, and tofu were served alternately. Although, there were times when the same type of protein sources was served for several days. Vegetables were prepared as soup or stir-fried also provided alternately by the nursing staff.

The food cooked by the nursing staff were rather displeasing which made the residents uninterested with the provided food. Sometimes the staff continuously serving fried meals made the residents lost their appetite.

1.2 Portion Size

The food provided by the nursing staff were served in lunch boxes. The lunch boxes were white with transparent lid and divider inside. The divider used to separate rice from vegetables and side dishes. The nursing staff who was in charge of cooking, determine the amount of rice, side dishes or vegetables served in the lunch boxes. The residents of the nursing home thought that the amount of rice served were too much. There were usually rice leftovers in one meal, which then kept by the residents for the next meal at noon or in the afternoon.

> *"There were leftovers, I couldn't eat it (the rice) all up. So they were dried every day, there were many rice leftovers upstairs. We only received a small amount (of vegetables), so we couldn't really enjoyed them. If I were at home, a full bowl of vegetables must be served…" (R2).*

> *"There was fish in lunch, chicken on the day after, and fish on the day after that. After that, there were vegetables, every meal had vegetables. There were beans, soup… but there is only rice and fried egg mixed with flour which chopped…. There were vegetables served*

If there were rice leftovers at the end of the day, then the leftovers then dried by the nursing staff.

1.3 Eating together with other residents

The nursing staff always ring a bell at the hall when it was time to eat. The residents walked from their rooms to the hall upon hearing the bell. After that they sat in the hall, waiting for the meal to be served. Some residents brought their food to their rooms after receiving their lunch boxes. One of the reason was they felt embarrass to eat together, therefore chose to eat in their rooms.

> *"Some of the grannies here felt embarrass to eat together, some were not. For example, if the other residents had finished their meals, but we hadn't, so it's better to eat in our rooms." (R3)*

The residents who were unhealthy or unable to walk stayed in their rooms. The nursing staff would deliver the lunch boxes to the residents' rooms. Every room had a dinner table in the middle of the room for the residents to eat in their rooms.

The residents were not always sharing meals with their roommates, depending on their mood and desire. The nursing staff had tried to establish sharing meals events in several occasions, such as breaking

the fast together or when there were visitors. However, some residents still felt uncomfortable of sharing meals with other people. The residents who finished their food earlier, made the other residents unconfident to finish their food, so they prefered to eat alone.

2.Internal Factors

2.1 Early Satiety

Most of the residents of Tresna Werdha Budi Pertiwi Nursing Home did not finish their meals on their mealtime. They were full after a few mouthfuls. They did not finish their meals not because they want to, but because they felt early satiety.

"But sometimes I felt full after a couple of mouthfuls. It's because of old age, my stomach couldn't contain much." (R4)

Several elders felt hungry not long after that. They usually consume snacks in between mealtimes. The snacks are purchased usually outside the nursing home or leftlovers from the previous meals.

Elders who had not had any teeth left, mostly did not consume protein-source food, such as meat or fish

Some residents felt stomach distension and nausea after consuming food. They felt that as they age,

the less amount of food that they could contain and they did not know why.

2.3 Chewing ability

The residents of Tresna Werdha Budi Pertiwi Nursing Home mainly had lost most of their teeth. Some of them loss their molars, some loss their entire front teeth, and some had no teeth at all which could cause chewing difficulties. Some residents chopped their food before eating them.

This made the elders preferred food with soft consistency that easy to chew. Solid food which difficult to chew usually avoided by the residents. because they were difficult to chew. The nursing home sometimes serve deep-fried food which made the protein hardened and were avoided by the elders. The rice provided by the nursing home sometimes have hard texture, hence difficult to chew. The residents preferred if the nursing staff serving semi-liquid food, such as porridge which easier to swallow. Some street vendors surrounding the nursing home sold soft-textured rice cakes, which were preferred by the residents than the food provided by the nursing home.

2.2 Xerostomia

Deterioration of oral health in elderly was not limited to the loss of teeth. Dry mouth or xerostomia happened to some elders. They complained about dryness which made the food difficult to swallow. Limited dental and oral care caused difficult acess to dental check-up and health care for the elders.

They preferred vegetables than protein-source food because their softer consistency.

"It's difficult if the food was hard, in addition of my canine hadn't erupt yet. So I only like soft food" (R5)

"I couldn't swallow if there were still something hard." (R6)

1. Nutritional intake adequacy

Nutritional intake adequacy of the residents based on *food recall* in this study was lower compared with INR. Almost all macro and micronutrients intake were below INR standards. However, nutritional status of the subjects of this study were relatively good compared to the study conducted in Kendari (Nurfantri and Yuniar, 2017). The previous study in Kendari showed that approximately 30% of elders

were undernourished, while in this study, we only found 10% of elders similar to the study from Denpasar in 2015 (Sudiantara et al., 2015).

This inadequacy of nutritional intake would slowly progress to undernutrition in elderly people. Chronic diseases, use of drugs, and physiologic aging process were the risk factors of muscle and fat mass deterioration (Julius et al., 2017). Deterioration of muscle mass could increase risk of fall in elders. Incidence of falling in elders was the main reason of bodily function deterioration, injury and mortality in elderly people. (Smith et al., 2019).

Energy intake inadequacy in elders could lead to slow progression of weight loss (Smith et al., 2019). Weight loss could worsen the nutritional status of the elders. The protein intake in this study was only fulfil 15% of the recommended intake by INR. A significant protein insufficiency could results deterioration of immunity which made the elders prone to infectious diseases (Julius et al., 2017).

2. External factors

External factors which were discussed in this study were variety of food, portion size and meal sharing activities. Similar study in 2015 which conducted in Denpasar observed external factors such as eating pattern and lack of knowledge of the elders about nutrition. (Sudiantara et al., 2015).

Food variation had a significant role as external factors in this study. Limited variety of food preparation technique and food taste made the elderly people avoided consuming food provided by the nursing home. High-fiber foods to meet the elders' requirements were seldom served. Increasing portion size theoretically would lead to nutritional intake improvement (Harris, 2017). In this study, the portion size of the rice was larger compared to the side dishes and vegetables which results in decreasing rice intake of the subjects.

The nursing staffs' knowledge level related to balanced nutrition and nutritional requirements of elderly people played important role in affecting nutritional intake. Dietician had a significant role in preventing undernutrition, especially by fulfilling recommended nutritional intake standards in elderly people living in nursing homes (Polonen et al., 2017). Determination of eating program designed by the dietician based on personal nutritional needs could decrease risk of undernutrition. (Farid and Nurviyandari, 2017).

The last external factor was related to meal sharing activities. Theoretically, nutritional intake could improve by eating accompanied by family or loved ones (Harris, 2017). However, the residents of Tresna Werdha Budi Pertiwi Nursing Home preferred eating alone which could affect their nutritional intake. Scheduled family visits might be a solution for this issue by eating together with the residents. (Pratono and Maharani, 2018). Other solutions including community program for elderly care such as posyandu for elders which usually had the same cadres as Pos Pembinaan Terpadu Penyakit Tidak Menular (Posbindu) across Indonesia. These cadres had previously received training to provide care for elderly people (Wulandari, 2018).

3. Internal factors

Internal factors which would be discussed in this study include early satiety, chewing ability, and xerostomia. These internal factors had a major impact on nutritional intake adequacy in elderly. Chewing difficulties accompanied by dry mouth (xerostomia) would made the eating process hard and uncomfortable. Xerostomia could reduce the amount of food consumed which could happened because of the deterioration of oral health as a part of the aging process. On the other hand, chewing difficulties would limit the amount of digested and absorbed food which could cause undernutrition (Lee et al., 2020).

Therefore, the nursing staff should prepare soft-textured food to resolve this issue. For examples, porridge as the carbohydrate source, the protein-source food prepared by boiling or steaming before cooking it to get softer texture and using soft-textured vegetables like potatoes.

The last affecting factor was early satiety in elderly. Early satiety is a condition caused by the aging process that made physiological alterations such as stomach capacity reduction, slower stomach emptying, and decreasing peristaltic movements which results in early satiety (Whitney and Rolfes, 2019; Guyton and Hall, 2016). Functional dyspepsia were commonly found in female elders (Kim et al., 2018). This condition which characterized by early satiety, epigastric or burning-like pain, and feeling bloated, could results in loss of appetite (Talley et al., 2017). Insufficient nutritional intake could provoke dyspepsia which then making an endless cycle. Non-steroid anti-inflammatory drugs (NSAIDs) which often consumed by the elders could also stimulate dyspepsia (Wongrakpanich et al., 2018). Dyspepsia could be caused by chewing difficulties in elderly as well (Halter et al., 2017). The elders need an explanation about the early satiety to provide more understanding that they should somehow finish their food.

The nursing home should facilitate a safe environment for the elders, maximize the elders' quality of life, and prevent, as well as manage acute illness in elderly (Sheppard et al., 2015). Those functions could be accomplished if there is periodic evaluation by an interdisciplinary team (Sheppard et al., 2015). The interdisciplinary team could consider the nursing, psychosocial, rehabilitation, nutritional, pharmacological, and other aspects such as dental and oral health aspects in elderly. Tresna Werdha Budi Pertiwi Nursing Home did not have doctor, nursing, dentist, or nutritionist staffs, however expected to take a good care of the elderly people. A comprehensive care for elderly requires interdisciplinary collaboration from doctors, dentists, nurses, and nutritionists to provide the best care at nursing homes.

The negative impact of the internal factors to the nutritional intake adequacy could be avoided by providing easy access to a healthcare facility for elders. Health insurance for elderly population should be our concern. The focus of Indonesian national health insurance (JKN) is prioritizing healthcare for elderly with universal coverage target in 2019 (Kemenkes, 2017). The government also need to include elderly people who did not have ID to join the national health insurance. Public health office, social services, the public or private nursing staffs, regional and central government should cooperate in improving the quality of life of elderly people.

The limitation of this study was the study location which limited to one nursing home. The nutritional intake data were collected using 24 hour *food recall* method and food scaling did not performed to provide more accurate data.

CONCLUSION

Nutritional intake in elderly people living in Tresna Werdha Budi Pertiwi Nursing Home which consist of macro and micronutrients intake were mainly inadequate, except for vitamin A intake. Internal factors which affect the inadequate nutritional intake were *early satiety* due to aging process and chewing difficulties because loss of teeth and dry mouth (xerostomia). External factors, including unbalanced portion size, limited variety of food and eating alone or eating with stranger concomitantly gave negative effect on the nutritional intake adequacy.

Further research at nursing homes in West Java is advised, in order to generalize food measurement through scaling. Establishing program and individualized menu based on each elder to improve

nutritional intake are recommended at Tresna Werdha Budi Pertiwi Nursing Home. A holistic program to improve malnutrition state in elderly people living in Tresna Werdha Budi Pertiwi Nursing Home should be further developed by Geriatric Division of Internal Medicine Department Dr. Hasan Sadikin General Hospital.

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