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Health Service Research

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## Effectiveness of collaboration in older adults: do interprofessional teams improve nutritional status more compared to usual care?

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### Abstract

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**Background:** Ageing is accompanied by many changes that make it more difficult for nutritional needs to be met. Management of malnutrition in older adults requires collaboration among multiple clinical disciplines.

**Objective:** This study aimed to determine the effectiveness of interprofessional collaboration and practice (IPCP) implementation for older adults with malnutrition compared to usual care.

**Methods:** This was a quasi-experimental study using an untreated control group design with dependent pretest and posttest sample of older adults with malnutrition. The intervention group worked as a team to give the intervention based on their own roles and responsibilities. The older adults of the control group received usual care from primary health care. Outcome measurement of nutritional status used the Mini Nutritional Assessment (MNA).

**Results:** The study results show significant differences between before and after IPCP implementation in the intervention group which had better scores of MNA after implementation. In the control group, there was no significant difference between before and after implementation of usual care. The statistical analysis showed there was a significant difference between the control and intervention groups who had improved nutritional status after IPCP implementation. IPCP had strong correlation with nutritional status based on correlation analysis. These results demonstrate that the collaboration by more than one health profession can improve nutritional status better than usual daily care.

**Conclusion:** IPCP has a strong and significant correlation with the nutritional status in older adults. The IPCP implementation could significantly improve their nutritional status after the IPCP implementation compared to usual care.

**Key words:** Caregivers, community medicine, geriatrics, multidisciplinary care, nutrition/diet, primary care

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### Key Messages

- Older adults are more vulnerable to malnutrition.
- Interprofessional collaboration had strong correlation with nutritional status.
- IPCP significantly improved nutritional status compared to usual care.

### Introduction

The demographic changes have resulted in the increasing number of older adults over the age of 60. By the end of 2025, the number of older people will outnumber younger people and it is estimated to exceed 1.2 billion globally (1). In Indonesia, the percentage of older adults has increased up to double in the last five decades (1971–2019), and the number of older adults in 2019 was 25.64 million (9.6%). This changing condition of the general population is challenging for health care providers in Indonesia who are forced to make a rapid transition from the old medical structure of the country that traditionally faced only a high prevalence of infectious disease to the current growing incidence of non-communicable diseases (1,2).

Ageing is accompanied by many changes that make it more difficult for nutritional needs to be met. Older adults are more vulnerable to malnutrition that can cause an increased risk of mortality and morbidity. Malnutrition especially undernutrition is associated with increased falls, more vulnerability to infection, loss of energy, delayed wound healing and mental confusion (1).

Management of malnutrition in older adults requires collaboration among multiple clinical disciplines. Malnutrition management needs an interdisciplinary team approach and leadership with interprofessional collaboration and practice (IPCP) that will foster open communication among health care providers (3). Essential collaborative skills include negotiation, delegation, mutual trust, cooperation and shared leadership. Collaboration among health care providers is also supported by the Institute of Medicine (IOM) who stated that all health professionals should be educated to deliver patient-centred care as members of an interdisciplinary team (4).

Primary health care providers serve as the first gatekeepers in the community who have the responsibility to find the causes of malnutrition in older adults and give the interventions to improve their nutritional status. The preliminary study showed that not all of the primary health care providers in Sleman District, Daerah Istimewa Yogyakarta (DIY), Indonesia were aware of the issues related to malnutrition in older adults. They are only concerned about the nutritional issue based on the specific patient disease such as hypertension and diabetes mellitus. Typically, the usual care related to nutrition is only the responsibility of the dietitian and does not give comprehensive care with other health professionals. This study involved a collaborative team of primary health care providers consisting of a physician, dentist, nurse, dietitian and pharmacist who provided comprehensive and holistic care with the IPCP approach. The collaborative team implemented the IPCP practice for older adults with malnutrition through home visitation. This study aimed to determine the effectiveness of IPCP implementation for older adults with malnutrition compared to usual care.

### Methods

#### Study design

This was a quasi-experimental study using an untreated control group design with dependent pretest and posttest sample of older

adults with malnutrition who live in the working area of 10 primary health centres. The older adults with malnutrition have not previously been a part of IPCP implementation in the primary health care. The quasi-experimental methods involved treatment, outcome measurement and experimental unit that were assigned without randomization. Both control and intervention groups were tested before and after the implementation.

#### Setting

This study was conducted in Sleman District, DIY Province, Indonesia. The DIY Province has the highest number of older adults in Indonesia and the majority of older adults live in Sleman District (2). Community and primary health care were chosen as the setting in this study because it was the nearest and easy to contact the population to improve their health quality. The research was conducted from October to December 2020.

#### Participants

A purposive sample of 40 older adults with malnutrition from 10 primary health centres working areas participated in this study and were divided into two groups. Ten primary health centres were chosen based on their accreditation in 2018 which for all were accredited Major (Top rating). There were four older adults who were the representatives from each of the primary health centres. We used the sample size formula from Hemming *et al.* (5) and Rosner (6) that showed the sample size per arm was five primary health centres with four older adults from each primary health centres (power: 80%) (5,6).

We determined the inclusion criteria as aged 60 or over, lived in the working area of primary health care in Sleman District, DIY Province, Indonesia, and have malnutrition problems. The exclusion criteria was older adult who refuse to participate, living in nursing home, have two or more health problem, and any uncontrolled degenerative disease. The older adult who met the criteria was chosen from the database of the primary health centres. The allocation of participants was completely independent. The research flow is described in Figure 1.

#### Measures

The nutritional status of the older adults was measured using the Mini Nutritional Assessment (MNA). MNA has been designed and validated as a rapid assessment of nutritional status in older adults in outpatient settings such as primary health care. The MNA is a simple measurement with brief questions that can be completed in about 10 minutes consisting of a total of 18 questions included 6 questions for screening. The sum of the MNA score distinguishes between older adults with risk of malnutrition, MNA 17–23.5 and malnutrition, MNA <17 (7). The questions with numbers 1–6 are screening questions to determine the necessity of completing the next questions or not. The screening score greater than or equal to 12 means not having malnutrition risk so it is not necessary to complete all of the questions. However, the screening score less than or equal to 11 means all of the questions should be completed. MNA has been

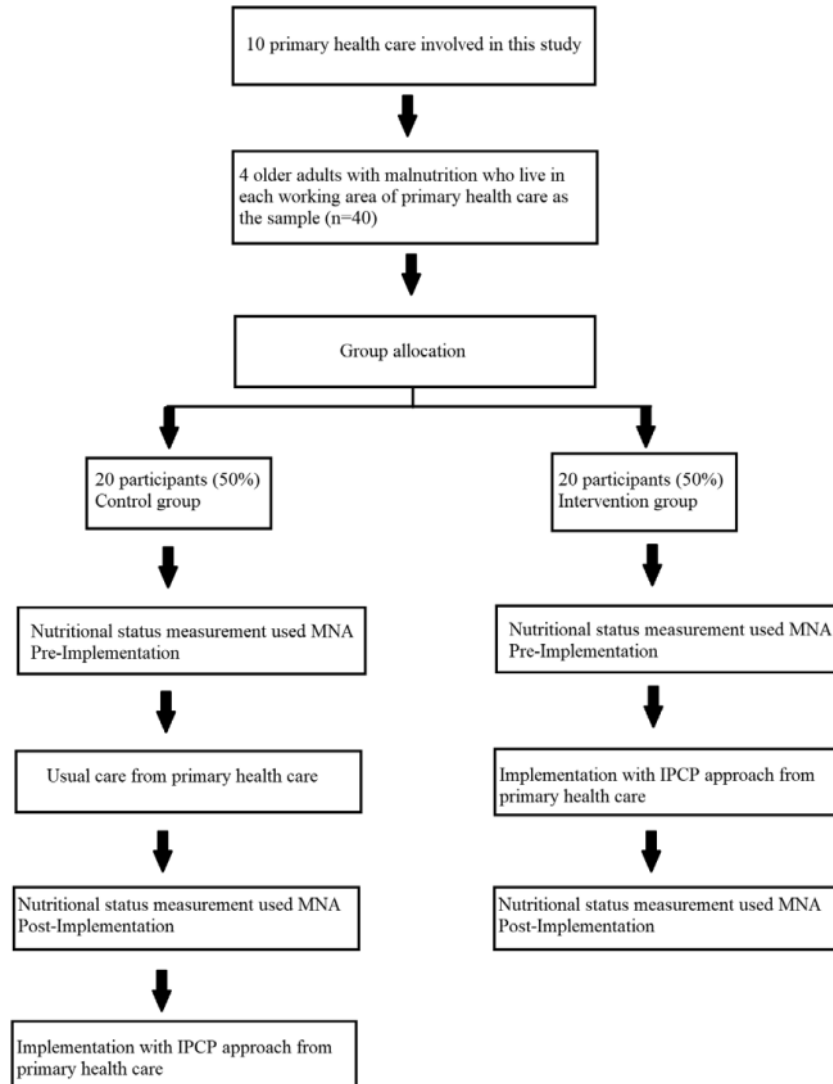


Figure 1. Research flow diagram

translated into the Indonesian language to be used as a technical guideline for health assessment in older adults by the Indonesian Ministry of Health (8).

### Intervention

The five health professionals consisting of a GP, dentist, nurse, dietitian and pharmacist from each primary health care gave the IPCP implementation to older adults with malnutrition in the intervention group. The five primary health care providers did home visitations and measured the nutritional status before the IPCP implementation.

The health professionals worked as a team to give the intervention based on their own roles and responsibilities. They assessed, discussed and gave the comprehensive intervention to improve nutritional status. The collaborative interventions included head-to-toe health examination by the GP, health education for preparing meal from the dietitian, dental and oral health intervention such as tooth

filling and suggestions for using prosthetics or dentures by the dentist, vital sign assessment by the nurse and recommendations by the pharmacist who also gave drug administration education.

The older adults did self-implementation with their family in their own home after the primary health care providers gave the education or medication. The IPCP team conducted monitoring in the next 4 weeks to monitor whether there were any difficulties in the self-implementation or not. In the last eighth week, the IPCP team measured the nutritional status to determine the achievement of their implementation. Figure 2 describes the process of the IPCP intervention.

### Controls

The older adults with malnutrition in the control group received their usual daily care from primary health care. Usual daily care for malnutrition and health problems in older adults includes health

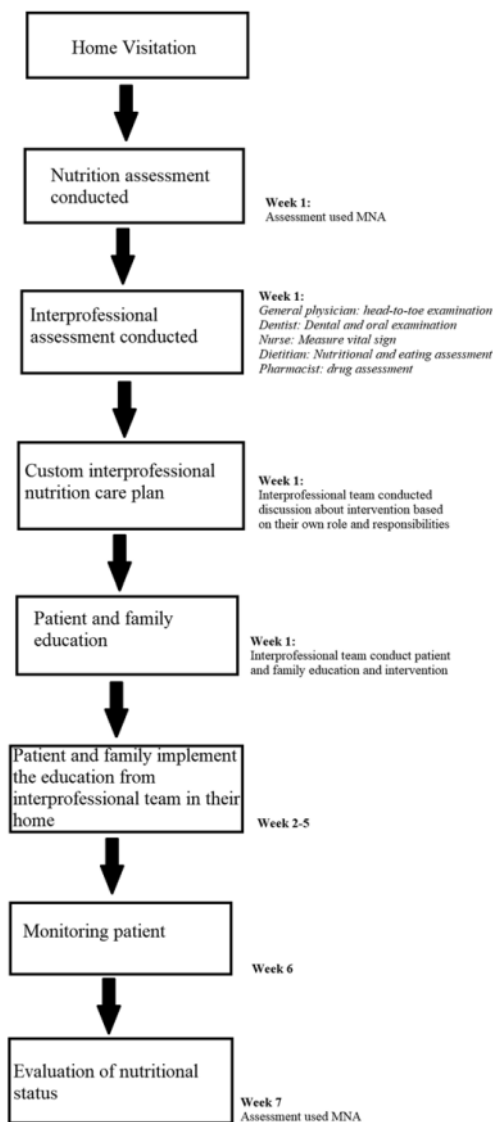


Figure 2. IPCP intervention process

education in community monthly screening for the older adult program by a nurse or midwife, supplementary feeding after the monthly screening program, and general health education through cadre volunteers delivered to the older adults. The older adults with malnutrition in the control group received the IPCP implementation just as the intervention group after the completion of the study for the sake of equality in the consideration of their needs.

#### Data collection

Primary health care providers measured the older adults with malnutrition using the MNA before and after the implementation. The MNA was created into an online version using Google Formlir to improve accessibility in the health care providers' smartphones. They chose the answer in each question based on the assessment of the

older adults. The results were automatically recorded in Microsoft Excel for the data tabulation and next analysis.

#### Data analysis

Descriptive analysis involved percentage and numbers with mean  $\pm$  SD was used to analyse the demographic data which consisted of age, gender, daily activity, education and body mass index. Data analysis was done using IBM SPSS Version 25 (IBM Corp., Chicago, IL). In the first step, the normality data test was performed to decide to use non-parametric or parametric tests for further analysis. Based on the normality test, the result showed that the data were not normally distributed; therefore, the non-parametric test was chosen. The Wilcoxon test was used to evaluate the pre- and post-implementation scores in each control and intervention group. The Mann-Whitney  $U$  test was used to evaluate the changes in scores from the pretest and post-implementation between the control and intervention groups. Correlation testing between IPCP with the MNA score used ANOVA and Pearson's correlation tests.

## Results

### Demographic data

There were a total of 40 older adults with malnutrition divided into the control and intervention groups who were involved to the end of this study, there were none of the older adults who were lost to follow-up (response rate 100%). There were none of the older adults who refused to be involved in this study. Participant demographic data are detailed in Table 1. More than half of the participants in both groups were female, with a range age of 60–69 years ( $n = 9$ ) in the control group with 60–69 ( $n = 8$ ) and 70–79 years ( $n = 8$ ) in the intervention group. Most of the participants in both groups had daily activities in their homes. Most of the participants in the control group did not have a degree ( $n = 11$ ) while most in the intervention group had elementary degree ( $n = 13$ ).

### Nutritional status

We measured the nutritional status of older adults with malnutrition with the MNA before and after implementation. The mean scores post-implementation were higher than the pre-implementation scores in both groups. We conducted the Wilcoxon test for the non-parametric data to determine the difference between the pre- and post-implementation scores in each group. The results of the Wilcoxon test showed that there was no statistical difference in the nutritional status between pre- and post-implementation in the control group ( $P = 0.213$ ). In the intervention group, there was a significant statistical difference between pre- and post-implementation based on the MNA score ( $P = 0.000$ ) with higher mean score in the post-implementation results. It means there was an improvement of nutritional status after the implementation of IPCP in the intervention group. We further analysed the MNA score in the post-implementation scores and the results showed that there was a significant difference between control and intervention groups ( $P = 0.000$ ) with the higher mean score in the intervention group. From these results, we can assume that the IPCP implementation was better to improve nutritional status than usual care. The comparison of the MNA score is detailed in Table 2.

### Correlation IPCP implementation to nutritional

#### status

The IPCP implementation could significantly improve the nutritional status in the intervention group. We conducted the ANOVA test to determine the correlation of IPCP implementation to the



**Table 1.** Demographic data of participants

Characteristic	Control group		Intervention group	
	N	Percentage	N	Percentage
Age in years				
60–69	9	45	8	40
70–79	7	35	8	40
80–89	3	15	4	20
≥90	1	5	0	0
Gender				
Male	7	35	3	15
Female	13	65	17	85
Daily activity				
Farming	7	35	2	10
Gardening	2	10	2	10
Activity in home	11	55	16	80
Degree level of participant				
Elementary	7	35	11	55
High school	0	0	1	5
Bachelor	0	0	1	5
Have no degree	13	65	7	35

N, number of participants.

Source: Primary data.

Date: December 2020.

**Table 2.** Comparison of the MNA score

Group	Mean ± SD		P-value (95% CI)	
	Pre-implementation	Post-implementation		
Control group	16.92 ± 2.59	17.72 ± 2.17	0.213	0.000
Intervention group	16.96 ± 3.09	21.98 ± 1.92	0.000	

CI, confidence interval; SD, standard deviation.

Source: Primary data.

Date: December 2020.

nutritional status in elderly with malnutrition. Based on the ANOVA test, there was a significant correlation between IPCP and nutritional status ( $P = 0.000$ ) with a correlation score of 0.674 (very strong). The IPCP contributes an effect of 45.42% ( $R^2 = 0.674$ ) to nutritional status in older adults with malnutrition. The correlation is described in Table 3.

## Discussion

This study examined the effect of the IPCP implementation that addresses the outcome of palliative care for elderly patients focused on the nutritional status. After the implementation of IPCP, the nutritional status in the intervention group was better than the control group which used usual care. The IPCP implementation involved more than one profession in primary health care including a GP, dentist, nurse, dietitian and pharmacist. The roles of each professional involved a nurse who performs innovative strategies to encourage the patients and family, a dietitian who performs nutritional screening and nutritional care plan, a dentist who performs oral and dental intervention, a pharmacist who evaluates drug–nutrient interaction, and the GP who supervises the overall care plan.

The IPCP in the management of malnutrition in older adults was shown to be an effective way to improve nutritional status. The results are supported by the research of Eliot *et al.* that

found nutrition-focused quality improvement promotes an interprofessional approach for early identification and treatment for malnutrition. The integration of teamwork into patient care can personally and professionally benefit from engaging in interprofessional competencies (9).

Based on this study, we found that there was a significant and strong correlation between IPCP and nutritional status in older adults. The multidisciplinary nutritional support incorporated nutrition as a clearly identified integral component by more than one profession to address multiple factors that contribute in malnutrition. The interprofessional therapeutic approach needs to go beyond a purely nutritional intervention and could comprehensively extend to covering nursing support, the environmental factors, and aim at the elimination of the underlying causes of the malnutrition (10). The current lack of collaboration in primary health care hinders the continuity of nutritional care in older adults. It is suggested that the collaboration in health care settings can be more successful through improving patient and staff knowledge and by establishing a team coordinator of nutritional care (11).

The IPCP implementation is consistent with principles of patient and family-centred care. In this study, family members were involved in the daily care of the older adults after the IPCP team implemented the intervention. They implement the health education in their home. The collaboration practice improves the mutual comprehension and

**Table 3.** Correlation IPCP implementation to nutritional status

Tests of between-subjects' effects					
Dependent variable: MNA Post					
Source	Type III sum of squares	d.f.	Mean square	F	Sig. (95% CI)
Corrected model	166.061 <sup>a</sup>	2	83.031	41.396	0.000
Intercept	212.521	1	212.521	105.954	0.000
Pre	57.161	1	57.161	28.498	0.000
Group	82.915	1	82.915	41.338	0.000
Error	74.214	37	2.006		
Total	16 764.500	40			
Corrected total	240.275	39			

CI, confidence interval; d.f., degrees of freedom; MNA, Mini Nutritional Assessment.

<sup>a</sup> $R^2 = 0.691$  (adjusted  $R^2 = 0.674$ ).

Source: Primary data.

Date: December 2020.

shared decision-making between health care providers and patient family members. The patient and family need to be provided mutually comprehensive information about their health, treatment and care related to nutrition. The family can participate in daily activities of meal preparation, grocery shopping and accompany the older adult during meals. This family support is considered essential for the well-being of older adults not only nutritionally but also socially (12).

The strength of this study is that it examines a novel intervention in primary care that is focused on nutritional status management in older adults with malnutrition. The malnutrition in older adults is often neglected and not considered as the main priority in primary care. By using a control group, we could make a stronger comparison between IPCP and usual care. The study was limited by not randomizing the sample in group allocation; however, the allocation was completely independent. The sample size was small because the older adults who met the criteria in the database of the primary health centres were limited. Further research with randomization, larger sample size and larger research area with homogenous characteristics can be implemented to strengthen and confirm the findings in this study.

## Conclusions

Malnutrition remains a complex health problem in older adults who need comprehensive and holistic care. This study compared approaches and results between IPCP and usual care in primary health care in efforts to improve the nutritional status in malnourished older adults. The results showed that IPCP has a strong and significant correlation with the nutritional status in older adults. The IPCP implementation could significantly improve their nutritional status after the IPCP implementation compared to usual care. Further research through randomization with larger sample size can be implemented to strengthen the findings in this study.

## Declaration

Funding: we declare that we do not have any sponsor or funding for this study. Ethical approval: this study was approved by the Medical and Health Research Ethics Committee with protocol number 914/UN6.KEP/EC/2020. We

maintained the anonymity of all participants; the control group was given IPCP intervention, to address ethical considerations.

Conflict of interest: we declare there are no potential conflicts of interest of this article.

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