Healthy Tadulako Journal (Jurnal Kesehatan Tadulako)
Vol. 12 No. 3, July 2026
P-ISSN : 2407-8441/e-ISSN : 2502-0749

Original Research Paper

Overview of 3J Diet Compliance in Type 2 Diabetes Mellitus Patients at the Purwokerto Timur II Community Health Center

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Access this article online
Quick Response Code :

DOI:10.22487/htj.v12i3.2089

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Page : 433-443

Article History:
Received: 2025-12-04
Revised: 2026-06-13
Accepted: 2026-07-31

Published by:
Tadulako University, Managed by Faculty of Medicine.

Website :
https://jurnal.fk.untad.ac.id/index.php/htj/index

Abstract

Background: Dietary self management is a key component of type 2 diabetes care. In Indonesia, the 3J dietary principle emphasizes the appropriate amount, type, and schedule of food to support glycemic management. **Objectives:** This study described adherence to the 3J diet among patients with type 2 diabetes mellitus at the Purwokerto Timur II Community Health Center. **Methods:** A quantitative descriptive cross sectional study was conducted among 85 respondents selected using purposive sampling. Data on adherence to food amount, type, and meal schedule were collected using a 3J questionnaire, while capillary blood glucose was measured and categorized. Data were analyzed descriptively using frequencies and percentages. **Results:** Adherence was 90.6% (77/85) for food amount, 21.2% (18/85) for food type, and 0% (0/85) for meal schedule. Blood-glucose values were <100 mg/dL in 7.1% of respondents, 100–200 mg/dL in 76.5%, and >200 mg/dL in 16.5%. **Conclusions:** Adherence varied substantially across the three 3J components, with meal scheduling representing the largest gap. These findings provide a descriptive overview of dietary adherence but do not establish an association between 3J adherence and blood glucose levels and may inform targeted nutrition education in primary care settings.

Keywords: Diabetes mellitus; 3J diet; dietary adherence; primary health care

Introduction

Diabetes mellitus (DM) is a chronic metabolic disease characterized by persistent hyperglycemia resulting from impaired insulin secretion, impaired insulin action, or both. Contemporary diabetes care emphasizes person centered self management, medical nutrition therapy, physical activity, medication use, and ongoing monitoring rather than relying on a single behavioral component[1]. Because type 2 diabetes develops and progresses through multiple metabolic and behavioral pathways, dietary practices should be interpreted as one element within a broader self management framework.

Type 2 diabetes represents a major and growing health burden that requires reliable epidemiological surveillance and sustained primary care management[2]. In Indonesia, knowledge, dietary behavior, physical inactivity, obesity, and access to preventive information remain relevant to diabetes risk and management[3]. These factors are particularly important in community health centers, where long term care depends on patients' ability to translate education into daily self care practices.

Adherence to diabetes treatment is

influenced by individual, social, and service-related factors rather than by knowledge alone[4]. Dietary screening is therefore useful for identifying specific behaviors that may require counseling, including portion size, food selection, and meal timing[5]. A descriptive assessment of these components can help health workers recognize which parts of a dietary recommendation are already practiced and which remain difficult for patients to implement.

In diabetes management, nurses have important roles as caregivers, educators, and motivators. Orem's Self Care Deficit Nursing Theory provides a useful conceptual perspective because it views self care as the actions individuals perform to maintain health and well being. In the present context, dietary adherence can be understood as a self care behavior that may be supported through repeated education, practical problem solving, and follow up rather than as a one-time instruction.

Dietary management for diabetes in Indonesia is commonly communicated through the 3J principle: jumlah (amount), jenis (type), and jadwal (schedule). Previous work has shown that adherence can differ substantially across these components[6], and descriptive studies of 3J behavior have similarly identified challenges in maintaining appropriate food type and meal schedule[7]. Education that combines diet and physical-activity messages may support broader diabetes self management[8]. Consequently, each 3J component should be reported separately instead of being reduced to a single overall adherence label.

Health professionals also influence adherence through continuing education and support. Evidence from HTJ indicates that a stronger nurse educator role is associated with better treatment adherence among patients with diabetes[9], while diabetes exercise research emphasizes that glycemic management is multifactorial and includes non-pharmacological behaviors beyond diet alone[10]. Indonesian studies have reported relationships between dietary adherence and blood-glucose control[11], knowledge and diet adherence[12,13], application of the 3J approach[14], and patient knowledge with adherence[15]. Motivation and treatment fatigue can further affect long-term self management[16]. Against this background, this study was designed as a descriptive cross sectional assessment to describe adherence to the amount, type, and schedule components of the 3J diet and the distribution of measured blood glucose values among type 2 diabetes patients at the Purwokerto Timur II Community Health Center. No inferential association between 3J adherence and blood glucose was tested in the reported dataset.

Materials and Methods

Study Design

This study used a quantitative descriptive approach with a cross sectional design. The purpose was to describe the distribution of respondent characteristics, adherence to each component of the 3J diet (amount, type, and schedule), and the blood glucose values recorded at the study visit. The study was not designed or analyzed as an analytical association study; therefore, no independent/dependent variable framework, hypothesis test, or causal interpretation was applied. The unit of analysis was the individual respondent with type 2 diabetes mellitus who participated in the Prolanis activities at the Purwokerto Timur II Community Health Center.

Sample

The study population consisted of 108 patients in the Purwokerto Timur II Community Health Center work area. The planned sample size was

calculated using the Slovin formula and 85 respondents were recruited using purposive sampling. Inclusion criteria were a diagnosis of type 2 diabetes mellitus, participation in diet therapy, and age 40-70 years. The age categories presented in the results were reconciled with these eligibility criteria; consequently, the youngest category represents the observed 40-45 year age range rather than the broader 36-45 year label used in the previous version of the manuscript.

Data Collection Technique

Data collection was conducted in August 2025 during Prolanis activities at the Purwokerto Timur II Community Health Center. Respondents completed the study questionnaire addressing the three components of the 3J principle, and a capillary blood-glucose value was recorded using a glucometer. The archived study output provided separate dichotomous classifications (compliant/non compliant) for food amount, food type, and meal schedule. The schedule classification was rechecked against the recorded dataset because all 85 respondents were coded as non compliant, and the 0% compliance result was retained. The study documentation available for this manuscript did not retain the questionnaire item count, item-level scoring range, numerical cut off values, language-adaptation procedure, or the coefficient values underlying the earlier statement of validity and reliability. Those details therefore cannot be reconstructed without the original questionnaire and validation report and are acknowledged as a reproducibility limitation. Similarly, the archived protocol did not specify whether the capillary glucose measurement was fasting, random, or postprandial; the timing relative to meals; the glucometer make/model and quality control procedure; or repeated measurements. For this reason, glucose results are reported only in the original study bands (<100, 100-200, and >200 mg/dL) and are not presented as diagnostic or clinical control categories.

Data Analysis Technique

Data were analyzed using SPSS version 25.0. Because the study objective was descriptive, analysis was limited to frequencies and percentages for categorical variables. Respondent characteristics, the three 3J adherence components, and the recorded blood glucose bands were summarized without correlation testing or hypothesis testing. No p-values, effect estimates, or confidence intervals for an association between 3J adherence and blood glucose are reported because such an analysis was not part of the dataset presented in this manuscript. Findings are therefore interpreted as observed distributions within this sample only.

Ethical Consideration

The study obtained ethical approval from the Health Research Ethics Committee of Universitas Muhammadiyah Purwokerto (Komite Etik Penelitian Kesehatan Universitas Muhammadiyah Purwokerto/KEPK-UMP), approval number KEPK/UMP/108/VII/2025. The ethics approval number is retained exactly as documented in the study record. Participant-level results are presented only in aggregate form in this article. The source manuscript available for this revision does not contain a separate description of the informed consent process or confidentiality procedures; these procedural details should therefore be checked against the approved protocol and ethics files before final publication rather than inferred or reconstructed.

Result

Table 1. Respondent Characteristics based on Age, Gender, Education, Occupation, Diet Therapy, and Blood Sugar Levels

Variable	Category	Frequency (n)	Percentage (%)
Gender	Men	38	44.7%
	Women	47	55.3%
Age (year)	40-45 years	5	5.9%
	46-55 years	14	16.5%
	56-70 years	66	77.6%
Education	SD-SMP	16	18.8%
	SMA	49	57.6%
	Diploma-S1	20	23.5%
Employment	Teacher	2	2.4%
	Housewife	40	47.1%
	Entepreneur	20	23.5%
	Retired	6	7.1%
	Laborer	4	4.7%
	Merchant	6	7.1%
	Civil Servant	7	8.2%
Blood sugar level	<100 mg/dL	6	7.1%
	100-200 mg/dL	65	76.5%
	>200 mg/dL	14	16.5%

Source: *Primary Data, 2025*

The 85 respondents were 40-70 years old. Most were aged 56-70 years (66; 77.6%), followed by 46-55 years (14; 16.5%) and 40-45 years (5; 5.9%). Women comprised 47 respondents (55.3%) and men 38 (44.7%); this difference is reported descriptively and was not subjected to a significance test. Most respondents had completed senior high school (49; 57.6%), while 20 (23.5%) had diploma/bachelor level education and 16 (18.8%) had elementary/junior high education. Housewives were the largest occupational group (40; 47.1%). Recorded blood-glucose values were <100 mg/dL in 6 respondents (7.1%), 100-200 mg/dL in 65 (76.5%), and >200 mg/dL in 14 (16.5%).

Table 2. Descriptive Results of the 3J Diet (Amount, Type, Schedule)

Variable	Category	Frequency (n)	Percentage (%)
Amount of food according to doctor's recommendations	Compliant	77	90.6%
	Non-compliant	8	9.4%
Types of food consumed according to doctor's recommendations	Compliant	18	21.2%
	Non-compliant	67	78.8%
Meal schedule according to doctor's recommendations	Compliant	0	0%
	Non-compliant	85	100%

Source: *Primary Data, 2025*

Table 2 shows a markedly different adherence pattern across the three 3J components. For food amount, 77 of 85 respondents (90.6%) were classified as compliant and 8 (9.4%) as non compliant. For food type, only 18 (21.2%) were compliant, while 67 (78.8%) were non-compliant. Meal scheduling showed the largest observed gap: none of the respondents met the recorded compliance rule (0/85; 0%), and all 85 (100%) were classified as non compliant. These component specific percentages should not be

combined or interpreted as evidence of an association with blood-glucose values.

Discussion

Age

The largest age group was 56-70 years, comprising 66 respondents (77.6%). This age distribution is consistent with the inclusion criteria and with the high burden of type 2 diabetes in middle aged and older adults. Aging is accompanied by changes in insulin sensitivity, body composition, physical activity, and pancreatic beta cell function, all of which can complicate diabetes self management. In addition, age may influence how easily patients receive, remember, and apply dietary instructions. The present study, however, did not test whether age was associated with 3J adherence or blood glucose values. The age findings should therefore be interpreted as characteristics of this sample rather than as determinants of adherence. For primary care practice, the predominance of older respondents suggests that dietary education may need to use simple language, repeated reinforcement, practical examples, and family involvement where appropriate.

Gender

Women accounted for 47 respondents (55.3%) and men for 38 (44.7%). The previous version incorrectly reported the male percentage as 38.7%; the correct value is 44.7%, as shown in Table 1. This distribution indicates only a modest numerical predominance of women in the study sample. Although sex-related biological and behavioral factors may influence diabetes risk and self-management, this study did not perform a statistical comparison between men and women. Accordingly, the sex distribution is described without terms such as “significant difference.” The slightly higher proportion of women may also reflect attendance patterns in Prolanis and health service utilization rather than a true difference in diabetes prevalence in the community.

Education

Most respondents had senior-high-school education (49; 57.6%), followed by diploma/bachelor education (20; 23.5%) and elementary/junior high education (16; 18.8%). Education can affect health literacy, understanding of dietary instructions, and confidence in making daily self care decisions, but formal education alone does not determine adherence. Diabetes knowledge and preventive behavior are influenced by multiple personal and environmental factors[3], and repeated health education may be needed even among patients with higher educational attainment. Because no association analysis was performed, the present results do not establish that education level caused differences in 3J compliance.

Employment

Housewives were the largest occupational group (40; 47.1%), while teachers were the smallest group (2; 2.4%). Occupation may shape daily routines, meal preparation, income, access to food, and the feasibility of following scheduled meals. Nevertheless, the descriptive design does not allow the study to determine whether employment status contributed to non adherence. The occupational distribution should instead be used to contextualize counseling: dietary recommendations need to fit patients' routines, household roles, purchasing capacity, and access to appropriate foods. Individualized planning is especially relevant because identical diet instructions may not be equally feasible across different work and family circumstances[1].

Blood Sugar Levels

Most respondents had a recorded blood-glucose value between 100 and 200 mg/dL (65;

76.5%); 14 (16.5%) were above 200 mg/dL and 6 (7.1%) were below 100 mg/dL. These ranges are reported exactly as study bands rather than as 'low,' 'moderate,' or 'high' clinical control categories because the measurement context was not documented sufficiently to apply diagnostic or treatment target thresholds. Interpretation of a glucose value depends on whether it is fasting, postprandial, or random and on the patient's treatment context. Previous Indonesian studies have examined dietary adherence in relation to blood glucose[17] and have used education on 3J management to support self care[18,19]. Other descriptive work has also considered diet adherence together with fasting glucose[20]. These studies provide context, but they do not convert the present descriptive findings into an association.

Glycemic management is also influenced by medication adherence, physical activity, duration of diabetes, comorbidities, body weight, and other behaviors. Food-management education can improve patients' understanding of practical dietary choices[21], while HTJ evidence on diabetes exercise demonstrates that non-dietary self management can also affect blood glucose outcomes[10]. Therefore, the blood glucose distribution observed here should not be attributed to the 3J pattern alone. Future studies should standardize the glucose-measurement protocol, record treatment and clinical covariates, and use an analytical design if the objective is to estimate the relationship between 3J adherence and glycemic control.

Diet Patterns Based on the Right Amount of Food

The food-amount component showed the highest adherence: 77 of 85 respondents (90.6%) were classified as compliant. This suggests that portion related recommendations may be easier for many patients to follow than requirements concerning food type or meal timing. Nutritional knowledge, dietary intake, and adherence are interconnected but not identical constructs[22]. Earlier research on the amount and schedule components of the diabetes diet also indicates that patients may succeed in one component while remaining inconsistent in another[23]. In practice, appropriate food quantity should be individualized according to energy needs, body weight, medication regimen, and metabolic goals rather than applied as a single fixed portion for all patients[1]. Dietary management reviews similarly emphasize balanced nutrient intake and practical meal planning[24]. The high percentage observed in this study should therefore be viewed as compliance with the study's recorded amount criterion, not as proof that calorie intake was clinically optimal.

Diet Patterns Based on the Right Types of Food

Food type showed substantially lower adherence than food amount. Only 18 respondents (21.2%) were classified as compliant, while 67 (78.8%) were non-compliant. This pattern is consistent with the broader challenge of sustaining healthy food choices in daily life and with research reporting low adherence to recommended diabetes dietary patterns[25]. Food selection is influenced by availability, affordability, taste, family habits, cultural preferences, and understanding of nutrition advice. Education may improve knowledge and diet adherence[26], but information alone may be insufficient when environmental or household barriers remain. For this reason, counseling should translate general advice into locally available alternatives and individualized meal plans. The 3J literature from Puskesmas II Denpasar Barat also underscores that amount, type, and schedule need to be considered together rather than as interchangeable components[27].

Diet Patterns Based on Proper Meal Scheduling

Meal scheduling was the most striking finding: all 85 respondents were classified as non compliant with the schedule component. The recorded result was rechecked against the study's dichotomous output and retained as 0% compliance. This finding should be interpreted cautiously because the item level scoring rule and cut off documentation were not available for independent verification. In routine diabetes care, meal timing should be individualized to medication use, insulin action when relevant, work patterns, sleep, cultural practices, and risk of hypoglycemia rather than treated as a rigid universal timetable[1]. Earlier 3J research has also described irregular meal timing among people with diabetes[23,27]. The present 100% non adherence therefore identifies a potentially important counseling target, but it may also reflect a stringent study scoring rule. Future work should use a fully documented and validated instrument and report the actual item responses so that schedule adherence can be reproduced and compared across populations.

Taken together, the three components demonstrate why an overall label of 'diet compliant' or 'diet non compliant' would conceal clinically relevant variation. The sample showed high compliance with food amount but low compliance with food type and no recorded compliance with meal schedule. This pattern supports component specific education. HTJ research has emphasized the importance of diabetes knowledge and preventive behavior[3], the educator role of nurses in sustaining adherence[9], and the contribution of exercise to glycemic management[10]. These findings reinforce a multidisciplinary approach in which diet counseling is integrated with medication support, physical activity, monitoring, and continuing education. The present study contributes a local descriptive profile that can be used to prioritize counseling content at the Purwokerto Timur II Community Health Center, especially practical food-choice and meal timing strategies.

Several limitations are important. First, the cross sectional descriptive design does not establish temporal, causal, or statistical relationships between 3J adherence and blood glucose. Second, the archived materials did not provide sufficient detail to reproduce the 3J questionnaire scoring, including the number of items, cut off values, adaptation process, and reliability coefficients. Third, the blood glucose protocol lacked documentation of fasting/random/postprandial status, timing relative to meals, device make/model, quality control, and repeat measurements. Fourth, purposive sampling at one community health center limits generalizability. Finally, potentially relevant factors such as medication regimen, diabetes duration, body mass index, physical activity, and comorbidities were not incorporated into the descriptive analysis. These limitations explain why the findings are presented as frequencies and percentages only and why no conclusion about the effect of the 3J diet on glycemic control is made.

From a service delivery perspective, the descriptive pattern can be translated into specific counseling priorities without claiming an effect on glycemic outcomes. Patients who already meet the food amount criterion may benefit from reinforcement and periodic reassessment, whereas the much lower adherence to food type suggests a need for practical skills such as reading food labels, selecting affordable alternatives, controlling added sugar, and adapting family meals. The schedule finding requires even more careful exploration. Rather than assuming that all respondents ignored advice, health workers should ask about work hours, medication timing, fasting practices, sleep patterns, food

availability, and household routines that may make a fixed schedule difficult. The role of the nurse as educator is particularly relevant because repeated, understandable, and context sensitive counseling can support adherence behaviors[9]. Education should also avoid presenting diet as the sole determinant of glucose control; physical activity and other self management behaviors remain important components of diabetes care[10].

The measurement issues identified in this revision also have implications for future research quality. A reproducible 3J instrument should state its source, language, number of items, response options, scoring direction, component scores, cut off rules, and evidence of validity and reliability. Reporting these elements is especially important when an extreme result such as 0% schedule compliance is obtained. Likewise, future glucose assessment should define the physiological context of measurement, timing in relation to meals, device and quality control procedures, and whether one or repeated values are used. If investigators intend to test whether 3J adherence is associated with glycemic status, an analytical protocol should be specified in advance and should consider medication, diabetes duration, body mass index, physical activity, and other potential confounders. Such an approach would allow effect estimates and confidence intervals to be reported and would distinguish descriptive service data from evidence about relationships or treatment effects. Until those data are available, the present study is most appropriately interpreted as a local profile of dietary adherence components that can inform the content of education and follow up at the Puskesmas.

For program development, the findings may be used as a baseline for a stepwise quality improvement approach at the Puskesmas. Education can first verify whether patients understand the three components as separate behaviors, then identify barriers for each component, and finally agree on realistic actions that can be reviewed at subsequent Prolanis visits. For food amount, follow up can focus on maintaining appropriate portions and adapting them to individual energy needs. For food type, counseling can emphasize substitution rather than prohibition, because replacing frequently consumed high sugar or highly refined foods with acceptable alternatives may be more sustainable than giving long lists of foods to avoid. For meal schedule, staff can explore whether non adherence reflects work and family routines, medication timing, cultural habits, or an overly rigid scoring criterion. Continuous education is consistent with evidence that knowledge and support influence adherence[6,9]. Documentation should also be improved so that future service evaluations can compare repeated measurements over time. A standardized recording form that captures the date and context of glucose testing, 3J component scores, medication use, and relevant lifestyle factors would allow the Puskesmas to distinguish changes in behavior from changes in glycemic status. Such monitoring would strengthen the practical value of the 3J framework while avoiding unsupported assumptions that a single diet component directly determines a single glucose measurement.

Conclusion

The results show that adherence to the three components of the 3J diet among patients with type 2 diabetes mellitus at the Purwokerto Timur II Community Health Center was uneven. Most respondents were compliant with the food-amount component (77/85; 90.6%), whereas compliance with food type was low (18/85; 21.2%) and no respondent met the recorded meal-schedule criterion

(0/85; 0%). Blood-glucose values were <100 mg/dL in 7.1%, 100-200 mg/dL in 76.5%, and >200 mg/dL in 16.5% of respondents. Because this was a descriptive cross sectional study without inferential association testing, these findings do not demonstrate that 3J adherence affected blood glucose levels. The observed pattern indicates that education and assistance at the Puskesmas should particularly address practical food selection and meal scheduling while continuing to reinforce appropriate food amounts. Future studies should use fully documented validated instruments and standardized glucose measurements if relationships with glycemic outcomes are to be evaluated.

Acknowledgment

The authors would like to thank the Purwokerto Timur II Community Health Center for the permission, support, and cooperation provided during this research. Appreciation is also extended to all respondents who participated and provided study data. The authors thank the supervising lecturer and all parties in the Nursing Science Study Program, Faculty of Health Sciences, Universitas Muhammadiyah Purwokerto, for their guidance and support in the preparation of this article.

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