



Nutritional Status and KAP among Older Adults with Type 2 Diabetes: A Cross-Sectional Study

Anila. H.L.

Assistant Professor, Department of Home Science, BCM College, Kottayam, Kerala,

Email : anilahl@bcmcollege.ac.in

Aparna S Giri (MSc)

Aleeza Anna Mariam, Esha Shine, Jyothika, Adrika

UG Students, Department of Home Science, BCM College, Kottayam, Kerala

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ABSTRACT

The present study titled “*Nutritional Status and KAP among older adults with Type 2 Diabetes: A Cross Sectional Study*” aimed to assess the dietary patterns, nutritional status, and knowledge–attitude–practice (KAP) related to diabetes among elderly individuals aged 65–75 years in Kerala. A total of 100 respondents (50 males and 50 females) attending a diabetic specialty hospital were selected. Data were collected using a structured questionnaire covering socio-economic status, dietary habits, lifestyle patterns, and diabetes-related knowledge. Nutritional assessment was carried out using anthropometric measurements, biochemical parameters, and food frequency analysis. The findings revealed that the majority of respondents belonged to a low socio-economic background with sedentary lifestyles and inadequate dietary practices. A high prevalence of overweight and poor glycemic control was observed, along with low intake of fruits, vegetables, and fiber-rich foods. Knowledge, attitude, and practices regarding diabetes management were found to be inadequate among most participants. The

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study highlights a strong association between poor nutritional awareness, unhealthy lifestyle behaviors, and increased risk of complications among elderly individuals with Type 2 Diabetes Mellitus.

1. INTRODUCTION

Ageing is a natural, progressive, and irreversible biological process characterized by a gradual decline in physiological functions and a reduced ability to adapt to environmental stress. Although old age is not a disease, it is often accompanied by functional impairments and increased vulnerability to chronic conditions. Changes in body composition, reduced energy expenditure, and declining physical activity levels are common during ageing, significantly influencing nutritional requirements and overall health status. Adequate nutrition in later life is therefore essential for maintaining functional independence, preventing disease, and improving quality of life.

The elderly population is particularly susceptible to multiple health challenges, including metabolic disorders such as obesity, hypertension, and diabetes mellitus. Among these, Type 2 Diabetes Mellitus (T2DM) has emerged as a major public health concern, especially in ageing populations. T2DM is a chronic metabolic disorder characterized by hyperglycemia resulting from insulin resistance or impaired insulin secretion. Its prevalence increases with age, and a substantial proportion of individuals above 60 years are affected. The burden of diabetes is rapidly rising worldwide, with developing countries accounting for a significant share. India, often referred to as the “diabetes capital of the world,” has witnessed a dramatic increase in diabetes prevalence, with states like Kerala reporting particularly high rates.

The rising prevalence of T2DM among the elderly is closely associated with modifiable lifestyle factors such as unhealthy dietary habits, physical inactivity, and obesity. These factors contribute not only to the onset of the disease but also to its progression and complications. Diabetes is associated with both microvascular complications (retinopathy, nephropathy, neuropathy) and macrovascular complications (cardiovascular diseases and stroke), which significantly impair quality of life in older adults. Nutritional status plays a crucial role in the management and prevention of these complications, as appropriate dietary practices can improve glycemic control and reduce disease burden.

Despite the importance of nutrition in diabetes management, many elderly individuals lack adequate knowledge, awareness, and appropriate health practices. Socio-economic constraints, low literacy levels, and limited access to healthcare information further exacerbate these challenges. Studies have shown that knowledge, attitude, and practice (KAP) regarding diabetes are critical determinants of disease management



outcomes. Poor understanding of dietary guidelines, misconceptions about the disease, and inadequate lifestyle modifications often lead to poor glycemic control and increased risk of complications.

Assessing the nutritional status and KAP related to diabetes among the elderly becomes highly significant. Understanding these factors can help in designing targeted interventions and educational programs to improve disease management and quality of life. Therefore, the present study titled “*Nutritional Status and KAP among older adults with Type 2 Diabetes: A Cross Sectional Study*” was undertaken to evaluate dietary patterns, nutritional status, and diabetes-related knowledge, attitude, and practices among elderly individuals. The findings of this study are expected to provide insights for developing effective nutrition education strategies and lifestyle interventions for better management of Type 2 Diabetes Mellitus in the elderly population.

II. MATERIALS AND METHODS

Study Design and Setting

This study was a hospital-based cross-sectional study conducted among elderly individuals diagnosed with Type 2 Diabetes Mellitus in Kerala. The study setting was selected due to the high prevalence of diabetes and accessibility to clinically diagnosed cases.

Study Population and Sample Size

A total of 100 elderly subjects (50 males and 50 females) aged between 65 and 75 years were included in the study. Participants were selected from hospital records based on predefined eligibility criteria.

Inclusion and Exclusion Criteria

Inclusion Criteria:

Participants aged 65–75 years diagnosed with Type 2 Diabetes Mellitus, having fasting blood glucose levels >126 mg/dL and postprandial blood glucose levels >200 mg/dL, and managed either through diet or oral hypoglycemic agents were included.

Exclusion Criteria:

Individuals with Type 1 Diabetes Mellitus, patients with acute medical conditions or severe complications, and morbidly obese individuals were excluded from the study.

Data Collection Tools and Procedure

Data were collected using a structured, pre-tested questionnaire through face-to-face interviews. The tool was designed to gather detailed information on socio-demographic characteristics, medical history, dietary habits, lifestyle patterns, and knowledge, attitude, and practices (KAP) related to diabetes. Relevant clinical and biochemical data were obtained from hospital records.

Assessment of Nutritional Status

Anthropometric Measurements : Anthropometric parameters including height, weight, waist circumference, and hip circumference were measured using standard procedures. Body Mass Index (BMI) was calculated as weight (kg) divided by height (m²), and Waist-Hip Ratio (WHR) was computed to assess fat distribution and associated health risks.

Dietary Assessment : Dietary intake was assessed using a food frequency questionnaire and dietary recall method. Information regarding meal patterns, food preferences, and frequency of consumption of major food groups was collected. Food frequency scores were calculated to evaluate dietary patterns.

Lifestyle Assessment : Lifestyle factors such as physical activity, sleep duration, smoking, and alcohol consumption were assessed using a structured questionnaire. Exercise patterns were categorized based on frequency (regular, irregular, or none) and type of activity.

Biochemical and Clinical Assessment : Biochemical parameters including fasting blood sugar (FBS), postprandial blood sugar (PPBS), and random blood sugar (RBS) were obtained from hospital records. Clinical complications such as diabetic retinopathy and neuropathy were documented based on available medical reports.

Knowledge, Attitude, and Practice (KAP) Assessment

KAP related to diabetes was assessed using a 30-item structured questionnaire. Each correct response was assigned a score of one, and incorrect responses were scored zero. Total scores ranged from 0 to 30 and were categorized as high (>15), moderate (=15), and low (<15). Attitude and practice components were evaluated using both open-ended and close-ended questions.

Statistical Analysis

The collected data were coded, tabulated, and analyzed using descriptive statistical methods. Results were expressed as frequencies, percentages, means, and standard deviations. Appropriate statistical tools were



used to interpret the data. Data were analyzed using SPSS version XX. Results were expressed as mean $\pm$ standard deviation and percentages. Chi-square test was used to determine associations, with $p < 0.05$ considered statistically significant.

Ethical Considerations

III RESULTS AND DISCUSSION

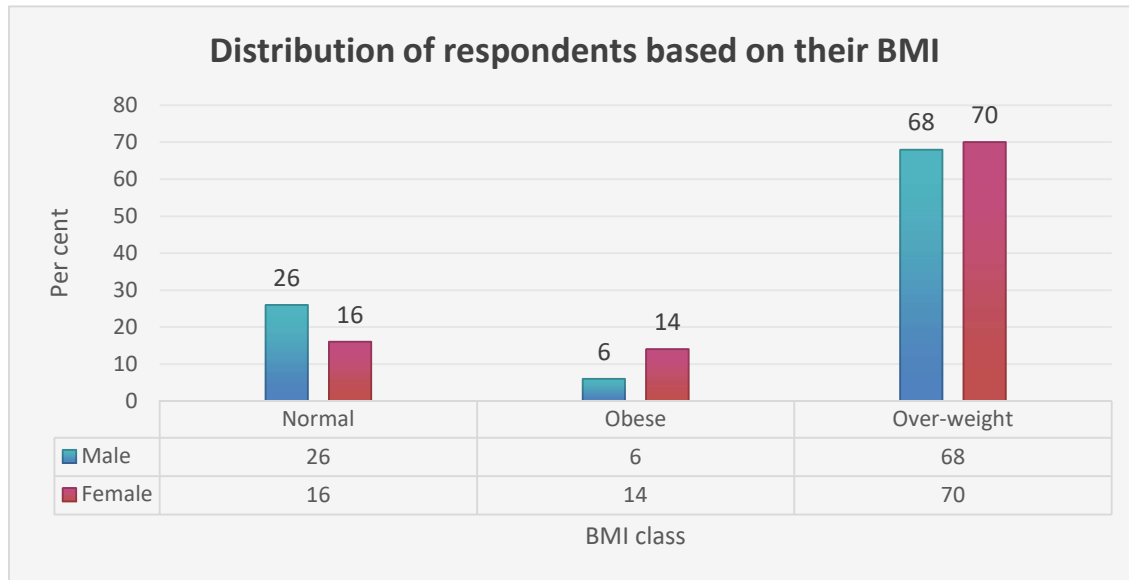
1. Socio-demographic Characteristics

The study population comprised 100 elderly individuals (50 males and 50 females), predominantly aged between 71–74 years. A majority of respondents belonged to the Hindu religion and were married. Educational attainment was generally low, with most participants having only lower primary or upper primary education. A significant proportion of respondents were unemployed, particularly females (92%), and belonged to low-income groups, with 76% earning less than ₹10,000 per month. Most participants lived in nuclear families (91%) and exhibited sedentary lifestyles (89%). Lifestyle risk behaviors such as smoking (40%) and alcohol consumption (36%) were observed among male respondents, while none of the female respondents reported such habits.

2. Medical History and Lifestyle Factors

A strong hereditary predisposition to diabetes was observed, with 66% of respondents reporting a paternal family history. The majority (85%) had been living with diabetes for more than 10 years, indicating chronic disease progression. Nearly half of the respondents were on insulin therapy. Sleep duration was suboptimal, particularly among females, with a large proportion sleeping less than the recommended hours. Physical activity levels were notably low, with 73% of respondents reporting no exercise, and walking being the most common form among those who were active. These findings highlight the combined impact of genetic and lifestyle factors on diabetes management.

Figure 1. Distribution of respondents based on BMI



3. Nutritional Status (Anthropometric Assessment)

Anthropometric evaluation revealed a high prevalence of overweight and obesity among the respondents. Approximately 69% of participants were overweight, while 10% were obese. Waist-Hip Ratio (WHR) analysis indicated a high risk of metabolic complications, particularly among males, with 48% having WHR greater than 1. These findings suggest increased central adiposity, which is a known risk factor for poor glycemic control and cardiovascular complications.

4. Biochemical Profile

Biochemical assessment showed poor glycemic control among the study population. A significant proportion of male respondents (42%) had fasting blood glucose levels above 200 mg/dL, while many females had levels between 140–160 mg/dL. Postprandial blood glucose levels were also elevated, with 66% of respondents falling within the 200–300 mg/dL range. Random blood sugar levels further confirmed hyperglycemia, with the majority of respondents having values between 200–250 mg/dL. These findings indicate inadequate diabetes management among the elderly population.

Table 1. Anthropometric and Biochemical Profile with Chi-square Test

Parameter	Category	Male (n=50)	Female (n=50)	Total (n=100)	p-value
BMI	Normal	13 (26%)	8 (16%)	21 (21%)	0.032*

	Overweight	34 (68%)	35 (70%)	69 (69%)	
	Obese	3 (6%)	7 (14%)	10 (10%)	
WHR	High Risk	25 (50%)	21 (42%)	46 (46%)	0.041*
	Moderate	25 (50%)	29 (58%)	54 (54%)	
FBS	140–200	25 (50%)	24 (48%)	49 (49%)	0.021*
	>200	21 (42%)	-	21 (21%)	

**p < 0.05 indicates statistical significance

5. Clinical Assessment

Clinical evaluation revealed a high prevalence of diabetes-related complications. Retinopathy was the most common complication, affecting 40% of respondents, followed by neuropathy and nephropathy. Symptoms such as tiredness and polydipsia were also reported. These complications are indicative of prolonged uncontrolled diabetes and poor disease management.

6. Dietary Patterns and Food Habits

Dietary assessment revealed that the majority of respondents were non-vegetarians and consumed three meals per day. While cereals, fish, milk, and fats were consumed frequently, the intake of fruits, green leafy vegetables, and nuts was considerably low. A significant proportion of respondents consumed sugary foods and snacks, with 86% reporting food cravings, particularly for sweets. Meal timing was irregular among many participants, especially females, and a considerable number reported consuming food from outside. The dietary pattern observed was nutritionally imbalanced and not aligned with diabetic dietary recommendations.

7. Knowledge, Attitude, and Practice (KAP)

The assessment of KAP revealed alarmingly poor knowledge levels regarding diabetes among the respondents. Approximately 95% of participants had low knowledge scores, indicating a lack of awareness about dietary management, complications, and lifestyle modifications. Attitude towards diabetes management was largely negative, with many respondents showing disagreement with scientifically established practices such as the importance of diet and exercise. Similarly, practices were poor, with low adherence to recommended behaviors such as regular exercise, weight monitoring, and dietary control.

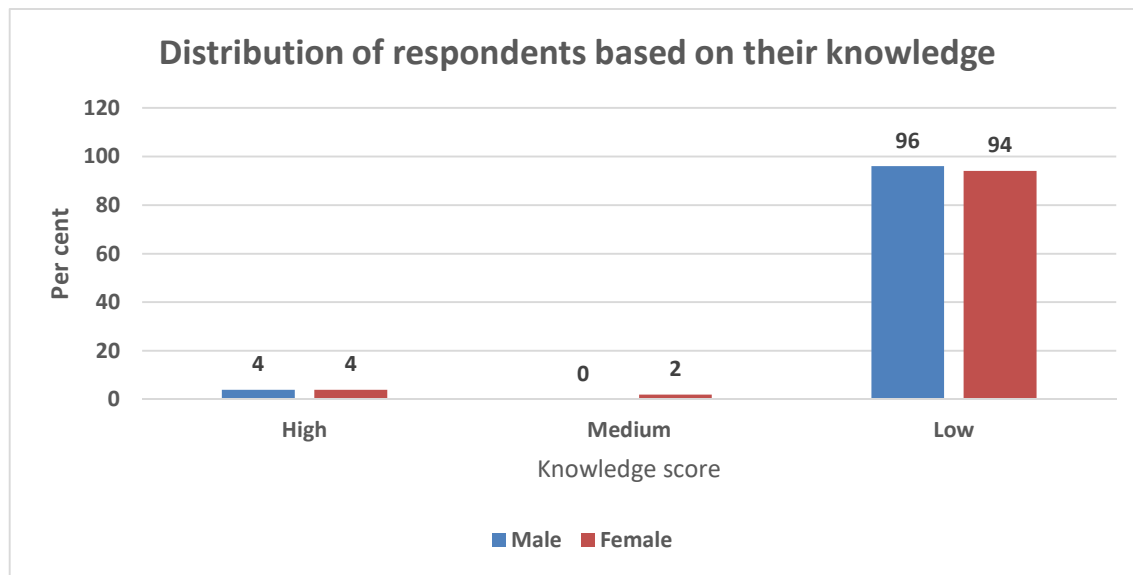
Table 2. Dietary Pattern and Knowledge Level with Chi-square Test

Parameter	Category	Male (n=50)	Female (n=50)	Total (n=100)	p-value
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Meal	3 meals/day	25 (50%)	27 (54%)	52 (52%)	0.412 (NS)
Frequency	4 meals/day	24 (48%)	22 (44%)	46 (46%)	
Food Habit	Non-veg	43 (86%)	41 (82%)	84 (84%)	0.287 (NS)
Fruit Intake	Low	46 (92%)	44 (88%)	90 (90%)	0.198 (NS)
Knowledge	Low	48 (96%)	47 (94%)	95 (95%)	0.001**
	High	2 (4%)	2 (4%)	4 (4%)	

NS= Not Significant * $p < 0.05$ = statistically significant; ** $p < 0.01$ = highly significant

Figure 2. Distribution of respondents based on their knowledge



The findings of the study clearly demonstrate that elderly individuals with Type 2 Diabetes Mellitus are characterized by poor nutritional status, inadequate dietary practices, sedentary lifestyles, and insufficient knowledge regarding disease management. The coexistence of socio-economic constraints, low literacy levels, and unhealthy lifestyle behaviors contributes significantly to poor glycemic control and increased risk of complications. These results emphasize the urgent need for targeted nutrition education, lifestyle interventions, and community-based diabetes management programs.

SUMMARY AND CONCLUSION

The present study on the *nutritional status of elderly individuals with Type 2 Diabetes Mellitus* was conducted among 100 respondents (50 males and 50 females) aged 65–75 years in Kerala. The findings revealed that the majority of participants belonged to low socio-economic backgrounds with limited educational attainment and predominantly sedentary lifestyles. Dietary assessment indicated a high intake of cereals, fats, and animal-based foods, while the consumption of fruits, green leafy vegetables, and fiber-rich foods was considerably low. Anthropometric and clinical evaluations showed a high prevalence of



overweight and obesity, along with poor glycemic control and diabetes-related complications such as retinopathy. Irregular meal patterns, low physical activity, and unhealthy lifestyle behaviors further contributed to poor nutritional outcomes.

The study also highlighted significant gaps in knowledge, attitude, and practices (KAP) related to diabetes management among the elderly population. Most respondents lacked adequate awareness regarding appropriate dietary modifications, the importance of regular physical activity, and self-care practices such as weight monitoring and blood glucose control. Negative attitudes and poor lifestyle practices were reflected in the high prevalence of metabolic risk factors and disease complications. Socio-economic limitations and low literacy levels were identified as major contributors to these gaps, preventing effective disease management despite long durations of living with diabetes.

In conclusion, the nutritional status of elderly individuals with Type 2 Diabetes Mellitus is suboptimal and requires immediate attention. There is a critical need for targeted nutrition education, lifestyle modification programs, and regular health counseling to improve awareness and promote healthier behaviors. Community-based interventions focusing on balanced diets, increased physical activity, and routine health monitoring can significantly enhance glycemic control and reduce complications. Strengthening these strategies will not only improve the nutritional and health status of elderly diabetic individuals but also enhance their overall quality of life and functional independence.

References

1. Jimenez-Redondo S., Beltran de Miguel B., Gomez-Pavon J., Cuadrado Vives C. Food consumption and risk of malnutrition in community-dwelling very old Spanish adults (≥ 80 years), 2016
2. Liu Y.J., Zhan J., Liu X.L., Wang Y., Ji J., He Q.Q. Dietary flavonoids intake and risk of type 2 diabetes: A meta-analysis of prospective cohort studies. Clin. Nutr. 2014
3. Morgantini C., Natali A., Boldrini B., Imaizumi S., Navab M., Fogelman A.M., Ferrannini E., Reddy S.T. Anti-inflammatory and antioxidant properties of HDLs are impaired in type 2 diabetes. Diabetes. 2011
4. Caron N., Peyrot N., Caderby T., Verkindt C., Dalleau G. Energy expenditure in people with diabetes mellitus: A review. 2016
5. Harris MI, Hadden WC, Knowler WC, Bennett PH. Prevalence of diabetes and impaired glucose tolerance and plasma glucose levels in US population aged 20–74 yr. Diabetes 1987



6. Manson JE, Rimm EB, Stampfer MJ, Colditz GA, Willett WC, Krolewski AS, Rosner B, Hennekens CH, Speizer FE. Physical activity and incidence of non-insulin-dependent diabetes mellitus in women 1991
7. Marshall JA, Hamman RF, Baxter J. High-fat, lowcarbohydrate diet and the aetiology of non-insulindependent diabetes mellitus: the San Luis Valley Diabetes Study. American Journal of Epidemiology 1991
8. Lundgren H, Bengtsson C, Blohme G, Isaksson B, Lapidus L, Lenner RA, Saaek A, Winther E. Dietary habits and incidence on noninsulin-dependent diabetes mellitus in a population study of women in Gothenburg, Sweden. American Journal of Clinical Nutrition 1989
9. Salmeron J, Ascherio A, Rimm EB, Colditz GA, Spiegelman D, Jenkins DJ, Stampfer MJ, Wing AL, Willett WC. Dietary fiber, glycemic load and risk of NIDDM in men. Diabetes Care 1997
10. Salmeron J, Hu FB, Manson JE, Stampfer MJ, Colditz GA, Rimm EB, Willett WC. Dietary fat intake and risk of type 2 diabetes in women. American Journal of Clinical Nutrition 2001
11. Meyer KA, Kushi LH, Jacobs DR, Folsom AR. Dietary fat and incidence of type 2 diabetes in older Iowa women. Diabetes Care 2001
12. Christiansen E, Schnider S, Palmvig B, Tauber-Lassen E, Pedersen O. Intake of a diet high in transmonounsaturated fatty acids or saturated fatty acids. Effects of postprandial insulinemia and glycemia in obese patients with NIDDM. Diabetes Care 1997
13. Hamalainen H, Ilanne-Parikka P, Keinanen-Kiukaanniemi S, Laakso M, Louheranta A, Rastas M, Salminen V, Uusitupa M and for the Finnish Diabetes Prevention Study Group. Prevention of type 2 diabetes mellitus by changes in lifestyle among subjects with impaired glucose tolerance. New England Journal of Medicine 2001