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Assessment of Knowledge, Attitudes and Practices on Metabolic Dysfunction Associated Fatty Liver Disease (MAFLD) Among Community: A Hospital-Based Analytical Cross-Sectional Study

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Abstract

Background:

Metabolic dysfunction Associated Fatty Liver Disease (MAFLD) is an emerging global health issue, replacing NAFLD with criteria emphasising metabolic risk factors over exclusion of alcohol use. Despite its high prevalence and severe complications, awareness remains low, particularly in developing countries. Understanding community knowledge, attitudes, and practices (KAP) is essential in designing effective awareness and prevention strategies.

Materials and methods:

A hospital-based analytical cross-sectional study was conducted from June 2024 to May 2025 in a tertiary care hospital in Mysuru. A total of 322 participants aged 18–65 years were selected through stratified sampling. Data was collected through a semi-structured, validated questionnaire assessing sociodemographic details and KAP regarding MAFLD. Statistical analysis was performed using SPSS V 22. The Mann–Whitney U test was performed to compare KAP scores between urban and rural participants, with significance set at $p < 0.05$.

Results

Urban participants had significantly higher KAP scores compared to rural counterparts ($p < 0.05$). Approximately, over 90% of rural and 85% of urban respondents lacked adequate knowledge of MAFLD, with most unaware of its risk factors, including obesity and diabetes. Awareness of lifestyle modification recommendations following liver disease diagnosis was also low, particularly in rural areas. Urban females showed the highest attitude and practice scores, while overall knowledge was poor across both groups.

Conclusion

The study reveals substantial gaps in MAFLD awareness and preventive practices, especially in rural communities. Limited recognition of risk factors and lifestyle modification measures underscores the urgent need for targeted, culturally appropriate health education initiatives to improve early detection, prevention, and management of MAFLD.

INTRODUCTION

Metabolic dysfunction Associated Fatty Liver Disease (MAFLD) is increasingly a global health concern. Recently, in 2020, it has been recognised as a specific disease, replacing the earlier nomenclature of Non-Alcoholic Fatty Liver Disease (NAFLD) with new diagnostic criteria. [1] MAFLD is a chronic liver condition marked by excessive fat accumulation in hepatocytes, which is associated with metabolic dysfunctions such as obesity, type 2 diabetes mellitus (T2DM), or other components of metabolic syndrome. [2, 3] Unlike NAFLD, which is defined by the exclusion of alcohol and other causes of liver disease, MAFLD uses positive diagnostic criteria rooted in metabolic dysfunction, obesity, or type 2 diabetes mellitus (T2DM). [4]

The shift from NAFLD to the overarching term MAFLD was initiated by the international panel of liver disease experts from 22 countries, who proposed a comprehensive definition for the condition. [5, 6] Because it relies on

exclusion criteria and ignores the disease's close connection to metabolic diseases, the standard nomenclature for NAFLD has drawn concern. [7] The definition of MAFLD focuses on inclusion specifically, evidence of hepatic steatosis along with overweight/obesity, T2DM, or metabolic dysregulation (e.g., high triglycerides, insulin resistance). The MAFLD diagnosis depends on the presence of metabolic factors rather than alcohol consumption. [8]

According to this interpretation, hepatic fat accumulation is often a hepatic sign of systemic metabolic failure. MAFLD is still not well understood, despite its frequency and possible repercussions. This is particularly true in developing countries like India, where the number of lifestyle-related illnesses is rapidly increasing. [9] It also highlights the need for increased awareness among the community and healthcare providers. MAFLD encompasses a spectrum of liver conditions ranging from simple steatosis, non-alcoholic steatohepatitis (NASH), severe fibrosis, cirrhosis, and the possibility of developing hepatocellular carcinoma (HCC). [10]

The change improves patient classification for monitoring and treatment, making early diagnosis more aligned with clinical reality. [11] Globally, MAFLD affects approximately 38% of the adult population, with significant variation across regions and demographic groups. 1 in 4 adults, 3 to 10% of children and adolescents are developing MAFLD, and numbers will likely increase to 31% in adults by 2030. [12] In 2021, it is estimated that 1,267,867,997 cases of MAFLD were reported globally. [13, 14] The burden is higher in urban and industrialised societies due to sedentary lifestyles, processed food consumption, rising rates of obesity and diabetes. It is often associated with metabolic syndrome in more than 50%. [15]

In India, studies report a prevalence of 25% to 35% of MAFLD in the general population, with higher rates among individuals with metabolic comorbidities. [16] Sadly, the condition is not confined to obese individuals; a large subset of patients presents as lean MAFLD, often with more advanced liver damage due to under diagnosis and delayed treatment. The prevalence is increasing both in adults as well as in children with obesity. [17] The increasing trend in adolescents and young adults further underlines the urgency for targeted awareness and screening strategies. [18] Risk factors like intake of high energy, genetic predisposition, hormonal imbalance, altered body composition, gut dysbiosis are potential triggers for lean MAFLD. [19] Triglycerides and glucose index (TyG) are the most significant factors for lean MAFLD. [20] Although there exists a close relation between obesity and liver fat, not all obese people develop metabolic disease, and not all patients with MAFLD develop metabolic dysfunction. [21]

In its early stages, MAFLD is generally asymptomatic, and many individuals are diagnosed during imaging or regular check-ups. [22] If symptoms persist, they include jaundice, hepatomegaly, tiredness, or pain in the right upper abdomen. [23]

The higher risk group includes individuals with Type 2 diabetes mellitus, Obesity or overweight, dyslipidaemia, polycystic ovarian syndrome (PCOS), Hypertension, Sedentary lifestyles, and hypothyroidism. [24, 25, 26] Additionally, MAFLD independently a risk factor to cardiovascular disease. [27, 28] A recent study suggested that HBV infection has a lower prevalence of fatty liver disease, metabolic syndrome and hyperglyceridaemia. (29) But few authors contradict this statement. [30] Globally, patients with MAFLD presented with higher intakes of added sugars, pastries and sugar-sweetened beverages. [31]

Notably, non-obese individuals with metabolic dysfunction are increasingly affected a phenotype particularly prevalent in Asian populations, including India. [32] Genetic polymorphisms, such as PNPLA3 and TM6SF2, also influence disease susceptibility and progression. Beyond a liver disease MAFLD also has serious hepatic and

extra-hepatic complications. Hepatic complications include Non-alcoholic steatohepatitis (NASH), advanced fibrosis, Cirrhosis, Hepatocellular carcinoma (HCC). Extra-hepatic complications like atherosclerosis and cardiovascular disease (leading cause of death), chronic kidney disease, colorectal cancer, sleep apnea and endocrine abnormalities. [33] Cardiovascular disorders are the leading cause of mortality among patients with MAFLD, followed by extrahepatic malignancies. [34] The significant treatment for MAFLD is lifestyle modifications such as diet, exercise, physical activity, weight loss, and avoiding highly processed food. [35, 36, 37] The diagnostic criteria for MAFLD is presence of hepatic steatosis, which is confirmed by blood markers, imaging and biopsy. [38]

Despite the high burden of disease, awareness about MAFLD remains low among the general public. Most of the people are unaware of the signs, risk factors or consequences of MAFLD. This lack of awareness might worsen results by delaying diagnosis, treatment and lifestyle changes. KAP (Knowledge, Attitude, and Practice) studies are powerful tools to identify gaps and inform interventions. By understanding existing perceptions, health systems can implement targeted strategies for behaviour change, screening, and resource allocation.

Given the emerging burden of MAFLD, particularly in younger, obese, and asymptomatic populations, it is essential to evaluate the existing knowledge, attitudes, and practices (KAP) across stakeholder groups. This study is done to assess the knowledge, attitudes and practices on MAFLD among individuals visiting a tertiary care hospital in Mysuru.

METHODS

Study design

A hospital-based cross-sectional study was conducted, from June 2024 to May 2025, within the OPDs of a tertiary care hospital in Mysuru.

Sample size

The sample size was estimated to be 322 with a prevalence of 23% knowledge in the community, 95% confidence interval, 5% type 1 error and 10% nonresponse rate. (22)

Participants

The study was conducted among individuals who visited a tertiary care hospital aged 18 to 65years. Inclusion criteria encompassed individuals who provided informed consent were physically available during the period of data collection.

Data collection: Semi-structured interviews were conducted to gather information from participants on socio-demographic information, including age, gender, education, occupation, place of residence and knowledge, attitude, practices on MAFLD.

Study tool

A semi-structured questionnaire was developed according to study objectives. The questionnaire was face-validated and pre-tested for validity and reliability. Before the main study, a pilot study was conducted with the 10% of the actual sample size in the study areas.

Ethical clearance

Before the commencement of the study, necessary permissions and ethical clearance from the Institutional Ethical Committee (JSS/MC/PG/MPH-1/2024-25) was obtained.

Statistical Analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS) V 22. The categorical data were represented using frequency and percentage. The continuous data was represented using mean and SD. The normality of the data was checked through the Histogram and the Shapiro-Wilk test. Since the data was not normally distributed, the Mann-Whitney U test was used to compare mean scores of urban & rural individuals. Statistical significance was interpreted at a p-value below 0.05. For open ended and more than one right answer questions, the data is represented in the form of frequency and percentage. Tables and suitable graphs were plotted using MS Excel to display the data.

RESULTS

Study participants

The sociodemographic characteristics of the 322 participants are represented in Table 1. The participant's age group ranges from 18 to 65years. The highest group ranges from 21 to 40 years (n = 115, n = 71 in urban and rural, respectively). Males are higher in urban (n = 97) and females in rural (n = 80). In urban 79 of the participants completed their undergraduate studies, and in rural maximum number of participants have completed their secondary education, with a frequency of 54. In both groups maximum participants were unemployed, in urban unemployed and professionals has same frequency that is 45.

Table 1
SOCIODEMOGRAPHIC DETAILS OF THE PARTICIPANTS FROM THE COMMUNITY

Variables	Categories	URBAN		RURAL	
		Frequency	Percentage	Frequency	Percentage
Age	18–20 years	7	64	4	36
	21–40 years	115	62	71	38
	41–60 years	58	54	50	46
	> 60 years	4	23.5	13	76.5
	Total	**184**		**138**	
Gender	Male	97	63	58	37
	Female	87	52	80	48
Completed education	No formal education	10	30	23	70
	Primary education	20	74	7	26
	Secondary education	51	49	54	51
	Under graduate	79	64	44	36
	Postgraduate and above	24	71	10	29
Occupation	Professional	45	68	21	32
	Semi professional	42	66	22	34
	Clerical/ Shop owner/ Farmer	32	56	25	44
	Skilled worker	0	0	5	100
	Unskilled worker	5	45.5	6	54.5
	Unemployed	45	47	51	53
	Student	15	65	8	35

Table 2 shows, that there is significant difference in knowledge, attitude and practice on MAFLD among urban and rural participants (p value < 0.05). So it is observed that urban participants have higher KAP than rural participants. This suggests that place of residence also influences the knowledge, attitude and practices of MAFLD.

Table 2
COMPARISON OF KNOWLEDGE, ATTITUDE AND PRACTICE BETWEEN URBAN AND RURAL

	Residence	N	Mean rank	Sum rank	Mann-Whitney U	P value
Knowledge	Urban	184	182	33630	8597	**0.007***
	Rural	138	131	18050		
Attitude	Urban	184	204	37700	4711	**0.000***
	Rural	138	103	14302		
Practice	Urban	184	136	25130	8110	**0.000***
	Rural	138	194	26873		
(*p < 0.05 is statistically significant)						

Comparison of knowledge, attitude and practice scores of urban and rural areas with respect to males and females is represented in Table 3. Knowledge, attitude and practice on MAFLD is higher among urban females with 15%, 90% and 67% respectively.

Table 3
COMPARISON OF KNOWLEDGE, ATTITUDE AND PRACTICE SCORES OF URBAN AND RURAL WITH RESPECT TO MALES AND FEMALES

	URBAN			**RURAL**		
	Male	**Female**	**Total**	**Male**	**Female**	**Total**
Knowledge scores (Mean ± SD)	3.753 (5.3)	3.862 (5.7)	3.804 (5.5)	1.966 (3.1)	2.076 (4.0)	2.029 (3.7)
Number of participants with higher than mean score (%)	**14 (14)**	**13 (15)**	**27 (15)**	**3 (5)**	**6 (8)**	**9 (7)**
Attitude scores (Mean ± SD)	6.00 (1.0)	5.74 (1.2)	5.88 (1.1)	3.08 (2.1)	3.37 (2.1)	3.25 (2.1)
Number of participants with higher than mean score (%)	**80 (82)**	**78 (90)**	**158 (86)**	**20 (34)**	**35 (44)**	**55 (40)**
Practice scores (Mean ± SD)	3.175 (1.9)	3.172 (1.9)	3.174 (1.9)	4.672 (1.7)	4.21 2(2.0)	1.406 (0.5)
Number of participants with higher than mean score (%)	**21 (22)**	**58 (67)**	**79 (43)**	**15 (26)**	**20 (25)**	**35 (25)**
(*p < 0.05 is statistically significant)						

Out of 322, 251 participants did not hear the term MAFLD. 20 participants heard it from hospital followed by in educational institutes, in social media, during health check-ups, through friends/ family and least in TV that is only 4 participants which is represented in Fig. 1.

The knowledge on risk factors of MAFLD among community is represented in Fig. 2. 133 out of 138 participants in rural and 163 out of 184 participants in urban do not know what are the risk factors of MAFLD. Among urban participant's19 said Diabetes mellitus, 16 said hypertension, 14 said obesity, 14 said alcohol are the causes of

MAFLD among people. In contrast, 5 said obesity, 4, 3, 3 participants from rural said obesity, hypertension, diabetes mellitus, and alcohol are the risk factors for MAFLD, respectively.

Figure 3, represents if the participants are aware of 'did the doctor recommend any lifestyle modifications after their friends/ family who have been diagnosed with liver disease'. 71% from urban and 57% did not know if the doctor recommended any lifestyle modification. Only 17% from urban and 39% from rural said yes.

DISCUSSION

The study found that urban participants had significantly better KAP scores compared to rural participants ($p < 0.05$). And many of them were not aware of the term MAFLD. This aligns with a study conducted by Priya Singh et al, among 313 participants, 50.15% of them is aware of NAFLD, and none of them is aware of MAFLD. (39) According to a study conducted in the USA among 11,700 participants, only 4.4% adults are aware of NAFLD, and it is higher among females than males. (40) This contradicts a study done in the Korean population, which found that 78% had heard the term NAFLD and 42.9% of participants knew that NAFLD can progress to liver cirrhosis or hepatocellular carcinoma. (23) According to this study, 15% of urban and 7% of rural areas had knowledge above the mean score, but a study done in Maharashtra shows that about 52% were knowledgeable, 41% had a good attitude, and 52% had good practice. (41) A study done in China among young adults showed only 26.2% of the participants had heard the term NAFLD among a total of 1373 students. (42)

Awareness of risk factors was alarmingly low. Most respondents in this study, 163 urban and 133 rural, did not know the risk factors of MAFLD. Only a small group of participants said obesity and diabetes mellitus are the risk factors. These findings show consistent results that at least 6 out of 10 individuals said liver disease could be caused by factors apart from the consumption of alcohol. (43)

It is important to implement ongoing educational initiatives on NAFLD/MAFLD for healthcare professionals, medical and dental students, as well as the community. Continuous education helps ensure that healthcare workers remain up to date with current diagnostic guidelines, treatment protocols and preventive strategies. (44) Therefore, the awareness campaigns in regional languages, primary health education and targeted interventions are essential in both urban and rural areas to educate people. Educating the community increases awareness about risk factors of MAFLD, thereby encouraging healthier behaviours. (45)

CONCLUSION

The study was conducted to access the knowledge, attitude and practices on Metabolic Dysfunction Associated Fatty Liver Disease (MAFLD) among individuals visiting a tertiary care hospital in Mysuru. The research was able to effectively identify considerable differences in levels of knowledge as well as practices related to MAFLD, with existing gaps in knowledge and systematic insufficiencies in education in the community.

The most serious gaps in understanding and awareness existed among the individuals, especially in rural areas. Alarmingly, more than 80% of rural participants had never heard the term MAFLD, or basic information about its risk factors, complications, or preventive strategies. Even among urban areas, more than 85% of participants had poor knowledge of MAFLD. This highlights the urgent need for grassroots public health education. Many participants were unable to identify obesity, diabetes mellitus, or dyslipidaemia as a risk factor. Furthermore, the findings also reveal that among those whose friends or family were diagnosed with liver disease, only a limited

percentage knew about the diagnostic procedure or the importance of lifestyle modifications. This indicates a lack of counselling by physicians or poor communication and education of preventive information.

Barriers such as lack of time, misinformation, and low health literacy were cited as common obstacles to lifestyle modification. This is particularly a problem in rural areas where access to structured health education, diagnostic services, screening programmes, and dietary counselling is often limited. These barriers must be addressed systematically through multipronged interventions, such as health education integrated in primary care, information delivered through digital and media, and through health workers.

LIMITATIONS:

This study possesses several strengths, addressing a critical gap in the literature by examining the KAP of individuals visiting a tertiary care hospital. The study offers an understanding of the need for creating education on metabolic diseases like MAFLD, which is a preventable disease. However, a study conducted in a single setting might limit the generalizability of the findings.

Declarations

Competing interests:

The authors declare no conflicts of interest.

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No funding was acquired for this research.

Author Contribution

A.B. contributed to literature search, data acquisition, data analysis, statistical analysis, manuscript preparation, manuscript editing, manuscript review, and acted as guarantor of the study.C.D. contributed to concepts, design, definition of intellectual content, literature search, data acquisition, manuscript editing, and manuscript review.E.F. contributed to concepts, design, definition of intellectual content, literature search, data acquisition, statistical analysis, manuscript editing, and manuscript review.All authors reviewed and approved the final manuscript.

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Figures

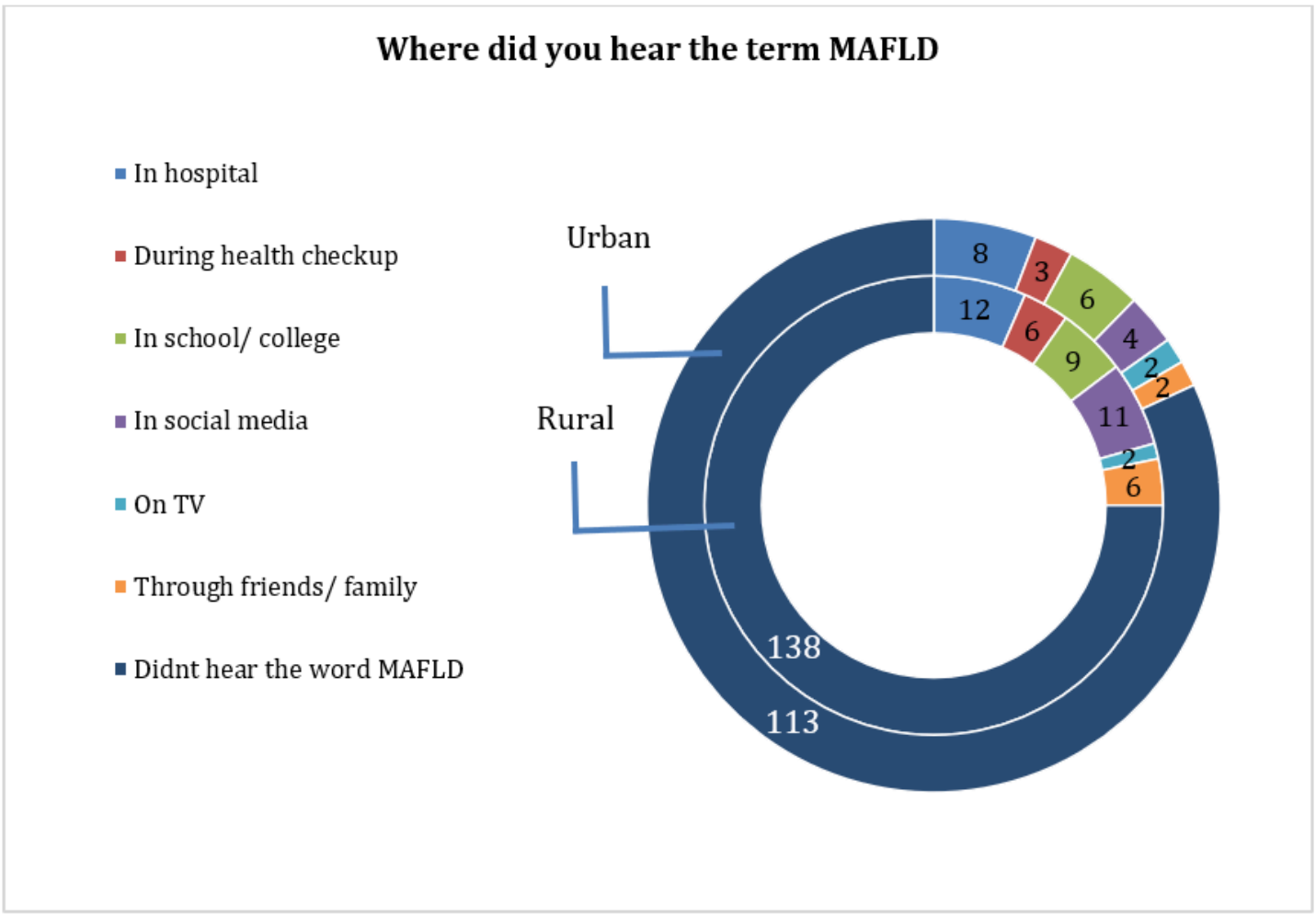


Figure 1

DISTRIBUTION OF SOURCE OF PARTICIPANTS HEARD THE TERM MAFLD

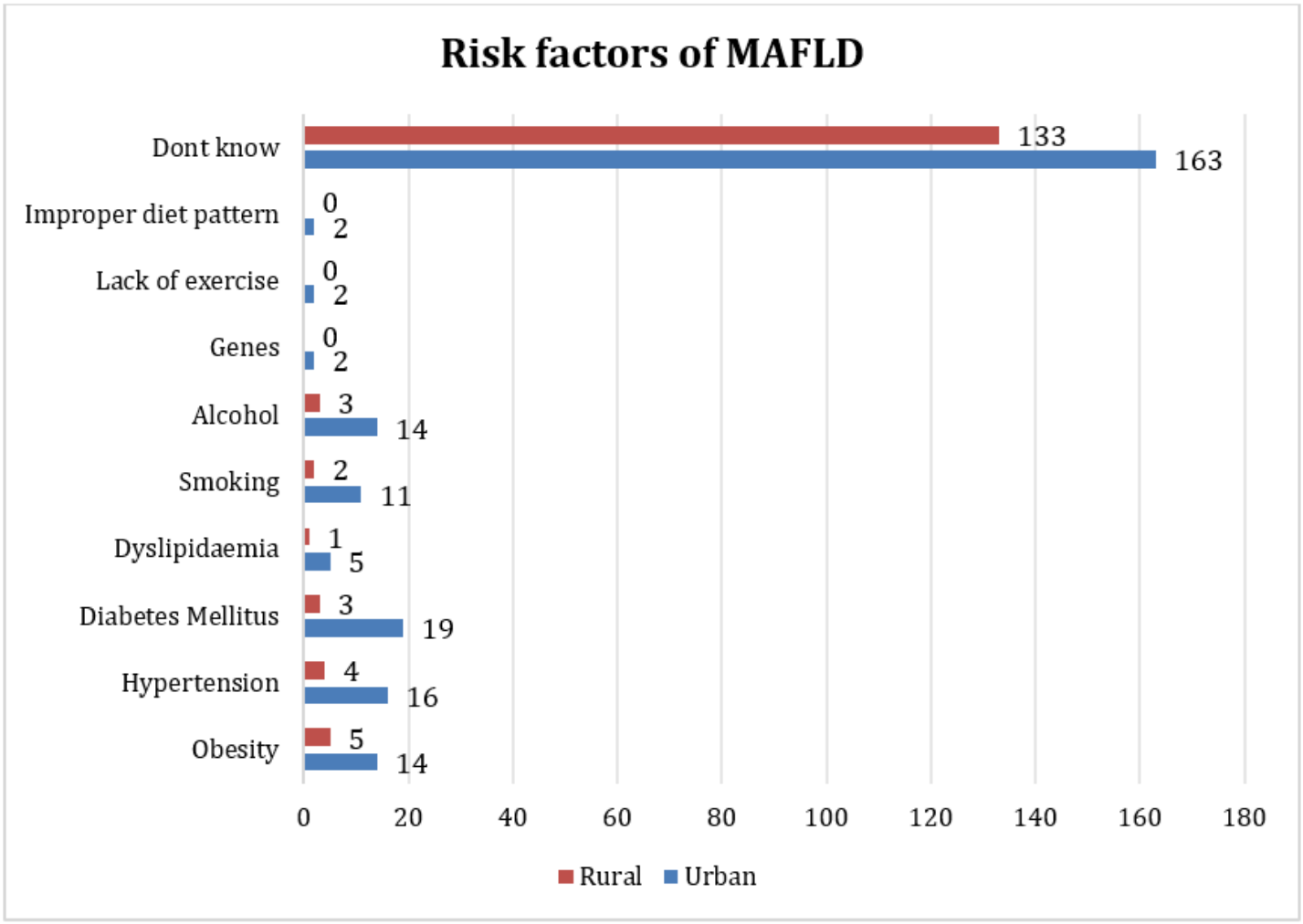


Figure 2

KNOWLEDGE ON RISK FACTORS OF MAFLD AMONG THE COMMUNITY

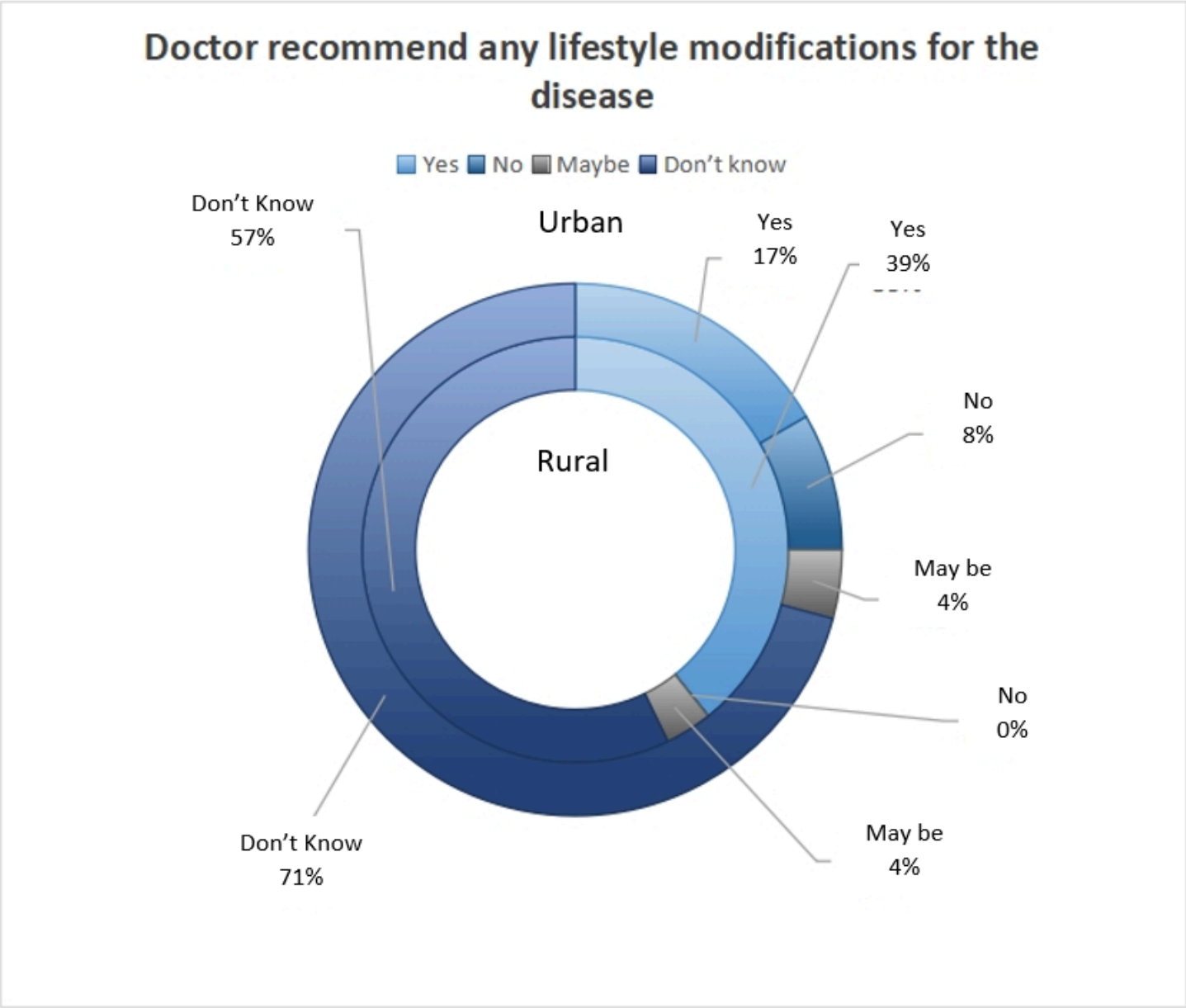


Figure 3

DOCTOR RECOMMENDED ANY LIFESTYLE MODIFICATIONS FOR THE DISEASE

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