Original Article

Awareness About Non-Alcoholic Fatty Liver Disease (NAFLD) in Al-Jouf Region, Saudi Arabia

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Abstract - Background: Nonalcoholic Fatty Liver Disease (NAFLD) is a global health burden. It is responsible for nearly all liver diseases. Appropriate, coherent prevention and control strategies depend mainly on real community needs. Aim: To evaluate community knowledge about NAFLD in the Al-Jouf region, Saudi Arabia, as the first step in its prevention and control strategies. Method: The study is a questionnaire-based cross-sectional study that enrolled 305 participants who answered an online questionnaire about NAFL. Results: A great percentage did not hear about NAFL (278,91%), whether it runs in families or not (226,74%), age group at high risk (210,66%), risk factors (162,53%), stages (223,73%), symptom (146,48%), complications (162,53%) or if it is life-threatening or not (119,39%). Regarding its relationship with chronic diseases, >50% of participants agreed that low blood pressure is not a risk factor (171,56%), and diabetes has a relation with NAFLD (183,60%). More than half participants agreed that eating habits may prevent NAFL, NAFL can be diagnosed by blood tests, BMI, and imaging, and laparoscopy is the standard treatment. Conclusion: There is a diminished awareness of NAFL regarding its risk factors, clinical manifestations, diagnosis, complications, and treatment among the population in the Al-jouf region. Health education programs are recommended.

Keywords - Non-alcoholic Fatty Liver Disease (NAFLD), Knowledge, Al-Jouf region, Saudi Arabia.

1. Introduction

Nonalcoholic Fatty Liver Disease (NAFLD) is a global health burden because it is responsible for up to 75% of all liver diseases. The estimated prevalence of NAFL is about 25% [1, 2].

NAFLD includes a wide range of disorders, starting from isolated hepatic steatosis to steatosis associated with inflammation and fibrosis, which may progress to cirrhosis. It is more frequent among patients with metabolic diseases such as obesity, diabetes mellitus, and hypertension. Patients with NAFLD have high mortality due to cardiovascular and hepatic problems [1].

In Saudi Arabia, due to the increased prevalence of obesity and type 2 diabetes mellitus (T2DM), NAFLD can be a driving factor in hepatic disorders in the coming years [3]. It was reported that NAFLD is strongly associated with obesity and diabetes in different cities in Saudi Arabia, and its prevalence is predicted to exceed 30% by 2030. This may increase the morbidity and healthcare burden [4].

To control NAFLD, it is a priority to evaluate the community's knowledge about the prevalence, risk factors, clinical manifestations, and ways of prevention. Appropriate, coherent prevention and control strategies depend mainly on real community needs. Thus assessment of the knowledge and attitude of the community towards NAFLD will be the first step in this direction. The current study aimed to evaluate the community awareness of NAFLD in the Al-Jouf region, Saudi Arabia.

2. Methodology

The current study is cross-sectional and enrolled 305 participants. The sample size was calculated by the Survey System Creative, Research Systems, using the following formula (confidence level equal to 95% & margin of error = 5%).

$$n = \frac{Z^2_{1-\alpha/2}\, P\,(1-P)}{d^2}$$

, where $Z^2_{1-\alpha/2}$ for 95% confidence level is $(1.96)^2$, P is the anticipated proportion of NAFLD in Saudi Arabia (ranging between 7% and 30%) [2], and d is the margin of error (5%). The sample Size (n) was supposed to range between 100- 322 participants (we chose the sample to be 305 to avoid bias). The questionnaire was distributed online. The sample was convenient. The inclusion criterion was any person resident in the Al-Jouf

region. Individuals less than 18 years old were excluded from the study.

2.1. Ethical Approval

The research proposal was approved by the Local Committee of Bioethics (LCBE) (NO:2-07-44; approval date 4-4-2023).

The study data collection tool is an open-source and validated questionnaire on NAFLD [5]. The questionnaire involves 3 sections: Section 1 includes a short brief on the research aim and approval to participate in the study; Section 2 (participants' sociodemographic data as age, gender, education level, occupation, marital status, and region of residency); section 3 includes questions to assess the participant's knowledge regarding NAFLD and its complications such as liver cirrhosis. The questionnaire included 18 knowledge questions, and every correct answer received a score of 1. Participants who scored >75% of the total score were categorized as having good knowledge.

Data was analyzed using SPSS version 21. The data is presented as numbers and percentages. The level of significance was at $p < 0.05$.

3. Results

3.1. Participants' Sociodemographic Data

The current study enrolled 305 participants who agreed to answer the questionnaire and their answers regarding the residency were valid. Most of the participants were females (254, 84%), aged between 18 and 30 years old (168, 55%), and university students or graduates (230, 75%). Half of the participants were single (154, 50%), and the other half were mainly married (142, 46%).

3.2. Participants' Knowledge Regarding NAFL and its Complications

Answers to the questionnaire revealed that many participants neither heard about NAFL (278, 91%) nor knew if it could run in the family (226, 74%).

Concerning occurrence, risk factors, manifestations, treatment, and complications of NAFL, about 66% of participants agreed that NAFL might occur at any age (201 participants), patients with NAFL may not feel any apparent symptoms (217, 71%), it is characterized by fat accumulation on the liver (223, 73%). However, a great percentage did not know the common risk factors (162, 53%) (Figure 1), stages (223, 73%), symptoms (146, 48%), complications of NAFLD (162, 53%) (Figure 2), and if it is life-threatening or not (119, 39%).

Regarding the relationship between NAFL and chronic diseases, more than half of the participants chose that hypotensive people are not at higher risk of NAFLD (171, 56%), and diabetes has a relation with NAFLD (183, 60%).

About 265 (87%) of participants agreed that eating habits could prevent NAFL, 217 (71%) agreed that NAFL can be diagnosed by blood tests, body mass index (BMI), and imaging techniques, and 189 (62%) have chosen laparoscopy as the standard treatment (Figure 3).
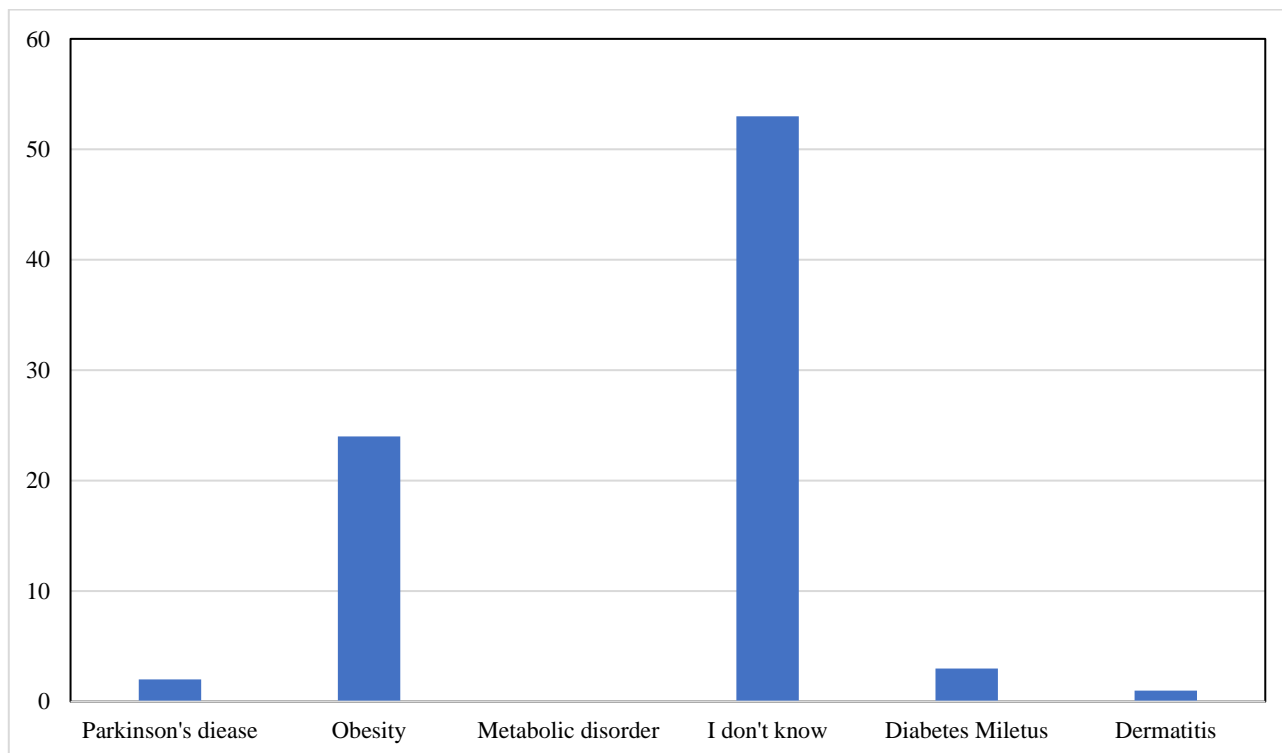

Fig. 1 Answers regarding the common risk factors of NAFLD and data are presented as percentages
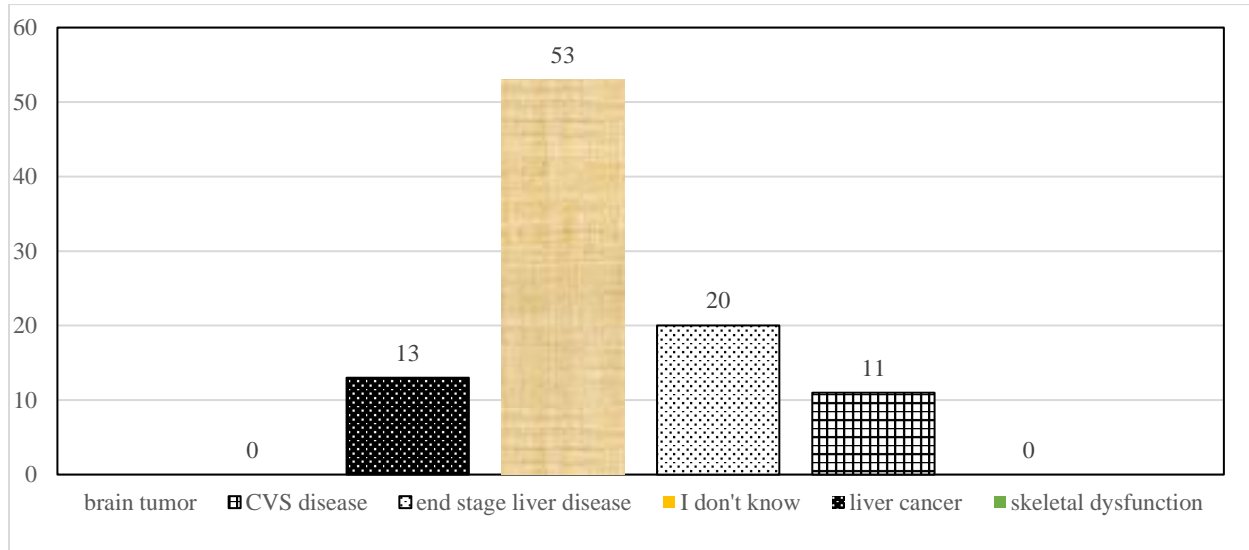
Fig. 2 Answers regarding the common complications of NAFL and data are presented as percentages
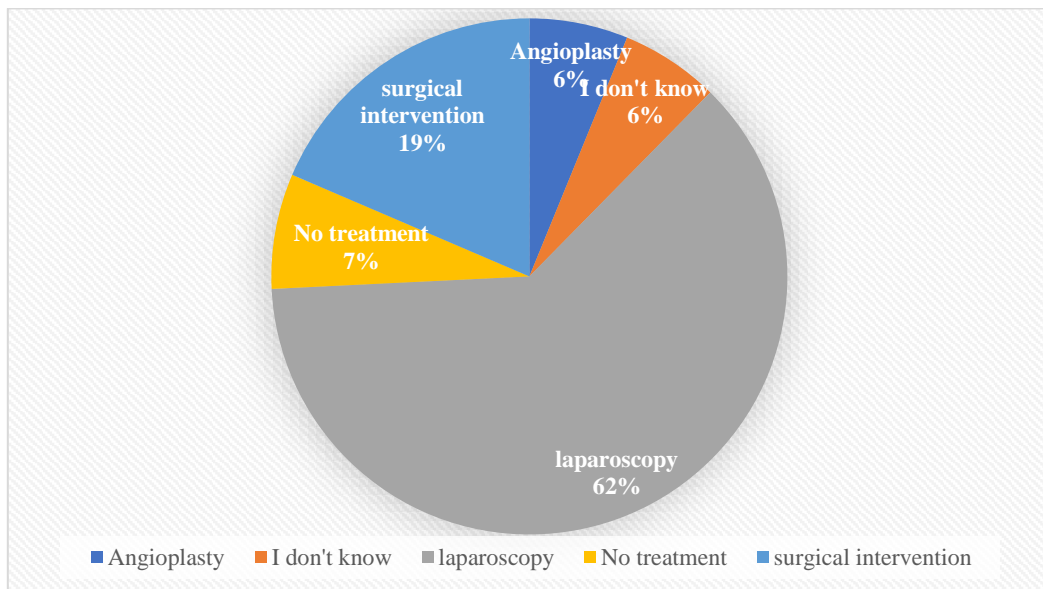

Fig. 3 Answers regarding the standard method for definite treatment of NAFLD and data are presented as percentages.

4. Discussion

NAFLD is one of the most common hepatic diseases worldwide with the highest prevalence in the Middle East (32%), followed by South America (31%), then Africa (14%) [2]. It is responsible for up to 75% of all liver diseases [1].

NAFLD usually occurs with metabolic diseases such as obesity and is associated with high mortality due to cardiovascular and hepatic complications [1].

In Saudi Arabia, the prevalence of NAFLD ranges from 7-30% and is expected to increase to 48% in 2030 [2]. It was reported that NAFLD is strongly associated with obesity and diabetes in different cities in Saudi Arabia, and its prevalence is predicted to exceed 30% by 2030. This may lead to increased morbidity and health care burden [4].

A center-based study in Saudi Arabia has documented the NAFL prevalence of 16.6% among the general population, particularly among Saudi patients with type-2 diabetes [6]. This estimated prevalence usually relies on ultrasonography (US), not liver biopsy [7]. To control NAFLD, it is a priority to evaluate the community's knowledge to be able to choose the appropriate, coherent prevention and control strategies.

The current study evaluated the community awareness of NAFLD in the Al-Jouf region, Saudi Arabia. Results clarified that many participants neither heard about NAFL (91%), nor knew if it can run in the family (74%). Concerning occurrence, risk factors, manifestations, treatment, and complications of NAFL, about 66% of participants agreed that NAFL may occur at any age (201 participants), patients with NAFL may not feel any apparent symptoms (217, 71%), it is characterized mainly by an

accumulation of fat on the liver (223, 73%). However, a great percentage did not know the common risk factors of NAFL (162, 53%), how many stages can occur in NAFL (223, 73%), what is the most commonly presented symptom of NAFLD (146, 48%), associated complications (162, 53%), and if it is life-threatening or not (119, 39%).

Regarding the relationship between NAFL and chronic diseases, more than half of the participants chose that hypotensive people are not at higher risk of NAFLD (171, 56%), and diabetes has a relation with NAFLD (183, 60%). About 265 (87%) of participants agreed that eating habits could prevent NAFL, 217 (71%) agreed that NAFL can be diagnosed by blood tests, body mass index (BMI), and imaging techniques, and 189 (62%) have chosen laparoscopy as the standard method for definite treatment of NAFLD.

Alsabaani et al. (2018) [8] have defined NAFLD prevalence and the factors among T2DM patients in primary healthcare centers in Abha City, Southwestern Saudi Arabia. They found that NAFLD prevalence was 72.8%, particularly among overweight, obese, moderate or poor diet-compliant patients. They concluded that high Body Mass Index (BMI) and poor dietary control are common risk factors for NAFLD among T2DM patients. They recommended the preparation of Health education programs to improve dietary control and the application of screening tests for NAFLD, especially for those with T2DM and high BMI.

Several studies have reported the co-existence of NAFLD, insulin resistance, obesity and T2DM [3, 9, 10]. They eventually lead to cardiovascular complications, which are the major reason for mortality among NAFLD patients.

Cleveland et al. (2019) [1] have assessed the awareness of NAFLD among asymptomatic middle-aged adults with hepatic steatosis in the USA. They noticed the high prevalence of hepatic steatosis among US adults. At the same time, there was a low level of awareness among them, even those with metabolic diseases.

They suggested that this lack of awareness of an NAFLD diagnosis is multifactorial and may be due to the asymptomatic nature of early NAFLD and the lack of screening programs. This highlights the community's need for health education and allocation of resources in the fight against NAFLD.

Alhumaid et al. (2021) [11] have assessed the family physician's knowledge about NAFLD and the barriers to providing care for these patients among 160 family physicians in Prince Sultan Medical Military City, Riyadh, Saudi Arabia. They noticed that the overall score of the knowledge level was poor. The main barriers to NAFLD management were a lack of patient compliance and physician confidence (62.1% and 43.5%, respectively). They suggested the real need for medical education programs for NAFLD.

Aljahdli et al. (2021) [2] have reported a high prevalence of NAFLD in Saudi Arabia and a decreased level of awareness among the general population. They evaluated the knowledge and awareness of NAFLD among a sample of the adult Saudi population. Results clarified that 33.1% of participants knew about NAFLD before the survey, 91.9% had already heard about cirrhosis, and 87.2% thought that obesity could cause fatty liver. A university education, and Saudi nationality were associated with a good knowledge level about fatty liver.

The difference in the prevalence rate of NAFL and the observed associated factors among the Saudi population in the different studies can be explained by differences in the geographical regions, culture, and lifestyle [12].

Alamri et al. (2021) [4] have determined the prevalence and risk factors of NAFLD among patients in tertiary care hospitals of Taif City between Feb 2017 and Feb 2019.

They found that 40% of all patients had NAFLD, and 75% of them had high fasting blood glucose (FBG) levels, total bilirubin, and reduced platelet count. They concluded that NAFLD can be a serious health problem that needs more attention to control the risk factors in the Taif region.

The main limitations of the current study were the small sample size, online distribution of the questionnaire, and working only on one governorate (Al-Jouf region). Thus, further studies on a larger scale are recommended.

5. Conclusion

There is a diminished awareness of NAFL regarding its risk factors, manifestations, complications, diagnosis, and treatment among the population in the Al-jouf region. Nearly all participants agreed that there is a relationship between NAFL and diabetes, and eating habits can prevent NAFL. Health education programs are recommended.

Data Availability Statement

The raw data supporting the conclusion of this article are available from the authors.

Ethics Statement

The Local Committee of Bioethics (LCBE), Jouf University, has approved the study proposal (NO:2-07-44; approval date 4-4-2023). The participants provided their consent by checking the agreement in the first section of the questionnaire.

Author Contributions

All authors have participated in the study design. Nouf Mohammad Alotibi, Renad Bandr Almusib, Ranyah Ahmed Alghamdi, Weaam Nawaf Almadhour, Shahad Shati Alruwaili, Aljofool Daood Falah Aldandani, Rana Bandr Almusib have collected and analyzed the data. Dr. Amany Ghazy and Dr. Eman Rashwan have got ethical approval, shared data analysis, and written the manuscript draft. All authors have revised the manuscript and approved it for publication.

Conflict of Interest

The authors declare that the research was conducted without any relationship that could be construed as a potential conflict of interest.

References

[1] Erin R Cleveland et al., "Low Awareness of Nonalcoholic Fatty Liver Disease in A Population-Based Cohort Sample: The CARDIA Study," *Journal of General Internal Medicine*, vol. 34, pp. 2772-2778, 2019. [CrossRef] [Google Scholar] [Publisher Link]

[2] Emad S. Aljahdli et al., "Awareness of Non-Alcoholic Fatty Liver Disease is Low in the General Population of Saudi Arabia," *International Journal of Medicine in Developing Countries*, vol. 5, no. 3, pp. 899-905, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[3] Khalid Alswat et al., "Nonalcoholic Fatty Liver Disease Burden - Saudi Arabia and United Arab Emirates, 2017-2030," *Saudi Journal of Gastroenterology*, vol. 24, no. 4, pp. 211-219, 2018. [CrossRef] [Google Scholar] [Publisher Link]

[4] Abdulhakeem S. Alamri et al., Prevalence and Predictors of Non-Alcoholic Fatty Liver Disease in Tertiary Care Hospital of Taif, Saudi Arabia: A Retrospective Study," *Saudi Journal of Biological Sciences*, vol. 28, no. 9, pp. 4921-4925, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[5] Alhumaidi Mazyad Alsubaie et al., "Awareness of Adult Population Toward Non-Alcoholic Fatty Liver Disease in Riyadh, Saudi Arabia," *International Journal of Medicine in Developing Countries*, vol. 4, no. 11, pp. 1938-1944, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[6] Waleed Al-hamoudi et al., "Epidemiological, Clinical, And Biochemical Characteristics of Saudi Patients with Nonalcoholic Fatty Liver Disease: A Hospital-Based Study," *Annals of Saudi Medicine*, vol. 32, no. 3, pp. 288-292, 2012. [CrossRef] [Google Scholar] [Publisher Link]

[7] Z. M. Younossi, "Review Article: Current Management of Non-Alcoholic Fatty Liver Disease and Non-Alcoholic Steatohepatitis," *Alimentary Pharmacology and Therapeutics*, vol. 28, no. 1, pp. 2-12, 2008. [CrossRef] [Google Scholar] [Publisher Link]

[8] Abdullah A. Alsabaani et al., "Non-Alcoholic Fatty Liver Disease among Type-2 Diabetes Mellitus Patients in Abha City, South Western Saudi Arabia," *International Journal of Environmental Research and Public Health*, vol. 15, no. 11, pp. 1-8, 2018. [CrossRef] [Google Scholar] [Publisher Link]

[9] Giovanni Targher, Amedeo Lonardo, and Christopher D. Byrne, "Nonalcoholic Fatty Liver Disease and Chronic Vascular Complications of Diabetes Mellitus," *Nature Reviews Endocrinology*, vol. 14, no. 2, pp. 99-114, 2018. [CrossRef] [Google Scholar] [Publisher Link]

[10] Alessandro Mantovani et al., "Complications, Morbidity and Mortality of Nonalcoholic Fatty Liver Disease," *Metabolism, Clinical and Experimental*, vol. 111, 2020. [CrossRef] [Google Scholar] [Publisher Link]

[11] Abdulrahman S Alhumaid, Ayla Tourkmani, and Mostafa Kofi, "Knowledge About Non-Alcoholic Fatty Liver Disease Among Family Physician in Primary Health Center at Prince Sultan Medical Military City, 2020," *International Journal of Advanced Community Medicine*, vol. 4, no. 1, pp. 23-28, 2021. [CrossRef] [Google Scholar] [Publisher Link]

[12] Erwa Elmakki et al., "Nonalcoholic Fatty Liver Disease (NAFLD) in Saudi Patients with T2DM in Jazan Region: Prevalence and Associated Factors," *Journal of Advances in Medicine and Medical Research*, vol. 5, no. 7, pp. 872-879, 2015. [CrossRef] [Google Scholar] [Publisher Link]