Journal of Neonatal Surgery
ISSN(Online): 2226-0439
Vol. 14, Issue 25s (2025)
https://www.jneonatalsurg.com

OPEN ACCESS

Analysis of Nonalcoholic Fatty Liver Research Papers: Saudi Arabia

Rasitha Banu GulMohamed[1], Dr. Sasikala[2], Mrs. Maha Yousif Rizgalla sulieman[3], Dr. Faiza Abdalla Saeed Khiery[4], Dr. Abir S Mohamed[5], AbdelNaser Shaaban Sayed Zaid[6]

[1]Health Informatics Program,Department of Public Health,College of Nursing and Health Sciences, Jazan University,Jazan,Saudi Arabia,Email:rbanu@jazanu.edu.sa,ORCID ID: 0000-0002-0015-6596

[2]Health Informatics Program, Department of Public Health, College of Nursing and Health Sciences, Jazan University, Saudi Arabia

[3]Health Education Program,Department of Public Health,College of Nursing and Health Sciences, Jazan University, Jazan,Saudi Arabia

[4]Health Education Program,Department of Public Health,College of Nursing and Health Sciences, Jazan University, Jazan,Saudi Arabia

[5]Health Informatics Program,Department of Public Health,College of Nursing and Health Sciences, Jazan University, Jazan,Saudi Arabia

[6]Department of Surgery, Faculty of Medicine, Jazan University, Jazan, Saudi.

Arabia.Orcid: 0000-0002-6820-9260

Email ID: Saad20868@gmail.com

Cite this paper as: Rasitha Banu GulMohamed, Dr. Sasikala, Mrs. Maha Yousif Rizgalla sulieman, Dr. Faiza Abdalla Saeed Khiery, Dr. Abir S Mohamed, AbdelNaser Shaaban Sayed Zaid, (2025) Analysis of Nonalcoholic Fatty Liver Research Papers: Saudi Arabia. *Journal of Neonatal Surgery*, 14 (25s), 268-275.

ABSTRACT

Background and Objective: Liver disease is becoming a significant global health concern, with non-alcoholic fatty liver disease (NAFLD) being the most prevalent liver condition in Western countries. The prevalence of NAFLD is increasing alongside rates of obesity and diabetes mellitus. While approximately 25% of people worldwide may have NAFLD, it is believed to be even more common in the Middle East. This study aims to determine the prevalence of NAFLD in the Kingdom of Saudi Arabia (KSA). [1] .By 2030, Saudi Arabia and the United Arab Emirates are projected to have approximately 12,534,000 and 372,000 NAFLD cases, respectively. As the population ages and the disease progresses, cases of non-alcoholic steatohepatitis (NASH) are expected to rise more rapidly than those of NAFLD. Additionally, annual liver-related fatalities are anticipated to increase to 4,800 in Saudi Arabia and 140 in the United Arab Emirates by 2030. The number of prevalent cases of compensated cirrhosis and advanced liver disease is also expected to quadruple during this period.[2] Researchers in Saudi Arabia have been actively studying NAFLD and publishing their findings. A systematic analysis of these studies is essential, as it will not only highlight the current status of NAFLD research but also aid in shaping future health policies related to the disease in Saudi Arabia.

Method: This study utilized the search string “Fatty Liver” OR “Non-alcoholic” OR “NA Fatty liver” AND AFFIL (Saudi AND Arabia) to retrieve articles from the PubMed Central and ScienceDirect databases. Various tools available in the PubMed database were employed to analyse bibliometric parameters.

Results: The search yielded a total of 206 articles from PubMed and 379 articles from ScienceDirect. Most of these articles originated from King Saud University (175), followed by King Abdulaziz University (48), King Faisal Specialist Hospital and Research Centre (36), King Saud University College of Applied Medical Sciences (25), and King Khalid University (36).

Conclusion: Saudi researchers are making significant contributions to addressing the public health challenge posed by fatty liver disease. However, it was noted that certain institutions are leading in this research while others are less involved. Therefore, the health department should encourage and implement strategies to increase participation from additional institutions in this important area of study.

Keywords: *Non Alcoholic fatty liver, Risk Factors, Saudi Arabia*

1. INTRODUCTION

The epidemiology and demographics of non-alcoholic fatty liver disease (NAFLD) vary significantly across regions, but its incidence is expected to make it the leading cause of chronic liver disease globally. In Western countries, most cases are associated with obesity and insulin resistance. However, in many Asian countries, NAFLD presents at lower body mass index (BMI) levels, and many affected individuals do not exhibit insulin resistance as defined by standard diagnostic methods.[15]

In Saudi Arabia, NAFLD is a prevalent health concern, projected to account for 30% of liver disease cases by 2030. The condition significantly increases morbidity and healthcare costs due to its association with liver fibrosis. There is a strong correlation between NAFLD, obesity, and diabetes in many Saudi communities. [3] The defining characteristic of NAFLD is excessive liver fat accumulation without other identifiable causes, which contributes to advanced liver disease in various countries. Key risk factors for NAFLD include type 2 diabetes mellitus (T2DM), metabolic syndrome, and overweight/obesity. [4,5,6]

The situation in Saudi Arabia is exacerbated by high rates of obesity and T2DM, both of which are major contributors to the development of NAFLD. Understanding the prevalence and characteristics of NAFLD in the Saudi population is essential for developing targeted health interventions and policies. T2DM, characterized by insulin resistance or insufficiency leading to elevated blood glucose levels, poses a significant risk for NAFLD. This relationship is complex and bidirectional: T2DM not only increases the risk of developing NAFLD but also complicates glycaemic control for affected individuals. [19,20] Saudi Arabia, with one of the highest rates of T2DM in the world, faces a critical dual challenge.

Research on this topic is disseminated through publications in reputable journals, highlighting the contributions of individual researchers and academic institutions. Such publications are vital for sharing information and keeping the scientific community informed about the latest advancements in the field. Bibliometric studies serve as an accurate measure of a nations or organization's research output in various disciplines, offering insights into productivity and impact within the scientific community.[9]With the advancement of the technological age, a wealth of medical databases has become available online, featuring subject-specific search functions and citation analysis tools. Numerous journals can be accessed through platforms like PubMed and ScienceDirect, simplifying keyword and citation searches. These platforms offer various search options, including advanced, author, basic, rapid, and source searches.

Over the past 20 years, Saudi Arabia has made significant investments to enhance research and higher education (Alhaider et al., 2015). Consequently, a considerable body of research on non-alcoholic fatty liver disease (NAFLD) has been produced by academics in the Kingdom. This study aims to analyze NAFLD-related publications from Saudi Arabia that were published between 1995 and 2024, utilizing the PubMed and ScienceDirect databases.

2. MATERIALS AND METHODS:

Bibliometric indicators from the PubMed and ScienceDirect databases were utilized to examine research publications authored by various scholars from different institutions in the Kingdom of Saudi Arabia. The PubMed Central (PMC) archive has expanded significantly, now encompassing papers from thousands of publications, originally starting with just two journals: *PNAS: Proceedings of the National Academy of Sciences* and *Molecular Biology of the Cell*. Established in 2000, the PubMed database also includes preprints collected by the NIH Preprint Pilot and articles submitted through the NIH Manuscript Submission System (NIHMS).

The PMC repository contains approximately 10 million full-text article records, spanning several centuries of biomedical and life science research, from the late 1700s to the present. This extensive collection includes preprint versions of articles made public before peer review, author papers that have undergone peer review and been accepted for publication, and formally published articles in academic journals. It features around 35,000 titles from approximately 12,000 publishers, with about 34,000 of these being peer-reviewed journals covering a wide range of subjects, including the physical and biological sciences, health sciences, and life sciences. The National Library of Medicine (NLM) updates the repository daily with new, revised, and removed citations.

For the present study, the search string "NAFLD" OR "NAFL" OR "Fatty Liver" OR "Non-Alcoholic Steatohepatitis (NASH)" AND AFFIL (Saudi AND Arabia) was used to retrieve articles from the PubMed Central and ScienceDirect databases. Boolean operators facilitated this systematic bibliometric analysis. The retrieved data were sorted by year of publication, source of funding, collaboration with other countries and universities, and subject matter. Various tools available in the PubMed database were employed to analyse these parameters effectively.

The obtained data were categorized by year of publication, source of funding, collaboration with other countries and universities, and subject matter. Various data analysis tools available in the PubMed database were utilized to analyze these parameters effectively.

3. RESULTS

A total of 206 papers covering a 17-year period were identified through searches in PubMed. Notably, there has been a significant increase in the number of publications on NAFLD over the past decade (see Figure 1). Between 2008 and 2019, only 46 publications were recorded. However, since 2020, there has been a substantial rise in the volume of publications, with 2022 and 2023 being the most productive years, contributing a total of 160 publications.

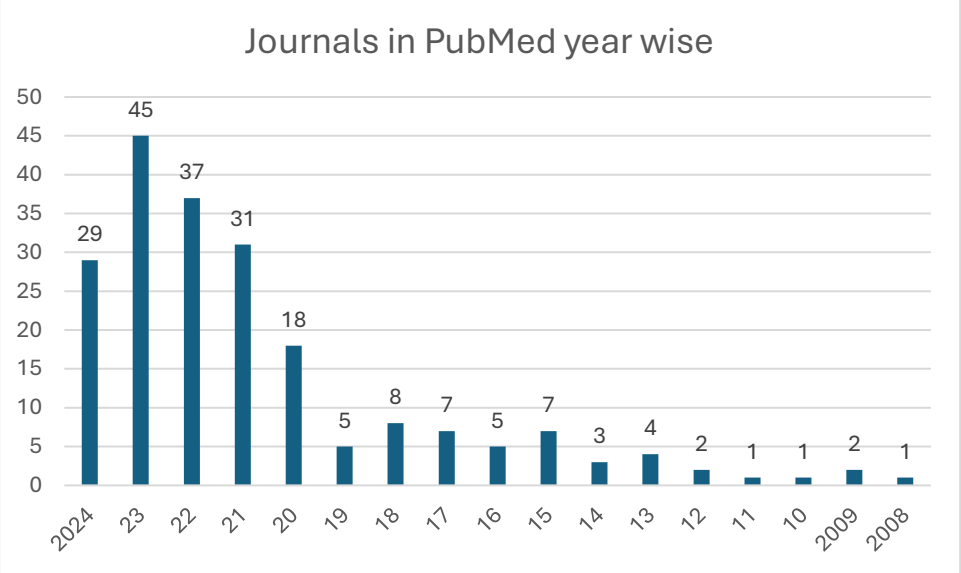


Fig 1: Year-Wise Distribution of the Number of Publications on NAFLD from Saudi Arabia in PubMed

A total of 364 papers from the 17-year period between 2008 and 2024 were identified through a search on ScienceDirect. Over the past decade, there has been a notable increase in publications related to NAFLD. Between 2008 and 2009, only 36 papers were published, followed by a decline over the next five years, with just 33 publications in total. However, since 2015, the number of publications has gradually increased, reaching a peak in 2023 and 2024 with 295 papers published in these two years alone.

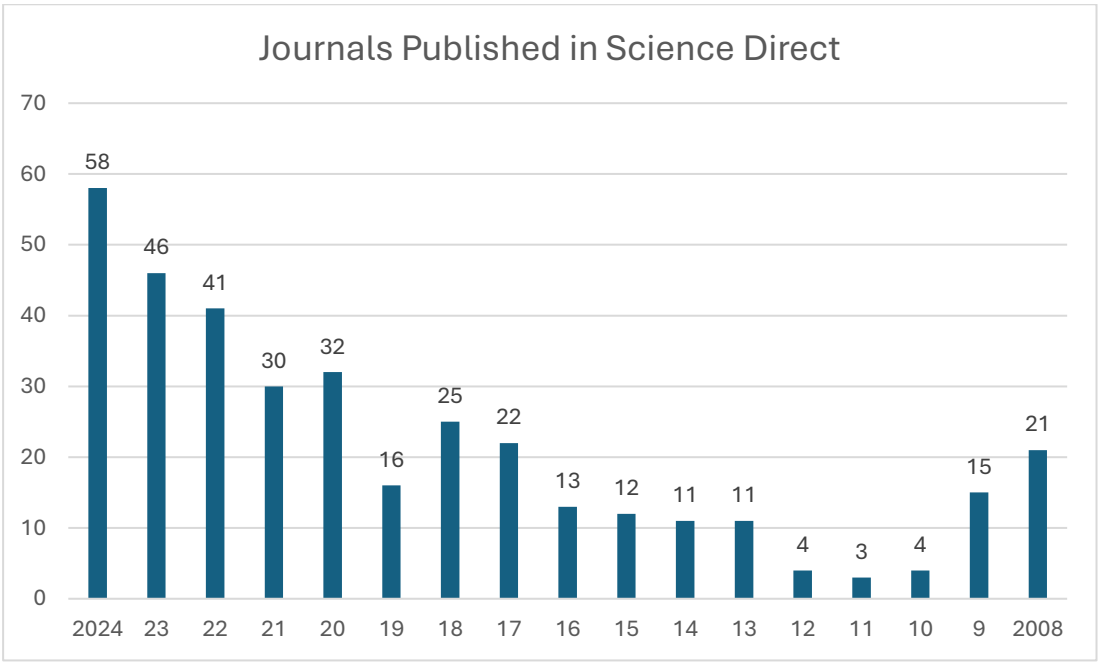
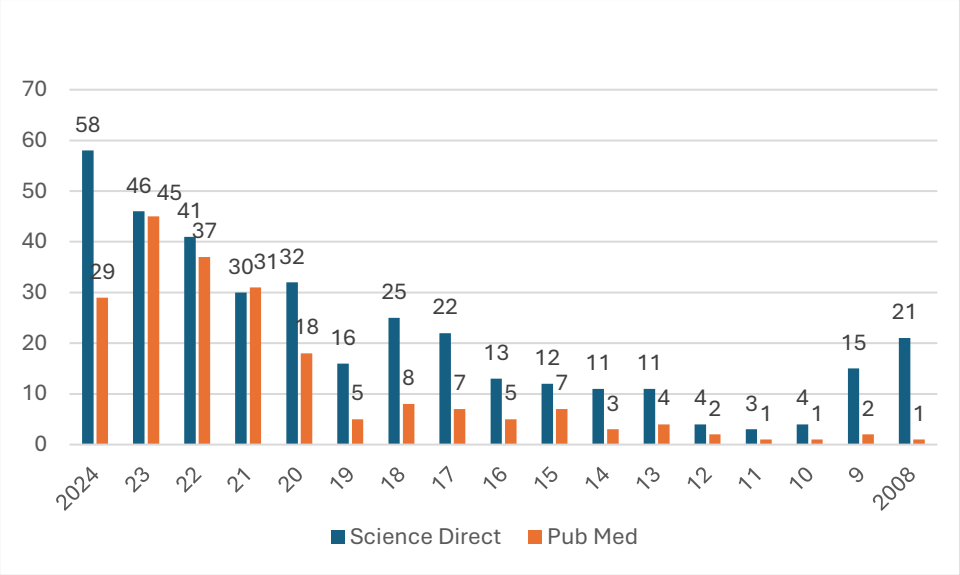


Fig 2: Year-Wise Distribution of the Number of Publications on NAFLD from Saudi Arabia in Science direct

The comparison of published journals in both databases is given in fig-3.



The analysis showed that 248 documents (44%) were original research articles, while 125 (22%) were reviews. The remaining documents were categorized as follows: 67 conference papers (12%), 49 meta-analyses (9%), 13 encyclopedia entries (2%), 50 book chapters (9%), and 18 short surveys (3%).

Table 1: Distribution of the Search Results Based on the Document Type

S.No	Document Type	PubMed	Science Direct	Total	Total Percentage
1	Review Articles	41	84	125	22%
2	Research Articles	117	131	248	44%
3	Book chapters	6	44	50	9%
4	Encyclopedia	5	8	13	2%
5	Conference abstracts	9	58	67	12%
6	Short survey	10	8	18	3%
7	Meta analysis	18	31	49	9%

The manuscripts were published up to 570 in different journals. The maximum number of articles published for both data base with journal names have been given in Table 2

Table2: Number of Publication on NAFLD Research Papers from Saudi Arabia Based on the Journal Title

S.No	**Journal Title- PubMed**	**No. of publications**	**Journal Title (Science Direct)**	**No.Of Publications**
1	Saudi Gastroenterol	15	Academic Press	24
2	Nutrients	7	Gastroenterology,	24
3	Cureus	7	Journal of Hepatology,	16
4	Sci Rep	5	Saudi Journal of Biological Sciences	13
5	Int J Mol Sci	5	The American Journal of Medicine	13
6	World J Hepatol	5	Clinical Gastroenterology and Hepatology,	12

7	PLoS One	4	Diabetes & Metabolic Syndrome: Clinical Research & Reviews,	7
8	Saudi J Biol Sci	4	Journal of Clinical and Experimental Hepatology	6
9	Biomed Pharmacother	4	Modern Pathology	5
10	Pharmaceuticals (Basel)	3	Journal of Ethnopharmacology	4

In the overall PubMed publications, Alqahtani SA has published 6 papers in this area and Lazarus JV has 5 maximum publications , Younossi ZM has 4 number of publications and Collison KS has 4 publications. Additionally, the authors were also checked for their universities/institutions are listed in Table 3. The highest number of authors were affiliated with King Saud University (45%), followed by King Abdulaziz University (14%), then King Faisal Specialist Hospital and Research Centre (12%) and King Saud University College of Applied Medical Sciences (6%). The highest affiliated university is King Saudi University.

Table: 3 Top Institutional Affiliations of Research papers on NAFLD

S.No	Affiliation Number percentage	Science Direct	PubMed	Total Percentage
1	King Saud University	164	92	45%
2	Jazan University	2	6	1%
3	King Abdulaziz University	47	33	14%
4	King Faisal Specialist Hospital and Research Centre	38	29	12%
5	Taibah University	7	5	2%
6	King Saud University College of Applied Medical Sciences	24	8	6%
7	King Khalid University	33	18	9%
8	Imam Abdulrahman Bin Faisal university	4	5	2%

Among the 570 papers on NAFLD were published under 25 different departments/subjects. The maximum articles were authored by the Medicine Department followed by Biochemistry, Molecular Biology, Chemistry, Agricultural and Biological sciences, Agricultural and Biological sciences, Nursing and Health promotions and Pharmacology. (Table 6).

Table 4 : Subject-Wise Distribution of the Publications on NAFLD in Saudi Arabia

Sr. no.	Subject Area	PubMed	Science Direct
1	Medicine and Dentistry	83	112
2	Biochemistry,Genetics and Molecular Biology	21	68
3	Pharmacology, Toxicology	10	55
4	Environmental Science	6	30
5	Nursing and Health Professions	20	30
6	Agricultural and Biological sciences	22	24

7	Chemistry	13	14
8	Immunology and Microbiology	14	13
9	Neuro science	4	11
10	Others	13	7

4. DISCUSSION

The objective of this study was to assess the volume of research on Non-alcoholic Fatty Liver Disease (NAFLD) from Saudi Arabia published between 2008 and 2024. A keyword search was conducted using the PubMed and ScienceDirect databases. The search results were categorized by subject, year of publication, document type, journal name, author name, author affiliation, and collaboration with universities.

PubMed offers a significant advantage over databases like Scopus and Web of Science by quickly updating with both printed and early online versions of publications from various journals. It includes journals covering core clinical subjects, dentistry, nursing, space and life sciences, biomedicine, medicine, and bioethics. On the other hand, ScienceDirect is a comprehensive bibliographic database spanning scientific, medical, and humanities fields, offering access to more than 2,500 peer-reviewed journals, over 18 million articles and chapters, and more than 42,000 e-books [12].

The literature search revealed that no previous studies have evaluated the growth of NAFLD research in Saudi Arabia. This study shows a substantial increase in NAFLD publications from the Kingdom over the past decade. The growing interest of Saudi Arabian researchers in Nonalcoholic Fatty Liver Disease (NAFLD) is noteworthy. In Saudi Arabia, the most common forms of NAFLD include Metabolic Dysfunction-Associated Steatotic Liver Disease (MASLD), Alcohol-Related Fatty Liver Disease (ALD), and enlarged fatty liver, in that order.

The burden of NAFLD-related liver disease could reach significant levels in Gulf countries, which have relatively young populations. This demographic suggests that the rates of advanced liver disease may be low soon but could rise dramatically in the coming decades. Childhood and adolescent obesity, already at epidemic levels in Saudi Arabia, the UAE, and other Arab nations, is increasing rapidly . [10,11]

Globally, the Middle East has the second-highest prevalence of NAFLD. From 1990 to 2017, Saudi Arabia and other Gulf nations had the highest prevalence rates of the disease, according to an observational study by Ge et al. (2020) . Alswat et al. (2018) projected that by 2030, NAFLD would affect 30% of the Saudi population . To better address this growing health issue, it is crucial to study the incidence and prevalence of NAFLD across different regions of Saudi Arabia.

In their study, Alenezi Yusf et al. found that the prevalence of NAFLD in adult populations was 16.8% (ranging from 11.1% to 22.5%) based on eight trials with a total of 4,045 participants. Among individuals with type 2 diabetes, the prevalence was 58.0% (45.0%–70.9%). However, no reliable general population studies on NAFLD prevalence in Saudi Arabia are currently available. This review highlights that type 2 diabetes is a significant risk factor for NAFLD in the country .

Gadah Mujlli's research revealed that obese children and adolescents are more prone to developing NAFLD than their non-obese counterparts. The study also found that NAFLD was more prevalent in male patients than in female patients. Additionally, obese patients were more likely to exhibit advanced stages of NAFLD compared to non-obese patients. Most participants in the study were diagnosed with moderate-stage NAFLD, though a small number progressed to nonalcoholic steatohepatitis (NASH) .[16]

The study further indicated that NAFLD diagnoses were more common in children over the age of ten. This finding aligns with the conclusions of many other investigations, which have shown that the risk of developing NAFLD increases by 20% in patients under the age of 20 . [17]

5. CONCLUSIONS

To prevent a significant rise in end-stage liver disease and related mortality, effective interventions for the prevention and treatment of NAFLD and NASH are urgently needed. Recent evidence highlights NASH's growing contribution to liver transplantation, signalling an increasing future disease burden.

In this study, only PubMed and ScienceDirect databases were utilized; however, future research could benefit from incorporating bibliographic citations from additional sources such as Web of Science and Google Scholar. While this study was quantitative, a more thorough qualitative review of papers on specific subjects would provide deeper insights. The findings of this report underscore the substantial interest of Saudi researchers in NAFLD.

The significant increase in NAFLD-related publications from Saudi Arabia over the past decade serves as a timely alert to the global rise in NAFLD among both children and adults. This alarming trend suggests that now is the ideal time for further

analytical epidemiological studies to identify potential risk factors contributing to the increase in NAFLD in the Saudi population. Such efforts should also aim to raise awareness among children and adults at early stages to help curb the progression of the disease.

REFERENCES

[1] Alenezi YM, Harris R, Morling J, Card T. Prevalence of Non-alcoholic Fatty Liver Disease (NAFLD) in Saudi Arabia: Systematic Review and Meta-analysis. Cureus. 2023 Jun 12;15(6):e40308. doi: 10.7759/cureus.40308. PMID: 37448425; PMCID: PMC10337700.

[2] Alswat K, Aljumah AA, Sanai FM, Abaalkhail F, Alghamdi M, Al Hamoudi WK, Al Khathlan A, Al Quraishi H, Al Rifai A, Al Zaabi M, Babatin MA, Estes C, Hashim A, Razavi H. Nonalcoholic fatty liver disease burden - Saudi Arabia and United Arab Emirates, 2017-2030. Saudi J Gastroenterol. 2018 Jul-Aug;24(4):211-219. doi: 10.4103/sjg.SJG_122_18. Erratum in: Saudi J Gastroenterol. 2018 Jul-Aug;24(4):255. doi: 10.4103/1319-3767.237645. PMID: 29956688; PMCID: PMC6080149.

[3] Abdulhakeem S. Alamri, Majid Alhomrani, Walaa F. Alsanie, Ahmad Joman Alghamdi, Zaher M. Alghamdi, Abdualmohsen A. Al-Subaie, Yasser A. Alharthi, Hesham H. Alqurashi, Syed Mohammed Basheeruddin Asdaq, "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, Volume 28, Issue 9, 2021,Pages 4921-4925, ISSN 1319-562X, https://doi.org/10.1016/j.sjbs.2021.05.063.

[4] Younossi ZM, Otgonsuren M, Henry L, Venkatesan C, Mishra A, Erario M, et al. Association of nonalcoholic fatty liver disease (NAFLD) with hepatocellular carcinoma (HCC) in the United States from 2004 to 2009. Hepatology. 2015;62:1723–30. [PubMed] [Google Scholar]

[5] Sanyal A, Poklepovic A, Moyneur E, Barghout V. Population-based risk factors and resource utilization for HCC: US perspective. Curr Med Res Opin. 2010;26:2183–91. [PubMed] [Google Scholar]

[6] Loomba R, Sanyal AJ. The global NAFLD epidemic. Nat Rev Gastroenterol Hepatol. 2013;10:686–90.

[7] Chalasani N, Younossi Z, Lavine JE, Diehl AM, Brunt EM, Cusi K, et al. The diagnosis and management of non-alcoholic fatty liver disease: Practice guideline by the American Gastroenterological Association, American Association for the Study of Liver Diseases, and American College of Gastroenterology. Gastroenterology. 2012;142:1592–609. [PubMed] [Google Scholar]

[8] EASL-EASD-EASO Clinical Practice Guidelines for the management of non-alcoholic fatty liver disease. Diabetologia. 2016;59:1121–40. [PubMed] [Google Scholar]

[9] Foy JP, Bertolus C, Goudot P, et al (2018). Bibliometric analysis of a century of research on oral erythroplakia and leukoplakia. J Oral Pathol Med, 47, 388-95.

[10] Al-Muhaimeed AA, Dandash K, Ismail MS, Saquib N. Prevalence and correlates of overweight status among Saudi school children. Ann Saudi Med. 2015;35:275–81.

[11] Shaikh MA, Al Sharaf F, Shehzad K, Shoukat F, Naeem Z, Al Harbi S, et al. Prevalence and trends of overweight and obesity amongst Saudi school children, a study done by using three noninvasive methods. Int J Health Sci (Qassim) 2016;10:381–7.

[12] ScienceDirect.com | Science, health and medical journals, full text articles and books. Accessed May 11, 2021. https://www.sciencedirect.com/

[13] Younossi ZM, Otgonsuren M, Henry L, Venkatesan C, Mishra A, Erario M, et al. Association of nonalcoholic fatty liver disease (NAFLD) with hepatocellular carcinoma (HCC) in the United States from 2004 to 2009. Hepatology. 2015;62:1723–30.

[14] Loomba R, Sanyal AJ. The global NAFLD epidemic. Nat Rev Gastroenterol Hepatol. 2013 Nov;10(11):686-90. doi: 10.1038/nrgastro.2013.171. Epub 2013 Sep 17. PMID: 24042449.

[15] Ge et al., 2020 X. Ge, L. Zheng, M. Wang, Y. Du, J. Jiang Prevalence trends in non-alcoholic fatty liver disease at the global, regional and national levels, 1990–2017: a population-based observational study, BMJ Open, 10 (8) (2020), Article e036663, 10.1136/bmjopen-2019-036663

[16] Mujlli G, Mahzari M, Alslamah I, Syed J, Omair A, Abulmeaty M, Aldisi D. Non-alcoholic Fatty Liver in Children and Adolescents in Saudi Arabia. Cureus. 2023 Oct 2;15(10):e46380. doi: 10.7759/cureus.46380. PMID: 37927726; PMCID: PMC10620069.

[17] Anderson EL, Howe LD, Jones HE, Higgins JP, Lawlor DA, Fraser A: The prevalence of non-alcoholic fatty liver disease in children and adolescents: a systematic review and meta-analysis. PLoS One. 2015, 10:e0140908. 10.1371/journal.pone.0140908

[18] Tilg H, Moschen AR, Roden M: NAFLD and diabetes mellitus. Nat Rev Gastroenterol Hepatol.

[19] Tanase DM, Gosav EM, Costea CF, et al.: The intricate relationship between type 2 diabetes mellitus (T2DM), insulin resistance (IR), and nonalcoholic fatty liver disease (NAFLD). J Diabetes Res. 2020, 2020:3920196.