Assiri A., et al. Yemeni J Med Sci. 2024; 18: 53 - 59
https://doi.org/10.20428/yjms.v18i1.2598
https://journals.ust.edu/index.php/yjms

ORIGINAL ARTICLE OPEN ACCESS

Assessment of Physician Knowledge and Practices Regarding Familial Hypercholesterolemia Screening and Management: A Survey Study

Ammar Assiri [1], Hamedah Nasr [1], Rana Alshamsani [1], Ebrahim Afef [1], Abdulrahman Abdulaziz [1], Sultan Al-Qattibi [1], Terteel Adnan [1], Amat Alrhman Mohammed [1], Afnan Abdulrab [1], Fares M.S Muthanna [1]

[1] *Department Basic Medical Science, Faculty of Medicine and Health Science , University of Science & Technology , Aden , Yemen*

ABSTRACT

Familial hypercholesterolemia (FH) is a hereditary illness characterized by high low-density lipoprotein (LDL) cholesterol, greatly boosting the risk of early cardiovascular diseases (CVD). This cross-sectional study assessed the knowledge, attitudes, and practices of 100 physicians in Aden, Yemen, from June to August 2023. Participants consisted of 65% females and 35% males, with 54% having more than five years of clinical experience and 56% working in private facilities. The survey revealed that 91% of physicians recognized familial hypercholesterolemia (FH) as a hereditary illness associated with elevated LDL cholesterol levels; however, only 53% were familiar with the diagnostic criteria, and 63% with the clinical detection algorithms. Routine assessment of familial hypercholesterolemia risk factors, such as a family history of early-onset cardiovascular disease, was reported by 49%, while only 28% consistently evaluated these risk factors. While 77% of physicians deemed familial hypercholesterolemia screening essential for patients with elevated LDL cholesterol, only 47% expressed confidence in identifying at-risk individuals. Physicians with more than five years of experience displayed greater awareness of familial hypercholesterolemia diagnostic criteria (60%) and were more willing to routinely assess familial risk factors (56%) compared to their less experienced counterparts (50% and 44%, respectively).

Despite significant awareness of familial hypercholesterolemia (FH) and its health implications, notable shortcomings were observed in the comprehension of diagnostic criteria, cascade screening, and adherence to screening protocols. Experienced physicians exhibited enhanced knowledge and confidence, underscoring the need of specialized training programs. Improving FH screening systems is critical for advancing patient care in Yemen and analogous countries.

Keywords: Familial hypercholesterolemia (FH) , Knowledge , Practices , Management , Aden, Yemen.

**** Corresponding author:*** *fares.mu.wu@gmail.com*

https://doi.org/10.20428/yjms.v18i1.2598
https://journals.ust.edu/index.php/yjms

INTRODUCTION

Familial hypercholesterolemia (FH) is a hereditary lipid disorder characterized by markedly elevated low-density lipoprotein cholesterol (LDL-C) levels, which significantly increase the risk of early-onset cardiovascular diseases (CVD), such as coronary artery disease (CAD) and stroke [1, 2]. The condition predominantly arises from mutations in genes associated with cholesterol metabolism, particularly the LDL receptor (LDLR) gene, and, less commonly, the APOB and PCSK9 genes [3]. If untreated, FH can lead to early cardiovascular events, often manifesting in childhood or adolescence, and is associated with a heightened lifelong risk of CVD [4].

Globally, FH affects approximately 1 in 250 individuals but remains underdiagnosed and inadequately treated, particularly in low- and middle-income countries [5]. Early identification and management of FH are crucial, as statin therapy and other lipid-lowering strategies can significantly reduce the risk of atherosclerotic cardiovascular disease (ASCVD). Despite guidelines recommending screening for individuals with a familial predisposition to early-onset CVD or hypercholesterolemia, research suggests that up to 90% of FH patients remain untreated [6].

The diagnosis of FH typically relies on clinical criteria, including elevated LDL-C levels, a family history of hypercholesterolemia, and physical findings such as xanthomas, with genetic testing used for confirmation [7]. Cascade screening, which involves identifying and testing first-degree relatives of affected individuals, is a vital public health strategy proven to prevent early cardiovascular events. However, its implementation is often limited by inadequate awareness and healthcare infrastructure [8].

Results from a study conducted in Yemen by A. A. [9] to investigate the relationship between body mass index (BMI) and lipid profiles among teaching staff at the Higher Institute of Health Sciences in Sana'a demonstrated a significant correlation between BMI and triglyceride (TG) levels. These findings underscore the interplay between lipid metabolism and cardiovascular risk factors in the Yemeni context, highlighting the importance of comprehensive lipid management strategies.

This study aims to assess the knowledge, attitudes, and practices of physicians in Aden, Yemen, regarding FH screening and management, while analyzing the impact of demographic factors such as years of experience and hospital type on their practices.

METHODS AND MATERIALS

Study Design

This cross-sectional survey was done from June to August 2023 in Aden, Yemen, with 100 physicians working in governmental and private institutions. Participants were chosen using convenience sampling, with eligibility criteria comprising active clinical practice and a minimum of one year of patient care experience. Physicians lacking direct patient care experience or with less than one year of clinical experience were eliminated.

Sample Size

The research encompassed 100 physicians in Aden, Yemen, employing convenience sampling to guarantee extensive representation of healthcare practitioners. The cross-sectional methodology facilitated diverse responses and a dependable evaluation of physicians' knowledge and practices on FH screening and management. The sample size was sufficient to identify trends and knowledge gaps.

Study Design

The survey utilized in this research was created by the authors and validated via a pilot study to confirm its clarity, reliability, and pertinence. The assessment comprised multiple-choice and Likert-scale questions focused on three principal domains: (1) comprehension of familial hypercholesterolemia (FH), encompassing its genetic foundation,

https://doi.org/10.20428/yjms.v18i1.2598
https://journals.ust.edu/index.php/yjms

diagnostic criteria, and related health risks; (2) clinical approaches, including the application of clinical algorithms and cascade screening; and (3) confidence in diagnosing and managing FH, especially regarding the initiation of lipid-lowering therapies. The obtained demographic data included the physician's age, gender, years of clinical experience, and kind of hospital (public or private).

Data Collection Procedures

The data collection process was place from June to August 2023, utilizing both electronic and paper-based survey methods to enhance response rates. The electronic survey was disseminated through email and other media platforms, mainly aimed at professional groups and mailing lists widely utilized by healthcare personnel in Aden. This method assured the participation of physicians from varied medical disciplines and practice areas. Additionally, hardcopy copies of the survey were distributed in hospitals across the city to accommodate persons without reliable access to digital platforms or those who preferred paper surveys. The survey was offered in Arabic and English to improve accessibility and mitigate language obstacles. To maintain anonymity and confidentiality, responses were collected through an online survey tool that ensured participants' identities were not linked to their responses. The survey was designed to be concise and took approximately 10-15 minutes to complete. All participants were informed of the study's aims and objectives, with implicit consent obtained upon the submission of the completed survey. Participants who obtained physical copies were instructed to submit their completed questionnaires directly to the research team. Follow-up reminders were communicated by email and phone calls to encourage participation and improve response rates, particularly in the private hospital setting, where engagement was initially inadequate.

Statistical Examination

Descriptive statistics were employed to summarize responses, categorizing Likert scale data as "Disagree," "Neutral," "Agree," and "Strongly Agree." The correlation between demographic variables (e.g., years of experience and hospital type) and physicians' knowledge and practices was evaluated by chi-square tests. A p-value of less than 0.05 was deemed statistically significant.

Ethical Approval

Approval for the study was secured from the Rthical Committee of the University of Sciences and Technology Aden Yemen , with Ethical Approval number MEC No/AD037. Approval was requested from the school administration, and verbal consent was acquired from the participants. Data collection complied with the norms of confidentiality and participant anonymity.

RESULTS

Demographic Characteristics

One hundred physicians participated in the survey. Among these, 65% were female and 35% were male. Regarding clinical experience, 54% possessed over five years of practice, whereas 46% had less than five years. Fifty-six percent were employed in private hospitals, while forty-four percent were in state hospitals.

Table 1 : Demographic variables n = 100

		N (%)
Gender	males	43 (43%)
	females	57 (57%)
Years of experiences	Greater than or equal to 5 years	54.0 (54%)
	Less than 5 years	46.0 (46%)
Clinic	Private	56.0 (56%)
	Public	44.0 (44%)
Age	Elderly	35 (35 %)
	Adults	65 (65 %)

Physician Awareness of Familial Hypercholesterolemia

Ninety-one percent of physicians recognized familial

https://doi.org/10.20428/yjms.v18i1.2598
https://journals.ust.edu/index.php/yjms

hypercholesterolemia (FH) as a genetic disorder associated with elevated LDL cholesterol levels; however, only 53 % were familiar with the diagnostic criteria, and 63 % were aware of the clinical algorithms for identifying FH. Although 95% acknowledged the potential health risks linked to untreated familial hypercholesterolemia (FH), merely 62% were cognizant of cascade screening as a preventive measure. Despite these knowledge gaps, a significant majority (81%) expressed confidence in their ability to identify individuals at risk for familial hypercholesterolemia (FH).

Physician Approaches to FH Screening and Management

Routine assessment for familial hypercholesterolemia risk factors, including a familial history of early-onset cardiovascular disease, was suggested by 49% of individuals. While 47% showed confidence in identifying patients at risk for familial hypercholesterolemia (FH), barely 28% consistently analyzed FH risk factors, and 77% judged FH screening important for patients with increased LDL cholesterol levels. Notably, physicians in private hospitals had a marginally higher propensity to evaluate familial history risk factors (52%) and demonstrated greater confidence in identifying at-risk patients (51%) than their counterparts in public hospitals (45% and 43%, respectively), but this disparity lacked statistical significance.

Correlation Between Demographics and Knowledge/Practice

Physicians with over five years of experience had superior knowledge of FH diagnostic criteria (60%) relative to those with fewer than five years of experience (50%). Likewise, seasoned physicians were more inclined to indicate regular evaluation of familial history risk factors (56%) in contrast to their less experienced peers (44%).

Data were collected from 60 women aged 16 to 40, randomly selected from students and staff members of the University of Science and Technology, Aden, Yemen. A structured questionnaire was used to gather information on PCOS prevalence and associated factors, including age, social status, presence of PCOS symptoms, and family history.

Table 2: Assessment of Physician Knowledge and Practices Regarding Familial Hypercholesterolemia Screening and Management: A Survey Study

	Strongly agree	Agree	Neutral	**Disagree**
1. Familial hypercholesterolemia (FH) is a common genetic disorder characterized by elevated LDL cholesterol levels?	47%	44%	5%	**4%**
2. I am familiar with the diagnostic criteria for FH?	31%	39%	26	**4**
3. I understand the potential health risks associated with untreated FH?	53.%	42.%	5.%	**0**
4. I am aware of the different clinical algorithms used to identify potential FH cases?	29.%	34.%	25.%	**12%**
5. I am familiar with the concept of cascade screening for FH in families?	21.%	41.%	28.%	**1%**
6. I am confident in my ability to identify patients at risk for FH?	33.%	48.%	16.%	**3.%**
7. I routinely assess patients for risk factors of FH, such as family history of early-onset heart disease?	47.%	42.%	8%	**3%**

https://doi.org/10.20428/yjms.v18i1.2598
https://journals.ust.edu/index.php/yjms

8.	I consider FH screening in my practice for patients with high LDL cholesterol levels?	28.%	49.%	19.%	4.%
9.	I am familiar with and utilize appropriate tools and resources for FH diagnosis?	35.%	38.%	24%	3%
10.	I am comfortable discussing the diagnosis and implications of FH with patients?	42.%	37.%	17%	4%
11.	I typically refer patients with suspected FH to specialists for further evaluation and management?	54.%	3%.%	15%	1%
12.	I am familiar with the current guidelines for the management of FH?	34.%	46.%	15.%	5.%
13.	I consider lifestyle modifications (e.g., diet, exercise) as an important component of FH management?	54.%	37.%	6.%	3.%
14.	I am comfortable initiating and managing statin therapy for patients with FH?	33.%	39.%	25%	35%
15.	I am aware of and consider using other lipid-lowering medications, such as PCSK9 inhibitors, in specific FH cases?	24.%	42.%	31.%	3.%
16.	I monitor patients with FH for potential side effects of lipid-lowering medications?	42.%	38.%	12%	0%

DISCUSSION

This study's findings show serious gaps in doctors' understanding and practices about the diagnosis and therapy of FH in Aden, Yemen. Despite the recognition of familial hypercholesterolemia (FH) as a genetic disorder and its associated cardiovascular risks by most practitioners, many lacked proficiency in the diagnostic criteria, clinical algorithms, and cascade screening techniques. This aligns with findings from other regions, where knowledge shortages hinder the effective implementation of FH screening and management [1]. The survey reveals that, although doctors are confident in recognizing at-risk patients, the consistent implementation of recommended measures, such as assessing family history and initiating screening, is insufficient. This corresponds with global trends, where structural barriers such as time constraints, resource restrictions, and insufficient referral channels obstruct the integration of FH screening into standard care [11]. The results demonstrate that more seasoned physicians typically have enhanced performance in both knowledge and practice, highlighting the importance of ongoing education and professional growth.

The discrepancies between physicians in private and public hospitals underscore inequities in healthcare resources, with private hospital physicians often exhibiting higher confidence and superior practices. This gap underscores the need for institutional reforms to ensure equitable access to diagnostic tools and training for all healthcare professionals, regardless of their practice setting.

The research reveals that while many healthcare professionals in Aden, Yemen, acknowledge familial hypercholesterolemia (FH), significant deficiencies exist in their knowledge and practices. The discrepancies in the implementation of diagnostic criteria and clinical algorithms underscore the need for enhanced education and training. A similar study conducted in Pakistan by Jafar et al. [12] assessed practitioners' comprehension and behaviors regarding familial hypercholesterolemia (FH). The results revealed that 87% of physicians recognized familial hypercholesterolemia (FH) as a genetic condition linked to elevated LDL cholesterol; however, only 45% were aware of its diagnostic criteria, and only 3%%

adhered to the recommended screening standards. These findings closely align with the situation in Aden, Yemen, where awareness of FH is rather high, although the application of diagnostic and management strategies remains inadequate. Both findings underscore the critical necessity for specialized training programs to improve physician competence in the management and screening of familial hypercholesterolemia (FH).

A study in the Netherlands by Versmissen et al. [13] demonstrated a high proficiency among physicians in detecting and managing familial hypercholesterolemia (FH). This accomplishment was attributed to mandatory continuing medical education (CME) sessions and a comprehensive cascade screening system. Dutch physicians exhibited a 9%% adherence rate to clinical guidelines for familial hypercholesterolemia screening and treatment, underscoring the effectiveness of structured training and healthcare policy integration in addressing gaps between knowledge and practice. The outcomes in Aden, Yemen, mirror those in Pakistan, where insufficient training and limited resources resulted in shortcomings in comprehension and execution. The Dutch study underscores that structured education and robust infrastructure can mitigate these challenges. This gap shows that strengthening medical curriculum, introducing CME programs, and developing cascade screening systems could considerably enhance FH management in Yemen and other resource-constrained environments.

The research revealed a disparity between physicians in private and public institutions, with private hospitals exhibiting greater confidence in identifying at-risk patients owing to superior access to resources, ongoing professional development opportunities, and a more patient-centered methodology. Comparable difficulties have been documented in various low- and middle-income nations, including India and South Africa. To rectify these inadequacies, targeted educational initiatives and clinical guidelines are required. Ongoing medical education programs must educate healthcare practitioners on the newest breakthroughs in familial hypercholesterolemia diagnosis and management, and efforts should be made to enhance access to diagnostic testing and specialist care. National familial hypercholesterolemia registries and population-based screening initiatives can enhance screening and care strategies for familial hypercholesterolemia. Public health initiatives can enhance awareness of familial hypercholesterolemia and promote early detection and intervention.

CONCLUSION

This study highlights considerable deficiencies in the knowledge and practices of physicians in Aden, Yemen, concerning familial hypercholesterolemia screening and care. Despite heightened awareness of FH as a genetic disorder, insufficient knowledge of clinical algorithms and cascade screening impedes optimal patient management. Targeted educational efforts, enhancements in healthcare infrastructure, and the incorporation of FH screening into comprehensive cardiovascular disease preventive strategies are essential for advancing diagnosis and management in Yemen. Confronting these obstacles is crucial for alleviating the burden of FH-related cardiovascular illnesses in resource-constrained environments.

REFERENCES

[1] Bianconi V, Banach M, Pirro M, Panel IL. Why patients with familial hypercholesterolemia are at high cardiovascular risk? Beyond LDL-C levels. Trends in Cardiovascular Medicine. 2021 May 1;31(4):205-15.

[2] Al-yumaini A, Mohammed M, Khaled A, Al-ozybi A, Mohammed A, Fouad Q, Abdullah S, Muthanna FM. Knowledge and Practice of Yemeni Physicians Regarding Management of Angiotensin-Converting Enzyme Inhibitor (ACEI)-Induced Cough: A Cross-Sectional Study among public and private hospitals-Aden, Yemen. Medical Science and Academic Journal-Multidisciplinary. 2024 Aug 12;1(1):1-8.

[3] Chora JR, Medeiros AM, Alves AC, Bourbon M. Analysis of publicly available LDLR, APOB, and PCSK9 variants associated with familial hypercholesterolemia: application of ACMG guidelines and implications for familial hypercholesterolemia diagnosis. Genetics in Medicine. 2018 Jun 1;20(6):591-8.

[4] Cohen H, Stefanutti C, Mighty Medic Satellite Research Group for Pediatric Dyslipidemia Serafina Di Giacomo Claudia Morozzi Kurt Widhalm Bojko B. Bjelakovic Andrea Berni Francesco Martino Giovanna Bosco. Current approach to the diagnosis and treatment of heterozygote and homozygous FH children and adolescents. Current Atherosclerosis Reports. 2021 Jun;23:1-4.

[5] Murphy A, Faria-Neto JR, Al-Rasadi K, Blom D, Catapano A, Cuevas A, Lopez-Jimenez F, Perel P, Santos R, Sniderman A, Sy R. World heart federation cholesterol roadmap. Global heart. 2017 Sep 1;12(3):179-97.

[6] Peterson AL, McNeal CJ, Wilson DP. Prevention of atherosclerotic cardiovascular disease in children with familial hypercholesterolemia. Current Atherosclerosis Reports. 2021 Oct;23(10):64.

[7] Najam O, Ray KK. Familial hypercholesterolemia: a review of the natural history, diagnosis, and management. Cardiology and therapy. 2015 Jun;4:25-38.

[8] Knowles JW, Rader DJ, Khoury MJ. Cascade Screening for Familial Hypercholesterolemia and the Use of Genetic Testing. JAMA. 2017 Jul 25;318(4):381-382. doi: 10.1001/jama.2017.8543. PMID: 28742895; PMCID: PMC6166431.

[9] Alhaj A. Relationship of Body Mass Index with lipid profile among teaching staff at the Higher Institute of Health Sciences, Sana'a. Yemeni Journal for Medical Sciences. 2013;7(1):14-9.

[10] Lipu MH, Hannan MA, Karim TF, Hussain A, Saad MH, Ayob A, Miah MS, Mahlia TI. Intelligent algorithms and control strategies for battery management system in electric vehicles: Progress, challenges and future outlook. Journal of Cleaner Production. 2021 Apr 10;292:126044.

[11] Alsaidan AA. Knowledge, attitude, and practice of physicians towards familial hypercholesterolaemia in north regions of Saudi Arabia. Journal of Pakistan Medical Association. 2024 Feb 29;74(2):327-.

[12] : Broekhuizen K, van Poppel MN, Koppes LL, Brug J, van Mechelen W. A tailored lifestyle intervention to reduce the cardiovascular disease risk of individuals with Familial Hypercholesterolemia (FH): design of the PRO-FIT randomised controlled trial. BMC Public Health. 2010 Dec;10:1-0.

[13] Becker F, Van El CG, Ibarreta D, Zika E, Hogarth S, Borry P, Cambon-Thomsen A, Cassiman JJ, Evers-Kiebooms G, Hodgson S, Janssens AC. Genetic testing and common disorders in a public health framework: how to assess relevance and possibilities. European journal of human genetics. 2011 Apr;19(1):S6-44.

[14] Avanecean D, Calliste D, Contreras T, Lim Y, Fitzpatrick A. Effectiveness of patient-centered interventions on falls in the acute care setting compared to usual care: a systematic review. JBI Evidence Synthesis. 2017 Dec 1;15(12):3006-48.