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Lp(a) Testing in Latin America: Low Awareness and Clinicalpractice Among Medical Society Physicians Highlight a Missed Opportunity in Cardiovascular Prevention

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Abstract

Background and aims In Latin America (LATAM), the level of awareness and clinical implementation of lipoprotein(a) (Lp(a)) testing among physicians remain largely unknown. This study aimed to evaluate the knowledge, frequency of use, and clinical management practices related to Lp(a) among LATAM physicians.

Methods We conducted a cross-sectional, 36-item Spanish-language online survey using convenience sampling through medical societies in twenty LATAM countries. All items were mandatory. The questionnaire included two sections based on whether respondents requested Lp(a) testing and explored barriers among nonusers.

Results A total of 512 physicians from various LATAM countries responded, with Mexico representing 75.4% of the participants. Overall, 36.7% of the physicians reported currently requesting Lp(a) testing, primarily in patients with premature cardiovascular diseases (CVD), familial hypercholesterolemia (FH), or recurrent events despite low-density lipoprotein (LDL-C) at goal. Among those never ordering Lp(a) testing, the main barriers were lack of availability (57.4%) and high cost (33.6%). Knowledge gaps were identified: Only half of the respondents correctly identified Lp(a) risk thresholds or LDL-C targets. Despite this, most physicians who ordered the Lp(a) test reported taking active measures such as intensifying lipid-lowering therapy (LLT) (90%) and intensifying the management of other CV risk factors (68%) if Lp(a) was > 50 mg/dL or 125 nmol/L.

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Conclusions Awareness and clinical use of Lp(a) testing among LATAM physicians remain limited and focused on high-risk scenarios. Improving test accessibility, providing clearer clinical guidelines, and reinforcing the evidence for Lp(a) as a therapeutic target may enhance its adoption and integration into cardiovascular risk assessment across the region.

Keywords Lipoprotein(a) awareness, Latin american physicians, Barriers, Survey, Cardiovascular risk assessment, Medical societies

Introduction

Lipoprotein(a) (Lp(a)) is a well-established contributor to residual cardiovascular risk [1–4]. Epidemiological studies and large Mendelian randomization analyses have demonstrated that elevated Lp(a) concentrations, typically defined as levels above the 80th percentile or > 50 mg/dL (> 125 nmol/L), are not only independently associated with but also causative of atherosclerotic cardiovascular disease (ASCVD), including coronary heart disease, stroke, and aortic valve stenosis [2, 5].

Globally, it is estimated that elevated Lp(a) levels affect between 10% and 30% of the population, corresponding to approximately 1.42 billion individuals [6–8]. Despite its clinical relevance, Lp(a) levels, as a component of cardiovascular risk assessment, remain underused.

In recent years, both international and national guidelines have recognized the importance of Lp(a) levels. The European Atherosclerosis Society (EAS), the 2024 Scientific Statement of the National Lipid Association, and the Mexican guidelines [9–12] recommend a one-time measurement of Lp(a) in all adults as part of the initial lipid profile assessment. In children, selective lipoprotein (a) testing is recommended [13]. This recommendation aims to improve cardiovascular risk stratification and guide more personalized preventive strategies [12, 14].

Nevertheless, Lp(a) testing remains underutilized, even in specialized centers [15, 16]. Several studies have identified common barriers to its implementation, including limited awareness of Lp(a) as a cardiovascular risk factor, confusion between Lp(a) and other lipoproteins, lack of familiarity with guideline recommendations, restricted access to testing, concerns regarding cost or insurance coverage, and the current lack of approved pharmacological therapies specifically targeting Lp(a) [15, 17].

In Mexico and other LATAM countries, the extent of Lp(a) testing and the barriers to its use have not been fully elucidated. To address these gaps, we conducted an anonymous, cross-sectional online survey to evaluate the knowledge, attitudes, and perceived barriers to Lp(a) testing among physicians in Mexico and across LATAM. Additionally, we aimed to compare these findings with those previously reported in the U.S. and European countries [17–26]. The objectives of this study were to identify opportunities to improve awareness and clinical integration of Lp(a) testing in the region, to assess the availability of testing across LATAM countries and to characterize the typical patient profile for whom Lp(a) testing is currently requested.

Materials and methods

Study design and setting

The Mexican Society of Endocrinology and Nutrition (SMNE), a member of the network of societies affiliated with the European Atherosclerosis Society (EAS), collaborates closely with other medical societies in LATAM, including those focused on cardiology, internal medicine, and neurology. Inspired by the 2022 survey on Lp(a) testing conducted by the European Lipid Clinic Network [17], we designed an observational cross-sectional study to explore current practices, perceived barriers, and clinical decision-making regarding Lp(a) testing among physician members of medical societies in LATAM.

Sampling and distribution

We used a convenience sampling strategy via academic networks across Latin America, distributing a Spanish-language questionnaire between 2024 and 2025. At the time of study deployment, we did not have the infrastructure or resources to adapt and validate the questionnaires in other languages. To minimize potential ascertainment bias, completion of all questions was mandatory.

Participants

We invited a total of five national and seven international medical societies from various Latin American (LATAM) countries to distribute the online survey to their members via email or internal communication. Due to agreements concerning data safety and confidentiality, we did not have direct access to the complete list of members within each medical society (Supplementary Table 1). The participating countries were grouped into subregions: North America (Mexico); Central America (Guatemala, Honduras, El Salvador, Nicaragua, Costa Rica, Panama); the Andean region (Ecuador, Colombia, Venezuela, Peru, Bolivia); the Caribbean region (Cuba, Dominican Republic, Puerto Rico); and the southern cone (Argentina, Chile, Uruguay, Paraguay).

Survey instrument

The survey consisted of 36 Spanish-language questions assessing the frequency of Lp(a) testing and the clinical actions taken based on the results. Most questions

offered multiple-choice responses, while two allowed free-text responses. The questionnaire was structured in two main parts: one for respondents who reported ordering Lp(a) testing in their clinical practice and another for those who did not, including follow-up questions to explore their reasons. For those who reported testing and identifying elevated Lp(a) levels, an additional set of questions was administered. These were tailored according to the respondent's specialty, such as endocrinology, neurology/neurosurgery, cardiology, or other fields, to capture specialty-specific decision-making patterns.

Data analysis

Survey answers were extracted from the online platform on May 4, 2025, and verified by two independent researchers. Participant input was reclassified by the same two researchers as appropriate when personalized answers were provided, particularly when misspelled words or synonyms occurred. Multiple-choice responses were allowed for more than one answer. In these cases, where the answers were not mutually exclusive, the sum of events may be greater than the number of participants. All survey questions were mandatory, with no missing data allowed. Descriptive statistics for categorical and ordinal variables were obtained with jamovi (version 2.6; Sydney, Australia) and are reported as count frequencies and percentages.

Results

Profile of physicians

The study included 512 participants (59.9% male) with a median age of 50 years (Interquartile Range [IQR]: 37–60). Most physicians reported working in both public and private healthcare systems. The most frequently represented specialties among respondents were, in descending order of frequency, endocrinology, cardiology, and internal medicine. Other specialties, such as nephrology, intensive care, and nutrition, were represented by only a few participants (Table 1).

Table 1 Characteristics of physicians who participated in the Lp(a) online survey

Variable *n* = 512	*n* (%)
Sex, men (n, %)	307 (59.9%)
Age	50 (37–60)
Clinical practice site	
- Private	129 (25.2)
- Public, tertiary care	203 (39.7)
- Both	179 (35.0)
Health Sector [a] (Mexico)	
- Tertiary care	252 (65.28)
- Private Medicine	134 (34.71)
Specialty of physicians requesting the Lp(a) test[b]	
- Cardiology	45 (23.9)
- Endocrinology	83 (44.1)
- General practitioner	11 (5.8)
- Internal medicine	39 (20.7)
- Neurology and neurosurgery	3 (1.5)
- Others [c]	7 (3.7)

[a] *n* = 386; [b] *n* = 188; [c] (critical medicine, geriatrics, hematology, nephrology)

The geographical distribution of participating LATAM countries is detailed in (Supplementary Table 2). The majority of responses were obtained from physicians in Mexico (75.4%), while participation was lowest among countries in the Southern Cone (2.3%). Within Mexico, most respondents practiced in the central region, whereas the southern region had the lowest participation (Supplementary Table 3).

Furthermore, the majority of respondents reported affiliation with the private sector, followed by the public sector, which was primarily represented by the Ministry of Health (a federal health system providing care to both inpatient and outpatient populations nationwide).

Barriers to lipoprotein(a) testing among physicians who had never requested the test

Among the 512 survey respondents, 63.3% ($n = 324$) reported that they did not request Lp(a) testing in clinical practice. The most commonly cited reason was lack of test availability (57.4%), followed by high cost (33.6%). Other reported barriers included the absence of specific and accessible therapies to reduce Lp(a) levels (13.9%), lack of familiarity with the test (12.7%), limited awareness of Lp(a) as a cardiovascular risk factor (4.1%), administrative burden and lack of reimbursement (3.1%), and the perception that it is not required in pediatric patients (3.1%) (Table 2).

Reported facilitators of Lp(a) testing among physicians who had never requested the test

The 324 providers who had never requested Lp(a) testing indicated that they would consider ordering the test under certain conditions, including the availability of Lp(a) testing (50%), reductions in cost and more coverage by third-party payers (30%), availability of treatment for high levels of Lp(a) (22%), clear international guidelines (21.6%), high Lp(a) concentrations could prompt adjustments in the intensity of treatment for other cardiovascular risk factors (20%) and more evidence of Lp(a) concentration as a causal factor of ASCVD (17.5%) (Table 2).

Clinical indications for Lp(a) testing

Of the 512 physicians surveyed, 188 (36.7%) reported that they currently requested Lp(a) testing. The most common clinical scenarios are presented in Table 3. The test was primarily indicated for patients with a family history of premature CVD (78%), followed by those with

Table 2 Barriers and facilitators for Lp(a) testing among LATAM physicians who had never requested the test

+Barriers *n* = 324	*n* (%)
1. High cost	109 (33.6)
2. Lack of reimbursement	10 (3.1)
3. Lack of available treatment for lowering Lp(a)	45 (13.9)
4. Lack of availability of Lp(a) test	186 (57.4)
5. Administrative burden	10 (3.1)
6. Lack of test awareness	41(12.7)
7. Perceived low relevance of Lp(a)	13 (4)
8. Lack of CVOT evidence	10 (3.1)
9. Works only with pediatric patients	10 (3.1)
+Facilitators *n* = 324	n (%)
1. Clear international guidelines	70 (21.6)
2. More Lp(a)-ASCVD evidence	51 (15.7)
3. Reduction in cost & coverage	98 (30.2)
4. Availability of therapies for Lp(a)	72 (22.2)
5. Lp(a) Test Availability	162 (50)
6. Lp(a)-Driven Risk Factor Adjustment	65 (20)

ASCVD Atherosclerotic cardiovascular disease, *CVOT* cardiovascular outcomes trial, *Lp* lipoprotein

+ Physicians could select more than one answer

Table 3 Reasons for requesting Lp(a) testing

Clinical scenario (*n* = 188)	*n* (%)
1. Prior CHD	114 (61)
2. A history of ischemic stroke	101 (54)
3. Familial hypercholesterolemia	131 (70)
4. Aortic valve stenosis	86 (46)
5. FHx – premature CVD	146 (78)
6. Recurrent ASCVD, LDL-C at goal	140 (74)
7. Suboptimal LDL-C on LLT	103 (55)
8. At least once in a lifetime	132 (70)
9. During an acute stress event	10 (5)
10. LLT refusal despite indication	1 (0.5)

ASCVD atherosclerotic cardiovascular disease, *C* cholesterol, *CHD* coronary heart disease, *CVD* cardiovascular disease, *FHx* family history, *LLT* lipid-lowering therapy, *LDL* low-density lipoprotein, *Lp* lipoprotein

recurrent cardiovascular events despite achieving target LDL-C levels (74%), familial hypercholesterolemia (FH) (70%), at least once in a lifetime (70%), prior myocardial infarction (61%), insufficient LDL-C reduction despite lipid-lowering therapy (55%), history of stroke (54%), aortic valve stenosis (46%), an acute stress event (5%), and hesitation to initiate lipid-lowering therapy despite clinical indication (0.5%).

In addition, the main reasons for ordering Lp(a) levels, in decreasing order, were the use of the test as a risk stratification tool for special patient groups (70.7%), personal or family history of ischemic heart disease without other evident risk factors (48.9%), and generalized screening (26.6%) (Fig. 1). When we specifically asked cardiologists and neurosurgeons about the frequency of ordering Lp(a) testing in acute events, 38.8% reported ordering it in acute coronary syndrome patients, and 66.7% reported

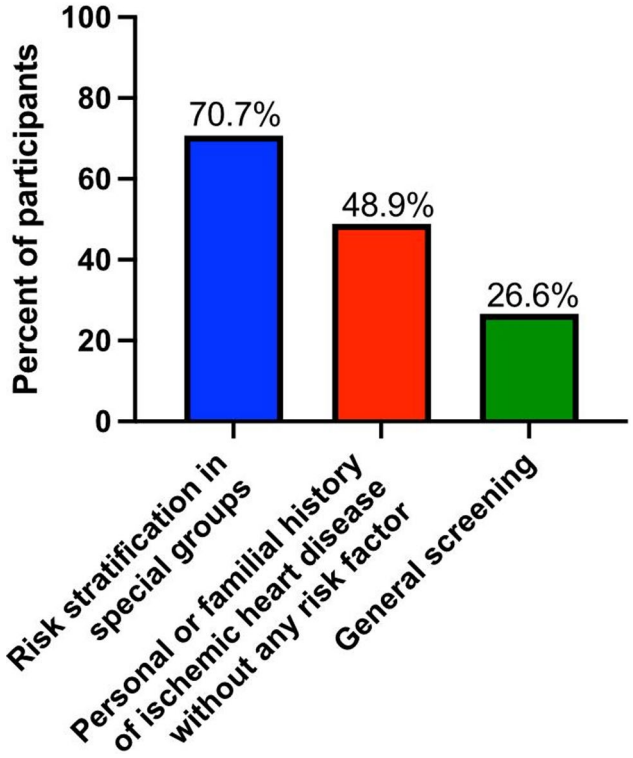

Fig. 1 Reasons for ordering Lp(a) testing among physicians who currently request the test (*n* = 188)

ordering it in acute stroke patients (Supplementary Table 4). The annual proportions of diagnoses related to ASCVD and FH reported by physicians are shown in Supplementary Fig. 1.

Physicians' knowledge of Lp(a): clinical implications, cardiovascular risk, and management targets

Among the physicians who reported ordering Lp(a) levels, 80.3% indicated that the Lp(a) concentration was reported in mg/dL, 12.8% reported it in nmol/L, and 6.9% did not know the unit used (Table 4).

A total of 51.6% of the participants correctly were aware of the nonrisk threshold for Lp(a) levels (< 30 mg/dL or < 75 nmol/L), and 58% correctly identified the cardiovascular risk threshold (> 50 mg/dL or > 125 nmol/L). Moreover, 21.8% were aware that Lp(a) concentrations ≥ 180 mg/dL (or ≥ 430 nmol/L) are considered equivalent to FH in terms of cardiovascular risk.

Regarding knowledge of LDL-C goals in individuals with elevated Lp(a) levels (> 50 mg/dL/>125 nmol/L), 39.9% correctly identified the target of < 100 mg/dL for patients at low cardiovascular risk. In addition, 45.2% of the participants identified the LDL-C goal of < 70 mg/dL for patients at moderate cardiovascular risk, 47.9% for patients at high cardiovascular risk, and 61.2% for patients at very high cardiovascular risk.

Table 4 Levels of knowledge regarding Lp(a) levels and cardiovascular risk associations among physicians who requested the test

Knowledge *n* = 188	***n* (%)**
Knowledge of Lp(a) Units in Own Laboratory	
• mg/dL	151 (80.3)
• nmol/L	24 (12.8)
• Did not know	13 (6.9)
Identification of Lp(a) nonrisk value (< 30 mg/dL/< 75 nmol/L)	97 (51.6)
Lp(a) Risk Threshold (> 50 mg/dL/>125 nmol/L)	109 (58)
Lp(a) ≈ FH Risk Level (> 180 mg/dL/430 nmol/L)	41 (21.8)
LDL-C Target < 100 mg/dL (Low-Risk + High Lp(a)) [a]	75 (39.9)
LDL-C Target < 70 mg/dL (Moderate-Risk + High Lp(a)) [a]	85 (45.2)
LDL-C Target < 55 mg/dL (High-Risk + High Lp(a)) [a]	90 (47.9)
LDL-C Target < 40 mg/dL (Very High Risk + High Lp(a)) [a]	115 (61.2)
Lp(a)-driven intensification of other risk factor management (> 50 mg/dL/ > 125 nmol/L)	91 (48.4)
Cascade screening	178 (94.7)

[a] Lp(a): as an enhancer cardiovascular risk factor. *C* cholesterol, *Lp* lipoprotein

Table 5 Actions taken by physicians upon elevated Lp(a)

Action (*n* = 188)	***n* (%)**
Lifestyle Modification Advice	118 (63)
Lipid-Lowering Therapy Initiation/Intensification	169 (90)
Uncertain Management Plan	2 (1)
Cascade screening	85 (45)
Referral to Lipid Clinic	28 (14)
Intensification of other CV risk Factors management	128 (68)
Antiplatelet Therapy Prescription	32 (16)

CV cardiovascular, *Lp* lipoprotein

Table 6 Clinical implications of elevated Lp(a) levels communicated to patients by physicians

Clinical implication communicated (*n* = 188)	***n* (%)**
Increased risk of ASCVD	182 (96.8)
Increased risk of aortic valve stenosis	86 (45.7)
Increased risk of heart failure	58 (30.8)
Increased risk of peripheral artery disease	124 (65.9)
Increased risk of chronic kidney disease	30 (15.9)
Increased risk of ischemic stroke	144 (76.6)

ASCVD Atherosclerotic cardiovascular disease, *Lp* lipoprotein

Additionally, 48.4% of the respondents were aware that Lp(a) concentrations above 50 mg/dL (or > 125 nmol/L) may warrant modification of the treatment plan, and 94.7% reported being aware of cascade screening practices in families of patients with elevated Lp(a).

Actions taken by physicians ordering Lp(a) testing in response to elevated values

Table 5 summarizes the clinical actions taken by physicians who ordered Lp(a) testing. The most frequent action was initiating or intensifying LLT (90%), followed by intensifying the management of other cardiovascular risk factors (68%). Only 1% of the respondents reported being unsure how to manage patients with elevated Lp(a) levels.

Regarding the type of LLT that they used in patients with high Lp(a) levels, they reported the titration of statin doses (66%), the addition of PCSK9 inhibitors (57%), the addition of ezetimibe (46%), the addition of niacin (3%), the addition of inclisiran (0.5%) and the referral of the patients to a research center for inclusion in a clinical study. (0.5%) (Supplementary Table 5).

Physicians who ordered Lp(a) testing and detected elevated levels informed patients of the following risks: 96.8% were advised that they were at risk for atherosclerotic CVD, 65.9% for peripheral artery disease, 45.7% for aortic stenosis, 30.8% for heart failure and 15.9% for kidney disease (Table 6). 78% of participants in the online survey reported that they would request the test more frequently after completing the survey (Fig. 2).

Finally, we decided to compare the obstacles and barriers, as well as the areas of opportunity, with those reported in other populations, such as European [17] and American [23] populations (Supplementary Table 6). Although the surveyed populations differ, it was noteworthy that physicians from lipid clinics affiliated with the EAS reported requesting Lp(a) testing in 75% of patients, whereas American and LATAM physicians reported lower rates.

Discussion

Recent consensus statements, including those from the EAS, the National Lipid Association (NLA), and the Brussels Summit, now recommend measuring Lp(a) at least once in a lifetime for all individuals [9, 13, 14, 27]. This marked a shift toward primary prevention rather than limiting testing to individuals at very high or extremely high cardiovascular risk where intervention may come too late. These recommendations emphasize the cost-effectiveness of Lp(a) testing and support the implementation of systematic screening as soon as possible.

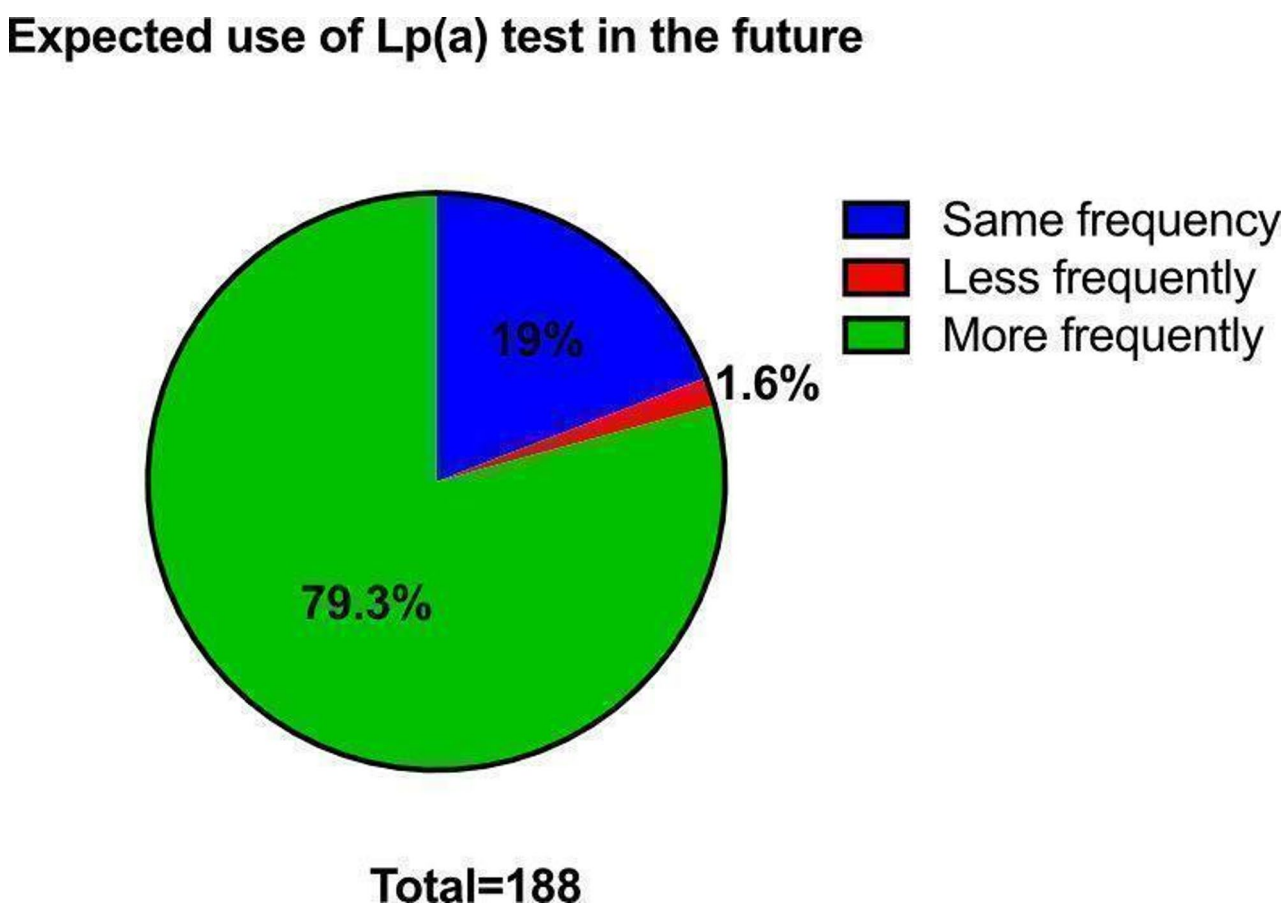

Fig. 2 Impact of the Lp(a) online survey on future Lp(a) testing by LATAM health providers. Lp: lipoprotein, LATAM: Latin American

In our survey, the geographic concentration of responses revealed potential regional disparities in awareness and implementation of Lp(a) testing, emphasizing the need for targeted strategies to promote equitable access and education, particularly in Latin America [28]. The potential explanations in the case of Mexico, could be greater access to specialized laboratories, more recent educational initiatives on Lp(a), and higher awareness of guideline recommendations within Mexican academic centers. However, these potential explanations should be interpreted with caution given the uneven distribution of responses across countries and the convenience sampling design, both of which may introduce participation bias and limit regional comparability. Geographic concentration of responses may reflect regional differences in interest, awareness, and implementation of Lp(a) testing. We emphasize the need to improve equitable access and strengthen educational initiatives across Latin America.

Similarly, the predominance of cardiometabolic specialists among those who order Lp(a) testing likely reflects greater familiarity with cardiovascular risk stratification. However, this also points to a missed opportunity to expand Lp(a) testing into primary care and other specialties, where preventive strategies could be more broadly applied.

Among respondents who reported never ordering Lp(a) testing, structural and educational barriers were frequently cited. Addressing these challenges will require coordinated efforts across healthcare systems, policy frameworks, and clinical training programs. Although technical limitations previously hindered routine Lp(a) measurement—such as isoform size heterogeneity and lack of assay standardization—these issues have largely been resolved. Reliable, reproducible assays independent of apo(a) isoform size are now available; thus, a lack of testing due to methodological concerns is no longer justifiable.

Several initiatives have been implemented to raise awareness of Lp(a) testing. These include short educational videos delivered by nursing staff [29] and electronic reminder systems integrated into hospital workflows, which have been associated with significantly increased Lp(a) test ordering rates [30]. Patient advocacy organizations for lipid diseases also play a crucial role in raising awareness of Lp(a) among patients, healthcare professionals, and policymakers. The goals of these methods

include improving detection rates and promoting cascade screening [31].

Barriers to Lp(a) testing varied by region. In Latin America, the most frequently reported obstacle was limited test availability; in Europe, the main concern was lack of reimbursement by insurance providers [17]; and in North America, the absence of cardiovascular outcome trials was a leading reason for underuse [24, 30, 32–34]. In Asia and Australia, low awareness and limited familiarity with Lp(a) management, along with misconceptions about its clinical utility, are prominent barriers [21, 25].

Among clinicians who do incorporate Lp(a) testing into practice, its use remains largely selective and typically focused on high-risk individuals, especially when residual cardiovascular risk persists despite achieving LDL-C targets. This approach reflects an incomplete integration of Lp(a) levels into routine cardiovascular risk assessments. Notably, testing indications varied by region, with LATAM physicians prioritizing patients with a personal or family history of premature CVD, Europeans focusing on FH, and American clinicians emphasizing aortic valve stenosis (Supplementary Table 6). Current North American guidelines, such as the 2025 AACE recommendations, continue to support this selective use [35].

Knowledge gaps regarding Lp(a) thresholds and therapeutic implications may also have limited the clinical utility of testing. These findings reinforce the need to integrate Lp(a)-related education into both specialist and general medical training [36]. Cascade screening has remained underutilized, despite its value in identifying familial risk clusters and enabling early, targeted preventive strategies similar to successful FH screening programs, where initiating statin therapy in childhood has been shown to reduce ASCVD mortality by up to 80%, as highlighted in the Brussels consensus [13].

Finally, coordinated efforts by LATAM medical societies and associations are essential to raise awareness among physicians and patients regarding the importance of evaluating and treating all abnormal lipid parameters in accordance with individual cardiovascular risk. While regional barriers differ, the overarching challenge remains the same: closing the gap between guideline recommendations and real-world practice.

Strengths and limitations

This study represents an initial effort led by medical societies in Latin America to assess awareness of and barriers to Lp(a) testing. The findings highlight not only existing gaps but also opportunities to increase dissemination of information about the risks associated with elevated Lp(a), particularly in countries with low response rates.

Similar online surveys have been conducted in the U.S., Canada, and Europe to capture regional realities, and our findings provide valuable insights by allowing comparison across regions, where the reasons for not requesting this test differ. These findings may guide future initiatives aimed at raising awareness among Latin American physicians about the importance of actively assessing this overlooked cardiovascular risk factor.

One limitation is that our convenience sample is not fully representative of all LATAM clinicians; 76% of respondents practiced in Mexico, and Brazil was not included due to language barriers. Thus, the generalizability of the findings to underrepresented countries is limited. Although we implemented safeguards against duplicate or low-quality entries, ascertainment bias cannot be excluded. In addition, the aforementioned reasons prevented a country-level analysis.

Conclusion

Among physicians affiliated with Latin American medical societies who did not request Lp(a) testing, the most frequently cited barriers were limited local availability, high cost, and uncertainty about how elevated Lp(a) should guide clinical decision-making. Addressing these challenges will require improving access to reliable Lp(a) assays, strengthening regionally applicable clinical guidance, and expanding dissemination of evidence on its role in cardiovascular risk stratification and management. Enhancing these elements may support broader and more consistent adoption of Lp(a) testing among clinicians across Latin America.

Abbreviations

AHA	American Heart Association
ASCVD	atherosclerotic cardiovascular diseases
CHD	coronary heart disease
CVOT	cardiovascular outcomes trial
EAS	European Atherosclerosis Society
FH	Familial hypercholesterolemia
FHx	family history
LDL-C	Low-density lipoprotein
LLT	Lipid -lowering therapy
LATAM	Latin America
Lp	Lipoprotein
SMNE	The Mexican Society of Endocrinology and Nutrition

Supplementary Information

The online version contains supplementary material available at https://doi.org/10.1186/s12872-025-05461-6.

Supplementary Material 1.

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Clinical trial number
Not applicable.

Authors' contributions
CBI conceived the study and wrote and reviewed the final version of the paper. FGY, APM, and GMSL collected the data through an online survey. CNY, ELD, RGLY, RGMA, MHL, MR, FHR, MRE, GCJC, AFJA, GLA, DAA, RCE, CAJE, VSR, CP, and MCO collected the data through the respective medical societies. BMA analyzed the data. MR reviewed the final version in proper English. CAAS and PC reviewed the final document.

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Data availability
The data that support the findings of this study are not publicly available due to privacy restrictions and confidentiality agreements with participating physicians. Deidentified data may be made available from the corresponding author upon reasonable request and with permission from the participating institutions.

Declarations

Ethics approval and consent to participate
The Research and Ethics Committees of the National Institute of Medical Sciences and Nutrition Salvador Zubirán declared this study exempt, as it used anonymous, minimal-risk data collected from health professionals without personal identifiers. Although this study did not involve patients or biological samples, it was conducted in accordance with the ethical principles outlined in the Declaration of Helsinki. Participation was voluntary, and electronic informed consent was obtained on the survey landing page. Approval reference number: 4910. The study protocol was initially approved in December 2023 and reapproved in December 2024.

Consent for publication
All authors provided their final consent for publication of the manuscript. No personal or identifiable information is included in this publication.

Competing interests
The authors declare no competing interests.

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