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Special article

Delphi expert document on therapeutic adherence in patients with cardiovascular disease: Barriers, facilitators, and clinical implications

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Abbreviations: CVD, cardiovascular disease; SC, Scientific Committee.

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ABSTRACT

Medication adherence is a key factor in managing cardiovascular disease, as it directly influences clinical control, event prevention, and healthcare efficiency. This Delphi expert involving 118 experts in cardiology, internal medicine, and primary care, aimed to identify barriers, facilitators, and practical strategies to improve adherence in Spain. Fifty statements were evaluated in 2 rounds, followed by 15 local meetings with clinical experts to contextualize and interpret the conclusions. Consensus was reached on 49 statements (98.0%), emphasizing the need to measure and promote adherence systematically. The main barriers identified were polypharmacy, lack of care coordination, and medication costs, while strategies such as fixed-dose combinations, digital tools, health education and patient education were highlighted as key facilitators. Good adherence was acknowledged to reduce cardiovascular events, hospitalizations, and costs, improving patient quality of life. This document offers clinical and organizational recommendations to optimize therapeutic adherence in cardiovascular patients.

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Documento experto tipo Delphi sobre la adherencia terapéutica en pacientes con enfermedad cardiovascular: barreras, facilitadores e implicaciones clínicas

RESUMEN

La adherencia a la medicación es clave en el abordaje de la enfermedad cardiovascular, ya que influye en el control clínico, la prevención de eventos y la eficiencia del sistema sanitario. Este Delphi, en el que participaron 118 expertos en cardiología, medicina interna y atención primaria, tuvo como objetivo identificar barreras, facilitadores y estrategias prácticas para mejorar la adherencia en España. Se formularon 50 afirmaciones en dos rondas, seguidas de 15 reuniones locales con expertos. Se alcanzó consenso en 49 afirmaciones (98,0%), y se mostró la importancia de medir y promover la adherencia. Se identificaron barreras como la polifarmacia, la falta de coordinación asistencial y el coste de los medicamentos, y se propusieron estrategias como el uso de combinaciones a dosis fijas, herramientas digitales, educación sanitaria, y la del paciente. Una buena adherencia reduce los eventos cardiovasculares, las hospitalizaciones y los costes. Este documento ofrece recomendaciones clínicas y organizativas sobre adherencia terapéutica.

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Palabras clave:

Enfermedad cardiovascular

Delphi

Adherencia a la medicación

Polifarmacia

Combinaciones de dosis fijas

Introduction

Therapeutic adherence is a fundamental component of cardiovascular disease (CVD) treatment, especially in patients who have suffered ischemic events, like acute coronary syndrome or stroke. The World Health Organization defines therapeutic adherence as the degree to which a person's behavior coincides with the treatment plan agreed upon with the patient's physician.¹ This concept has evolved toward a more collaborative model that recognizes the autonomy and active participation of patients in their treatment.^{2,3}

Several studies have shown that adherence to medications such as antiplatelet agents, beta-blockers, angiotensin-converting enzyme inhibitors, and statins is often suboptimal, decreasing over time.^{4,5} The causes of nonadherence can be classified into two broad categories: factors related to the health care system and patient-related factors.⁶ The former include the complexity of the drug regimen,⁷ the

number of doses,^{8,9} poor communication with the patient,¹⁰ insufficient medication knowledge,¹¹ difficulties in accessing care,¹² and lack of continuity of care.⁶ Patient-related factors include sociodemographic characteristics such as age,¹¹ comorbidities,¹² fear of side effects,¹³ cultural beliefs and individual perceptions about the disease and treatment.^{12,14}

A lack of adherence to cardiovascular treatment increases the risk of cardiovascular events,¹⁵ mortality,¹⁶ disease progression,¹⁷ worsening of comorbidities,¹⁸ increased health care costs,¹⁵ and reduced quality of life.¹⁹ An adherence rate of 80% has generally been considered a benchmark for efficacy.²⁰ In Spain, approximately 50% of patients do not correctly comply with the prescribed therapeutic guidelines²¹; therefore, to improve this indicator is essential.

The objective of this Delphi consensus was to evaluate therapeutic adherence in patients with CVD, addressing its definition, measurement, determining factors, improvement strategies, and impact on clinical outcomes to guide clinical practice in Spain.

Materials and methods

The consensus was developed using the Delphi methodology structured in two rounds of voting, overseen by the Scientific Committee (SC), composed of three cardiology specialists, an internist, and a primary care physician; this committee validated the literature search, critically assessed the evidence, and directed the development of the surveys.

A literature review was conducted in the Medline/PubMed, Web of Science, and Scopus to identify evidence gaps supporting the questionnaire. Searches used these keywords “Patient Adherence,” “Patient Cooperation,” “Patient Non-Compliance,” “Patient Nonadherence,” “Medication Adherence,” and “Treatment Refusal,” in combination with “Cardiovascular Diseases,” “Heart Disease,” and “Acute Coronary Syndrome.”

The study reflects the perspectives and priorities identified by members of the Spanish Society of Cardiology (SEC), the Spanish Society of Internal Medicine (SEMI), and the Spanish Society of Primary Care Physicians (SEMERGEN). The manuscript follows the formal consensus methodology, including a structured Delphi process, predefined criteria for agreement, and a multidisciplinary expert panel, but it represents the experts’ consensus, not an official position of the involved societies.

Based on the review, the questionnaire was developed by the SC through meetings and reviewed by 15 scientific advisors and 2 expert patients. The SC selected 50 initial statements, focusing on clinical relevance and literature controversy concerning therapeutic adherence. These statements were refined and validated before the Delphi process began. The expert patients participated in the review and validation phase of the initial questionnaire, contributing their experience regarding perceived barriers to medication adherence, integrating the patient perspective early in the consensus process.

The expert panel was composed of 118: 29 primary care physicians, 68 cardiologists, and 21 internal medicine physicians. The experts were selected using purposive sampling based on 10 years of clinical experience in cardiology, internal medicine, or primary care, and active participation in relevant scientific societies, ensuring balanced geographic representation across Spain. The identities of the respondents were kept anonymous.

The Delphi had two rounds: the first from October 21 to November 10, 2024, and the second from November 27 to December 15, 2024. In each round, the SC supervised the development of the surveys, reviewed the responses, and prepared summaries to facilitate consensus building. The questionnaire included 50 statements organized into 6 knowledge blocks, with gender as a cross-cutting criterion to enhance applicability and equity.

Following the Delphi results, 15 local meetings were organized with the participating experts and distributed across autonomous communities. Structured discussions were focused on the key thematic areas identified in the study. The qualitative data from these meetings were analyzed thematically and formed the basis for the “Discussion” section.

The study was based exclusively on survey administration and did not involve human subjects or clinical data management. Therefore, approval from an ethics committee was not needed.

Statistical analysis

Frequencies, medians, quartiles, interquartile ranges [IQR], and percentages of agreement were calculated. A nine-point Likert scale (1 = “strongly disagree” to 9 = “strongly agree”) was used. Consensus was defined on the median location within 3 intervals: 1–3 (disagreement), 4–6 (neutrality), and 7–9 (agreement). Consensus was considered when the median was within the agreement or disagreement interval and two additional criteria were met: (a) less than one-third of expert scored outside the corresponding interval and (b) the IQR ≤ 4 . The data were analyzed via LimeSurvey version 6.5.6.

Results

All 118 experts completed both Delphi rounds (100.0% participation). The geographic distribution of the participants is shown in Fig. 1. In the first round, 47 of 50 statements reached consensus (94.0%), and 3 did not receive a consensus (3.0%), moving on to the second round. The SC decided to reformulate two of the statements to improve the clarity of the messages. In the second round, out of three statements, two received a consensus (66.7%), and one did not receive a consensus (33.3%). Ultimately, 49 of 50 statements achieved consensus (98.0%). Responses are presented in Tables S1–S6.

On current knowledge of adherence (staying on treatment)

Five statements were evaluated and reached consensus in the first round (Fig. 2).

The experts considered a therapeutic adherence rate of $\geq 80.0\%$ an adequate threshold for classifying adherence as satisfactory in these patients, although with a relatively low level of agreement (73.7%). There was unanimity regarding the fact that lack of therapeutic adherence significantly increases the risk of morbidity and mortality in patients with chronic CVD (agreement: 100.0%).

The experts also emphasized the need to develop and implement more effective strategies to promote better therapeutic adherence in this population (agreement: 99.2%). Furthermore, they highlighted the importance of verifying that the patient’s treatment is precisely as prescribed, since errors resulting from a lack of coordination between different health care professionals can generate confusion and negatively affect adherence (agreement: 99.2%). Finally, they recognized a strong correlation between a greater number of medications prescribed and lower treatment adherence, highlighting the complexity of the drug regimen as a determining factor of adherence (agreement: 98.3%).

How is adherence measured?

Nine statements were evaluated and received a consensus in the first round of voting. The results are shown in Fig. 3.

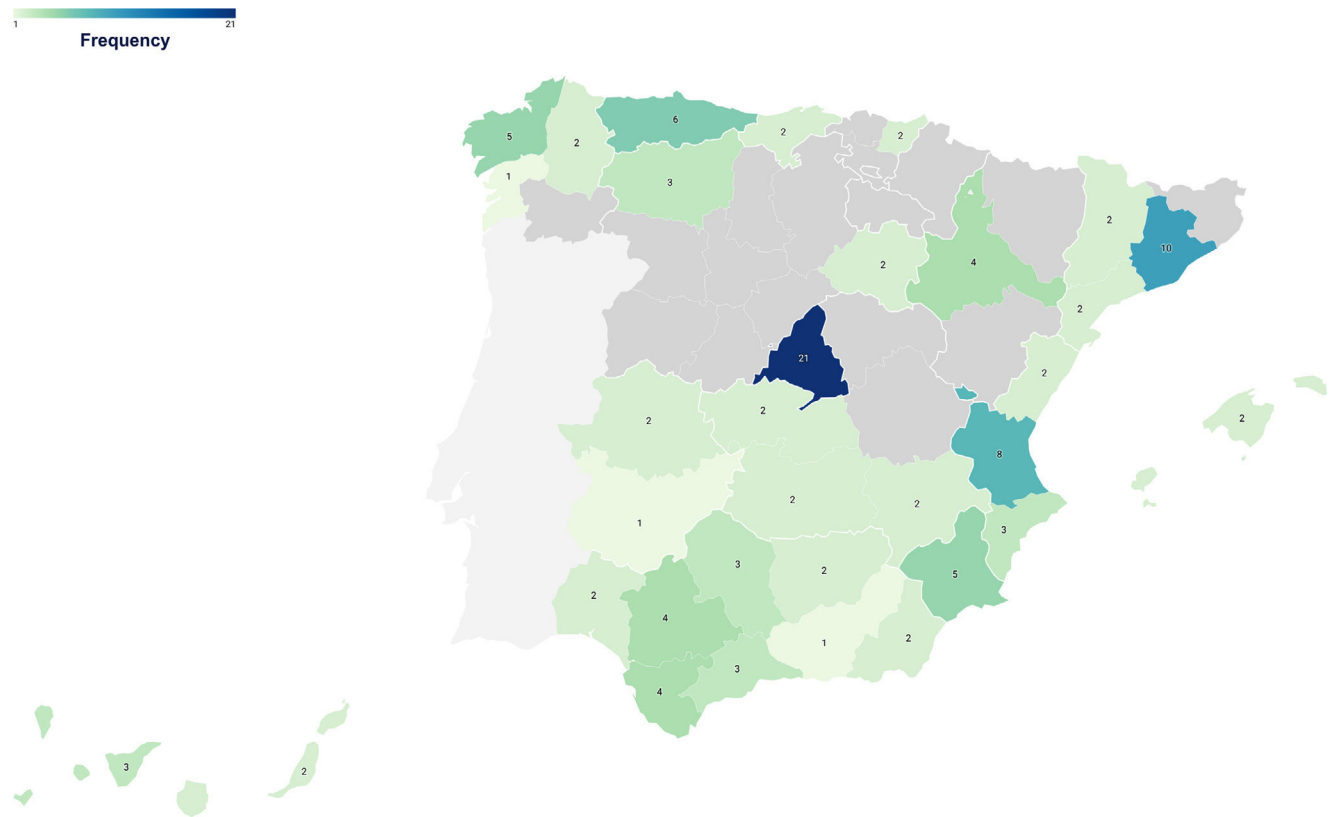


Fig. 1 – Geographical distribution of participating experts.

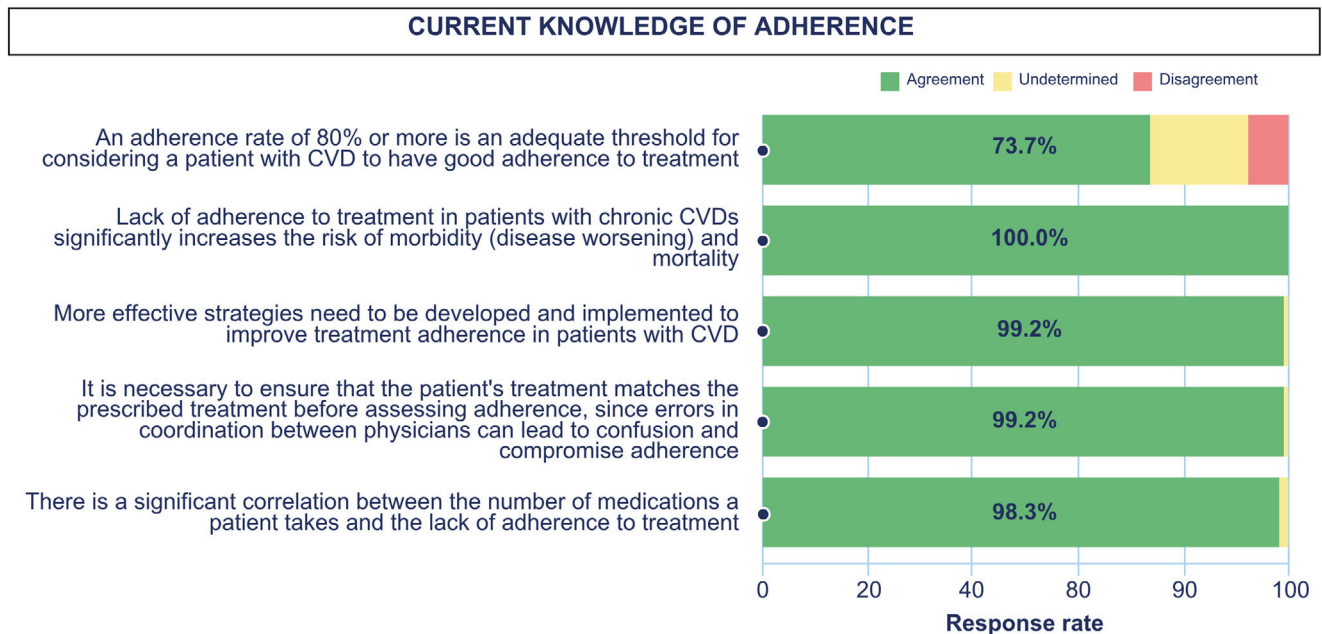


Fig. 2 – Level of expert consensus on current knowledge. CVD: cardiovascular disease.

The experts broadly agreed on the importance of regularly assessing treatment adherence in patients with CVD, emphasizing that this practice is essential to ensure therapeutic efficacy and safety and facilitate decision-making regarding potential interventions (agreement: 99.2%). There was also a consensus that knowledge of the level of adherence can

prevent unnecessary drug substitution or unjustified dose increases (agreement: 95.8%).

Since there is no single, universally applicable method, the experts recommended that health care professionals employ various approaches to measure therapeutic adherence in these patients (agreement: 90.7%). Among these

HOW IS ADHERENCE MEASURED?

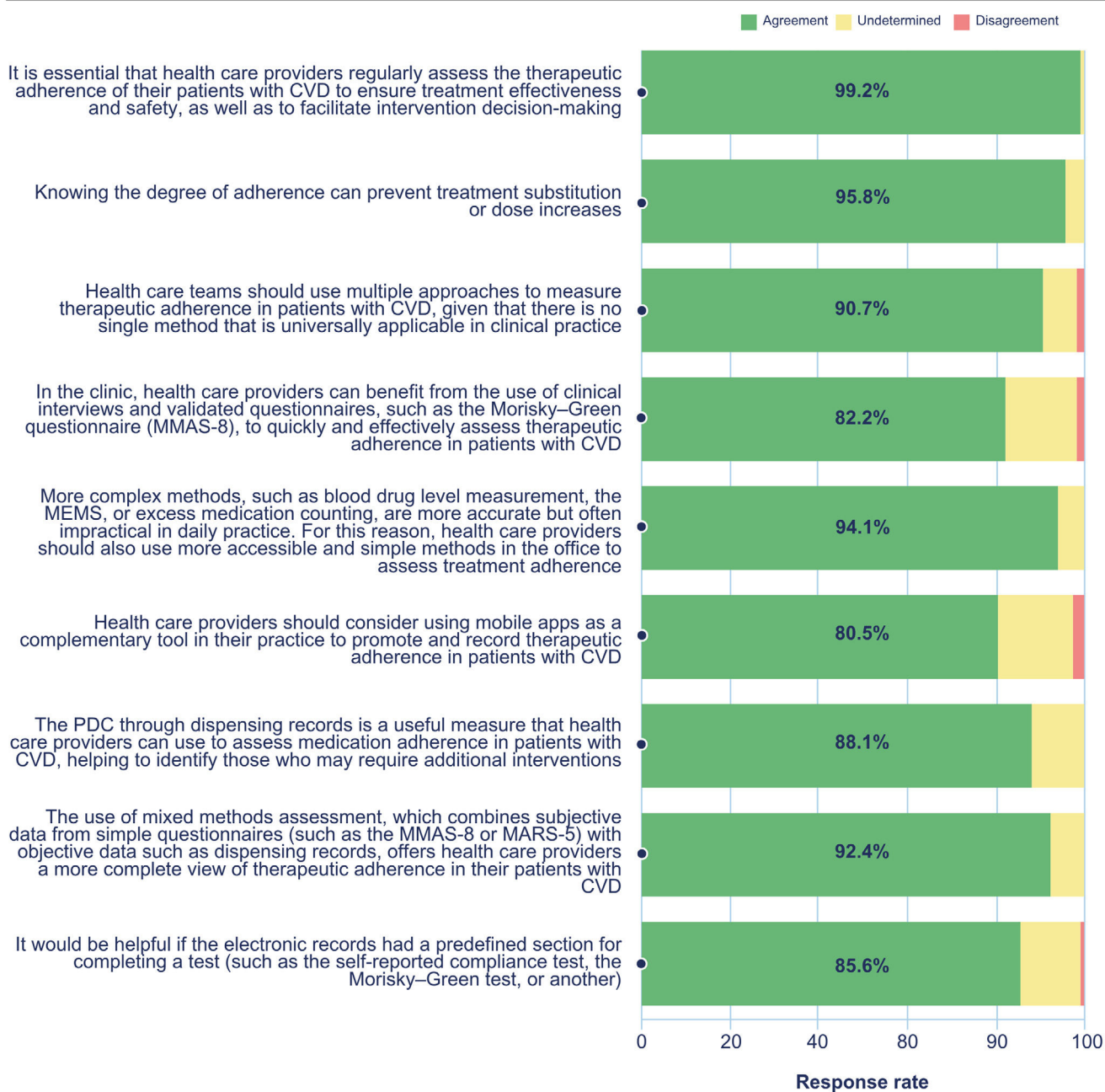


Fig. 3 – Level of expert consensus on the measurement of therapeutic adherence in patients with cardiovascular disease. CVD: cardiovascular disease; MEMS: Medication Event Monitoring System; PDC: proportion of days covered.

methods, structured clinical interviews and validated questionnaires, such as the Morisky–Green Medication Adherence Questionnaire (MMAS-8), stand out for their accessibility and effectiveness, enabling rapid assessment in routine clinical practice (agreement: 82.2%). In contrast, more complex methods such as pharmacokinetic determination through plasma drug level measurement, electronic monitoring systems such as the Medication Event Monitoring System, or pill counts, although more accurate, are often challenging to implement in daily clinical routines. Therefore, the need to complement these more accurate methods with more straightforward and

feasible methods in routine clinical practice was emphasized (agreement: 94.1%).

Additionally, experts recommended the use of mobile applications as auxiliary tools to promote and record therapeutic adherence in cardiovascular patients (agreement: 80.5%). They also highlighted the usefulness of objective methods, such as the proportion of days covered, obtained through dispensing records, which make it easier to identify patients likely to require additional interventions to improve their adherence (agreement: 88.1%).

SITUATIONS RELATED TO POOR ADHERENCE

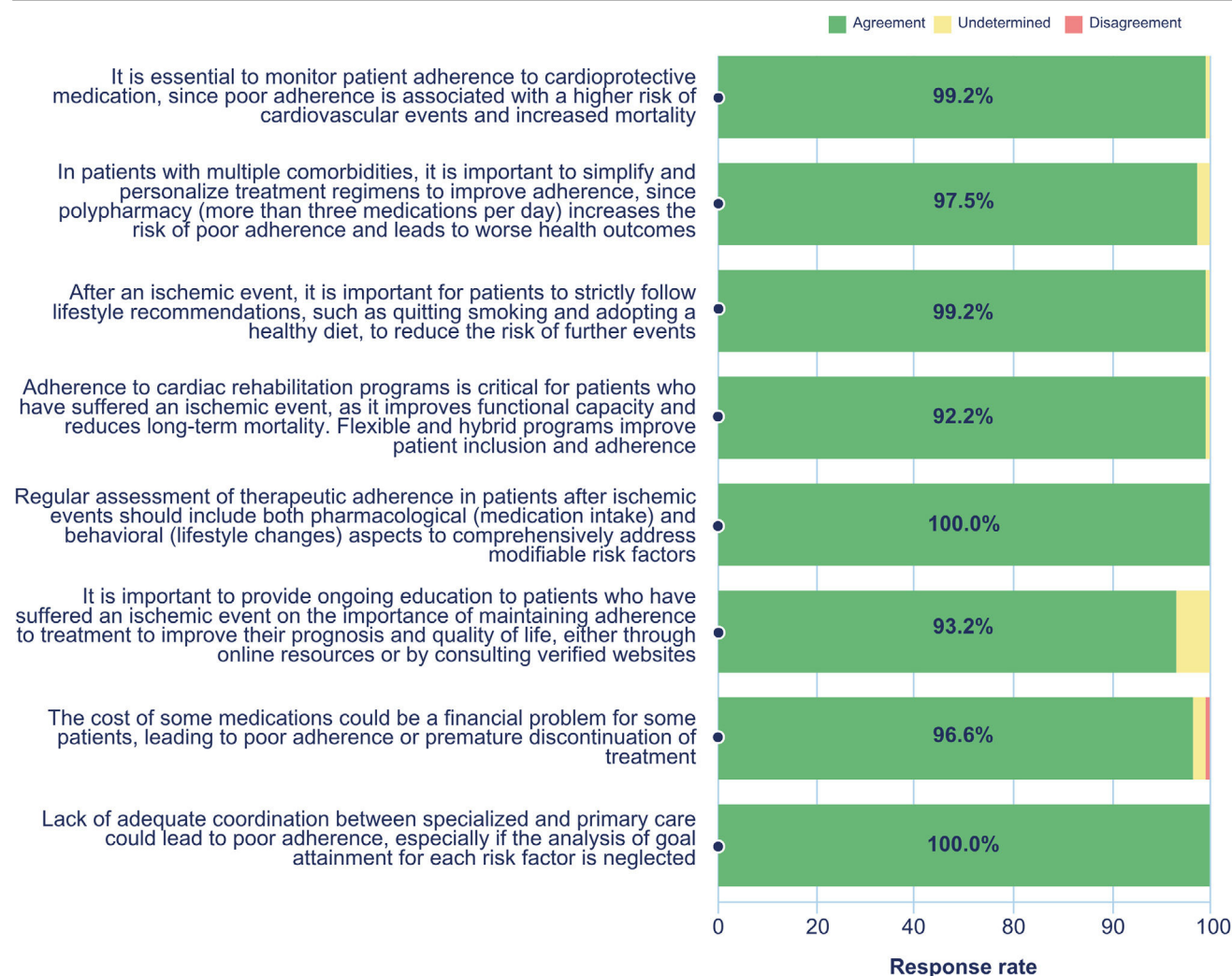


Fig. 4 – Level of expert consensus on situations related to poor adherence.

Moreover, the combined use of subjective methods (such as the MMAS-8 or the Medication Adherence Report Scale [MARS-5] questionnaires) and objective methods (dispensing records) provide a more complete and accurate assessment of therapeutic adherence in patients with CVD (agreement: 92.4%). Finally, the experts highlighted the usefulness of incorporating a specific section into the electronic medical records for conducting and recording validated adherence tests, such as the self-reported adherence test or the Morisky–Green Questionnaire (agreement: 85.6%).

Situations related to poor adherence

Eight statements were evaluated and received a consensus in the first round of voting. The results are shown in Fig. 4.

The experts agreed on the need to systematically monitor adherence to cardioprotective medications, given that poor adherence is associated with a significantly increased risk of cardiovascular events and mortality (agreement: 99.2%).

In the context of patients with multiple comorbidities, simplifying and personalizing therapeutic regimens is considered a priority because polypharmacy (defined as the prescription of more than three medications per day) has been linked to a greater likelihood of poor adherence and worse clinical outcomes (agreement: 97.5%).

Similarly, the experts considered it important for patients to strictly follow recommendations regarding lifestyle changes after an ischemic event, for example, by quitting smoking and adopting a cardioprotective diet, to prevent recurrences (agreement: 99.2%). Adherence to cardiac rehabilitation programs was also considered essential because of their positive impact on functional capacity and reduced long-term mortality and because of their superior effectiveness when implemented in flexible or hybrid formats that encourage patient participation (agreement: 99.2%).

Furthermore, it was recommended that therapeutic adherence after an ischemic event be assessed comprehensively, including both pharmacological (medication adherence) and behavioral (lifestyle modification) aspects, with the aim of

FACTORS THAT INFLUENCE THERAPEUTIC ADHERENCE

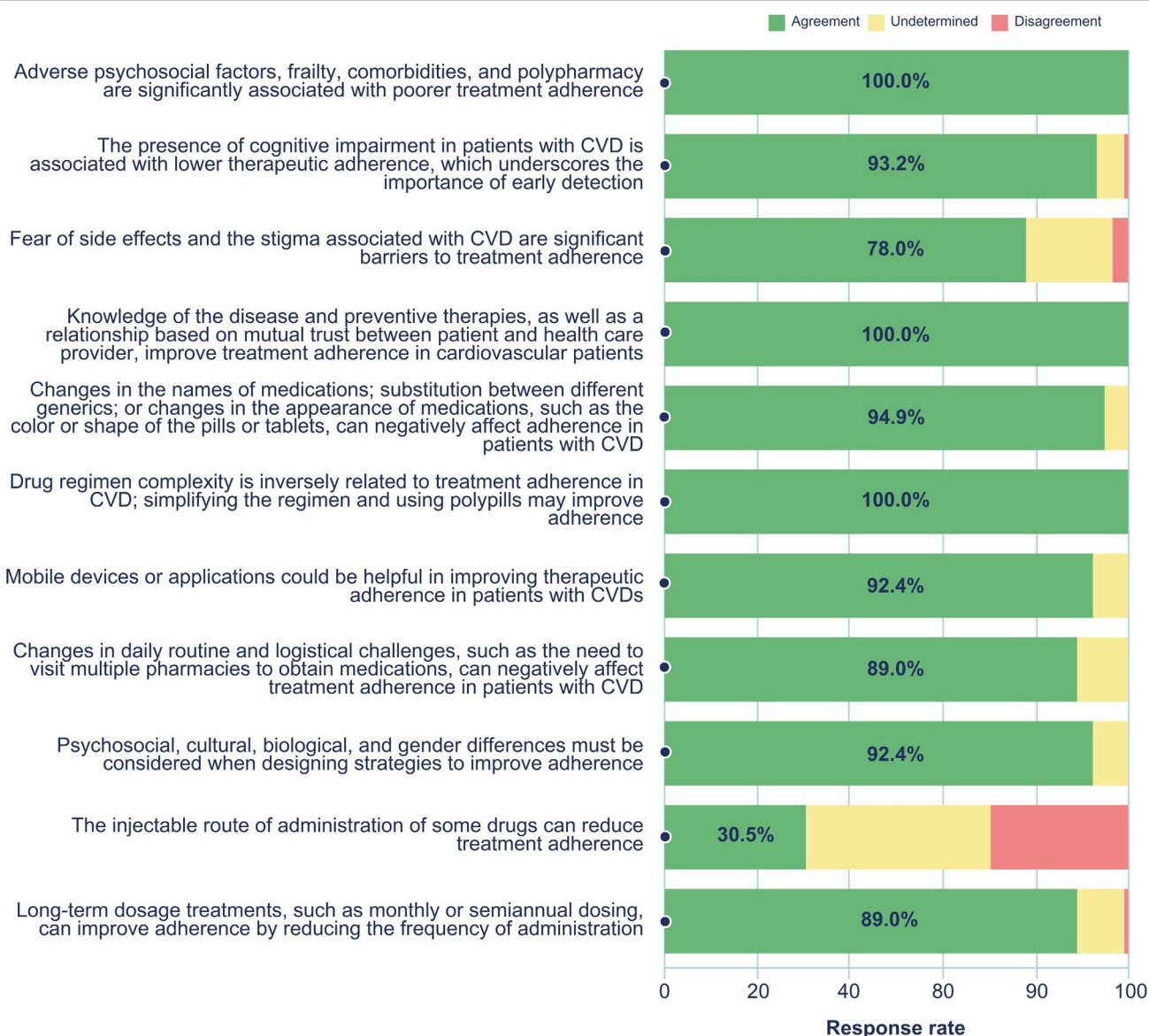


Fig. 5 – Level of expert consensus on factors that influence therapeutic adherence. CVD: cardiovascular disease.

comprehensively addressing modifiable risk factors (agreement: 100.0%).

The panel of experts also highlighted the importance of providing ongoing education to patients about maintaining treatment adherence. To this end, they suggested the use of proven digital resources or reference websites, which offer reliable and accessible information (agreement: 93.2%).

Likewise, the economic cost of certain medications was identified as a significant barrier to adherence, with the ability to lead to noncompliance or premature treatment discontinuation (agreement: 96.6%). Finally, the lack of coordination between different levels of care, especially between primary and hospital care, was identified as a factor hindering adequate adherence to therapeutic goals and, consequently, promoting poor adherence (agreement: 100.0%).

Factors that influence therapeutic adherence

Eleven statements were evaluated and 10 obtained consensus. The results are shown in Fig 5.

Among the factors influencing therapeutic adherence, the experts fully agreed that the presence of unfavorable psychosocial conditions (such as difficulty accessing health services or a vulnerable socioeconomic background), along with clinical frailty, multiple comorbidities, and polypharmacy, are significantly associated with lower treatment adherence (agreement: 100.0%). They also highlighted that cognitive impairment in patients with CVD represents a critical factor limiting adherence, reinforcing the need for early detection in clinical practice (agreement: 93.2%). Psychological factors such as fear of adverse drug effects, as well as

WHAT STRATEGIES CAN WE USE TO IMPROVE ADHERENCE?

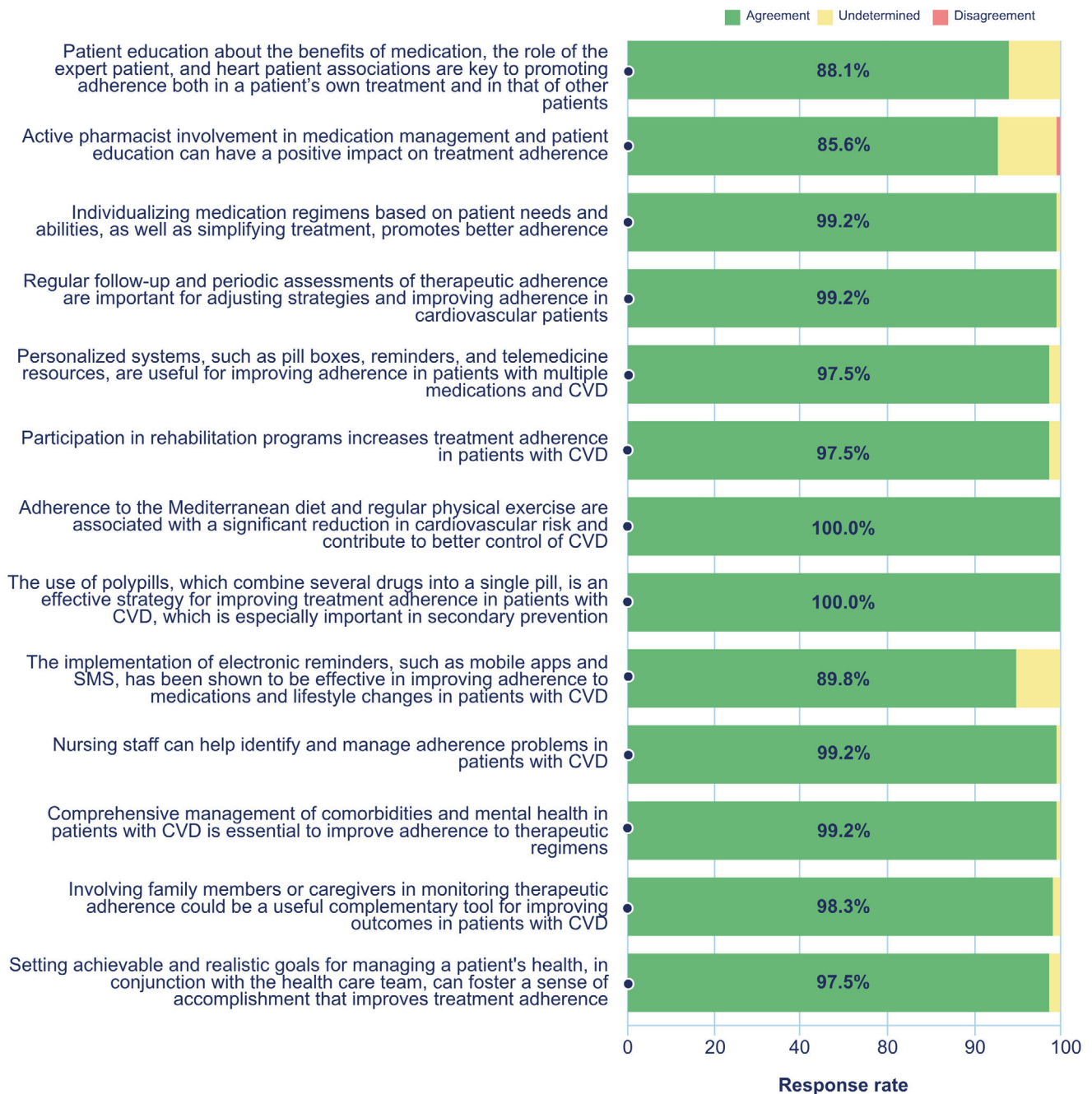


Fig. 6 – Level of expert consensus of strategies to improve therapeutic adherence. CVD: cardiovascular disease.

the stigma associated with CVD, were identified as significant barriers to adherence (agreement: 78.0%).

In contrast, adequate patient knowledge of their disease, available preventive therapies, and a clinical relationship based on mutual trust between health care professionals and patients were considered key facilitators of good adherence (agreement: 100.0%). Seemingly minor changes, such as switching between drug brands or interchangeable generics (with identical active ingredients but variations in appearance, such as color, shape, or packaging), can lead to patient

confusion and negatively impact therapeutic continuity and adherence in this population (agreement: 94.9%).

The experts also noted that the complexity of the drug regimen is inversely associated with adherence. Simplifying treatment through fixed-dose combinations (polypills or pill combinations) was considered an effective strategy to significantly improve adherence in patients with CVD (agreement: 100.0%).

Logistical barriers, such as changes in the patient's daily routine or the need to visit multiple pharmacies to complete

prescribed treatments, were also highlighted. These factors were recognized as relevant obstacles that may hinder therapeutic continuity (agreement: 89.0%).

In this context, long-term formulations (administered monthly or semiannually) were seen as useful alternatives to improve adherence by reducing the frequency of drug administration and simplifying follow-up (agreement: 89.0%).

Mobile devices and digital applications were recognized as potentially valuable tools to support therapeutic adherence in patients with CVD (agreement: 92.4%). Furthermore, the importance of incorporating a differential perspective considering psychosocial, cultural, biological, and gender specificities in designing strategies to promote adherence was highlighted (agreement: 92.4%).

Finally, no consensus was reached on whether the injectable route of certain drugs can negatively affect treatment adherence, given that the levels of agreement and disagreement were similar (agreement: 30.5%).

What strategies can we use to improve adherence?

Thirteen statements were evaluated, and consensus was reached in the first round of voting. The results are shown in Fig. 6.

The experts agreed on the importance of patient education about the benefits of drug treatment and the positive role that expert patient figures and cardiac patient associations can play, not only in improving individual adherence but also as agents of change for other patients (agreement: 88.1%).

The active participation of pharmacists, primarily in medication management and patient education, was recognized as an effective strategy for optimizing therapeutic adherence (agreement: 85.6%). In this regard, the experts agreed that individualizing therapeutic regimens according to patient characteristics, abilities, and preferences and simplifying drug regimens are fundamental measures to promote treatment adherence (agreement: 99.2%).

Regular follow-up and periodic assessments of therapeutic adherence were considered key elements for adjusting clinical strategies and promoting better adherence (agreement: 99.2%). Furthermore, personalized support systems, such as medication organizers, physical or digital reminders, and telemedicine platforms, were positively valued, especially for patients on multiple medications (agreement: 97.5%).

Participation in cardiac rehabilitation programs was considered an intervention that significantly contributes to improving therapeutic adherence (agreement: 97.5%), as was the adoption of healthy lifestyles, such as adherence to the Mediterranean diet and regular exercise, which not only reduces cardiovascular risk but also promotes overall disease control (agreement: 100.0%).

The experts recognized the positive impact of polypill use, especially in the context of secondary prevention, by reducing the patient's perceived therapeutic burden and increasing the likelihood of adherence (agreement: 100.0%). Similarly, the usefulness of electronic reminders, such as mobile apps or SMS messages, in improving adherence to both medication and lifestyle modifications was highlighted (agreement: 89.8%).

Nursing staff were identified as key professionals in detecting and addressing adherence-related problems because of their closeness to patients and their role in clinical follow-up (agreement: 99.2%). Moreover, comprehensive treatment of comorbidities and mental health is essential to ensure proper therapeutic adherence (agreement: 99.2%).

Finally, the value of involving family members or caregivers as complementary support in therapeutic follow-up was recognized (agreement: 98.3%), as was the importance of setting realistic and achievable goals, agreed upon by the patient and the health care team, to foster a sense of achievement and intrinsic motivation for treatment (agreement: 97.5%).

Impact of therapeutic adherence on clinical outcomes

Four statements were evaluated and received a consensus in the first round of voting. The results are shown in Fig. 7.

The experts agreed that high medication adherence is associated with a significant reduction in the risk of cardiovascular events, hospitalizations, and mortality, confirming its role as a central element in the secondary prevention and clinical management of these conditions (agreement: 99.2%).

Furthermore, they agreed that patients who maintain good treatment adherence experience a notable improvement in their quality of life, allowing them to maintain greater functionality, participate in more daily activities, and maintain better overall health (agreement: 97.5%).

From a public health perspective, adequate therapeutic adherence also contributes to a significant reduction in health care costs by reducing the need for unplanned medical interventions, hospitalizations, and readmissions, positively impacting both the health care system and available resources (agreement: 98.3%).

However, experts identified a misperception that can arise over time after a cardiovascular event. This misperception indicates that some patients, upon experiencing a subjective improvement in their health and quality of life, may feel that they no longer need to continue treatment, which represents a significant barrier to sustained adherence (agreement: 78.8%).

Finally, Table 1 provides practical recommendations to improve therapeutic adherence in patients with CVD in Spain.

Discussion

This Delphi consensus demonstrates a high degree of agreement among experts, with a consensus reached on 49 of the 50 statements evaluated (98%).

Identification of non-adherent patients and use of assessment tools

One of the central results identified in this consensus was the need for practical, validated, and standardized tools to identify nonadherence in clinical practice, especially in the context of chronic CVD.

Given that physicians often lack sufficient time during consultations, it was recommended that adherence assessment tools be self-administered by patients or administered by nursing staff as part of the follow-up process. In this context,

IMPACT OF THERAPEUTIC ADHERENCE ON CLINICAL OUTCOMES

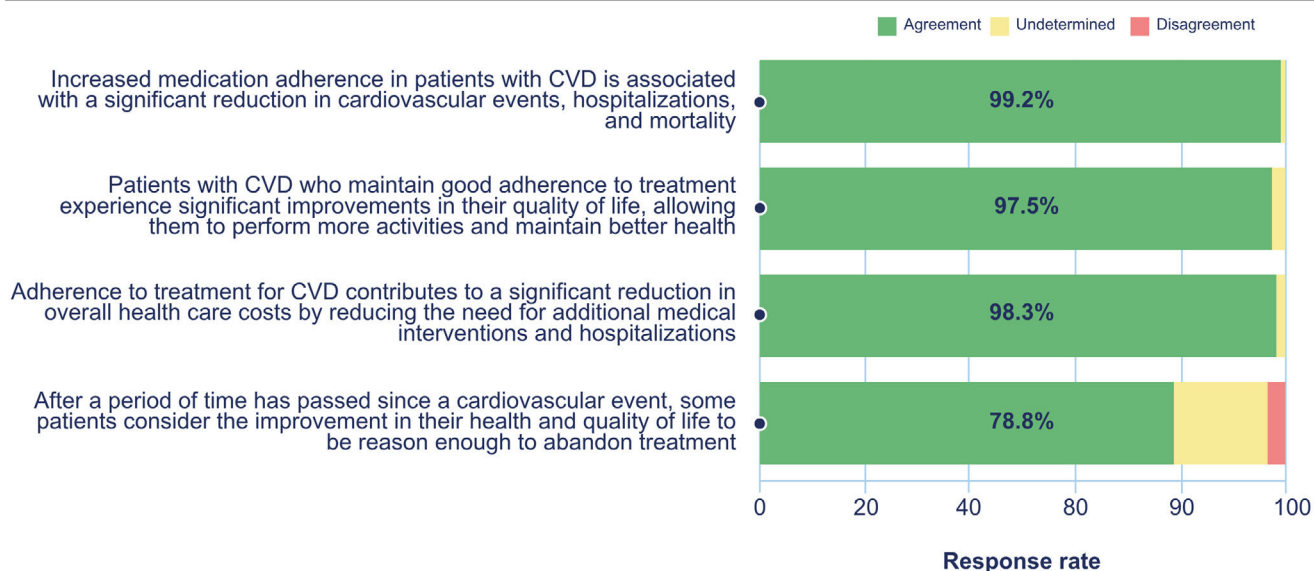


Fig. 7 – Level of expert consensus on the impact of therapeutic adherence on clinical outcomes in patients with CVD. CVD: cardiovascular disease.

Table 1 – Practical recommendations to improve therapeutic adherence in patients with cardiovascular disease in Spain.

| Number | Recommendations |
|--|---|
| <i>Overcoming inertia in identifying nonadherent patients</i> | |
| 1 | Integrate objective indicators, such as medication non-refilling from the pharmacy, into electronic health systems and generate automatic alerts that trigger preventive interventions. |
| 2 | Use brief tools (e.g., the Haynes–Sackett questionnaire) and the single prescription module for rapid screening during consultations. |
| 3 | Promote the role of nursing in monitoring adherence and therapeutic follow-up. |
| <i>Treatment simplification and use of combination therapies</i> | |
| 4 | Use fixed-dose combinations to reduce the number of pills taken. |
| 5 | Include an explicit recommendation for treatment simplification in hospital discharge reports as a marker of quality of care. |
| 6 | Clearly explain to patients the purpose of each medication and the expected benefits, encouraging their active involvement and that of their families. |
| <i>Interventions to maintain adherence over time</i> | |
| 7 | Promote maximal inclusion of patients in cardiac rehabilitation programs, complemented by the active participation of vascular risk units, coordinated by internal medicine physicians. |
| 8 | Encourage continuity of care and coordination between levels, for instance, by facilitating the use of shared electronic medical records between levels of care. |
| 9 | Strengthening the role of community nursing and pharmacists. |
| 10 | Promote the continuation of multidisciplinary training and the creation of professional networks with consistent clinical messages. |

the single prescription module was highlighted as the most practical and objective method for detecting nonadherence. The single prescription module is a digital system integrated into national health services that records and tracks pharmacy dispensing data, allowing real-time monitoring of medication collection by patients. This enables the calculation of indirect adherence indicators, such as the proportion of days covered, that estimates the percentage of days a patient has access to medication over a specified period.²²

They also considered simple tools such as the Haynes–Sackett questionnaire²³ or structured interviews such as the MMAS-8²⁴ to be useful.

Variability in clinical practice and strategies to improve adherence

Experts noted high variability in the implementation of adherence strategies in Spain, with differences across regions, centers, and levels of care. Pagès-Puigdemont et al.²⁵ reported that this organizational heterogeneity may have significant clinical implications, particularly in patients with chronic diseases such as CVD. This heterogeneity mainly affects the degree of coordination between primary care and cardiology. Notable barriers include administrative limitations and a lack of shared clinical pathways.

The role of the family physician as an integrative figure and the community pharmacist as a facilitator was another key point. Various reviews have shown that coordinated interventions between these professionals significantly improve adherence and clinical outcomes in patients with CVD.²⁶ Experts propose the use of specific notes on electronic prescriptions to avoid drug substitutions in particularly sensitive patients. In this context, the frequent substitution of medications with different pharmaceutical forms, whether brand-name drugs or generics, with different shapes, colors, or presentations can lead to confusion and decreased adherence, particularly in older adults or those taking multiple medications.²⁷

Additionally, specific interventions that have proven helpful in daily practice, such as weekly pillboxes, mobile apps with reminders, audible or visual alerts, and the active participation of family members and caregivers, are highlighted. A recent systematic review confirmed that digital technologies (mobile apps, SMS, automated reminder systems) can improve adherence by 10–15% in patients with CVD.²⁸

Structured health education was highlighted as a fundamental component for sustaining adherence. The experts emphasized the following:

- Clearly explain the purpose of each prescribed medication.
- Highlighting expected benefits, such as reduction of cardiovascular risk or prevention of recurrence.
- Discussing the risks of discontinuing treatment, including increased morbidity and mortality.
- Visualizing progress with the patient using clinical parameters or diagnostic results (e.g., blood pressure, lipid profile).
- Promoting patient empowerment by encouraging active involvement in treatment decisions through education, trust-building, and shared decision-making.

These strategies are aligned with contemporary models of patient-centered care, which promote shared decision-making and self-efficacy in chronic disease management.²⁹

Treatment simplification and combination therapies

Experts agree that treatment simplification is a key strategy for improving medication adherence. This approach benefits all patients, regardless of the number of medications prescribed. However, its impact is particularly notable in patients with polypharmacy, where the reduction in pill burden facilitates greater treatment persistence. Several studies support that simplified regimens improve adherence and reduce clinical events.³⁰ International guidelines recommend their use in secondary prevention.^{31–35}

Treatment simplification, using fixed-dose combinations (including polypills), pill reduction, and deprescribing unnecessary medications, was one of the most highly valued strategies. These interventions have been associated with improved adherence and clinical outcomes. In particular, the SECURE trial demonstrated that, compared with standard treatment, cardiovascular polypills significantly reduce major cardiovascular events while also improving medica-

tion adherence.³⁶ These findings are further supported by the START study, which analyzed real-world data and showed that single-pill combinations not only enhance therapeutic adherence but are also associated with significant reductions in hospitalizations, cardiovascular events, and mortality compared with equivalent multi-pill regimens.³⁷

Overcoming challenges such as therapeutic inertia and professional health care overload is vital for improving patient adherence. The incorporation of fixed-dose combinations (polypills or single pill combinations) into discharge reports is a proposed quality marker, highlighting the need to invest in fixed-dose combinations as a core solution to simplify treatment regimens, given their proven cost-effectiveness.^{38,39}

Continuity of care and coordination between levels

Continuity of care between levels was another central topic, given its impact on adherence. The literature highlights that fragmented care can lead to duplication, medication errors, and treatment abandonment.⁴⁰ Although tools such as e-consultation represent progress, they still have limitations, such as unidirectionality and a lack of integration with shared medical records. We should move toward bidirectional, interoperable, and patient-centered communication models.

Discharge reports should include clear and structured therapeutic information, given that errors in the transition between levels increase the risk of adverse events and nonadherence.⁴¹ Through professionals such as case managers, nursing can improve coordination, follow-up, and patient education, as reflected in multiple reviews.⁴²

The implementation of postdischarge care pathways and integrated circuits that facilitate follow-up from primary care was proposed. These models have been shown to reduce rehospitalization and improve adherence.⁴³ Furthermore, the usefulness of incorporating electronic alert systems that detect clinical risks or interruptions in treatment was highlighted as tools that have proven effective in contexts with a high care load.⁴⁴

Route of administration and its influence on therapeutic adherence

The statement that did not reach consensus in this study was whether the injectable route of administration reduces therapeutic adherence (agreement: 30.51%; disagreement: 29.66%). This lack of consensus may be due to the statement's ambiguity, which did not specify the frequency or type of drug.

Injectable formulations in patients with ischemic CVD are often associated with a higher initial cost compared to conventional oral treatments, especially in the case of innovative drugs such as proprotein convertase subtilisin/kexin type 9 (PCSK9) inhibitors or GLP-1 receptor agonists. Several cost-effectiveness analyses have shown that, in well-tolerated settings and with spaced dosing regimens, these treatments can offset the initial investment by reducing hospitalizations, medical visits, and cardiovascular complications.^{45,46} Beyond single-agent therapies, the cardiovascular polypill, by enhancing adherence and simplifying therapeutic regimens, has demonstrated favorable cost-effectiveness in secondary prevention.⁴⁷

The literature also indicates that adherence is influenced by multiple factors beyond the route of administration, such as dosing frequency, perception of disease severity, health education received, and possible injection phobia.⁴⁸ Although some patients may initially show reluctance to receive injectable treatment, adherence is usually high once the treatment initiated, especially if the regimen is simple and well tolerated.⁴⁹

This study is limited by an expert panel composed solely of physicians and two expert patients. Future research should include a broader multidisciplinary perspective, as nurses and pharmacists also play key roles in treatment adherence.

Conclusions

The results of this document based on Delphi methodology, reinforced by subsequent qualitative validation in local meetings, highlight the need to adopt a comprehensive, collaborative approach tailored to real-world clinical practice to address therapeutic adherence in patients with CVD. The high level of expert participation (100%) and the overall consensus achieved across 84% of the evaluated items underscores the robustness and representativeness of the findings. Identifying structural and operational barriers and proposing feasible solutions, such as simplifying treatment, improving continuity of care, and using digital tools, constitute an applicable roadmap for improving clinical outcomes and optimizing the use of health care resources.

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Statement on the use of artificial intelligence

The authors declare that no artificial intelligence tools were used in the writing of this manuscript or in statistical analysis.

Authors' contributions

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and supervision. J. Cosín Sales was responsible for project administration. V. Pallarés-Carratalá, R. Campuzano Ruiz, L. Castilla-Guerra, and D. Vivas validated the questionnaire. V. Pallarés-Carratalá, R. Campuzano Ruiz, and L. Castilla-Guerra contributed to the data visualization. V. Pallarés-Carratalá, R. Campuzano Ruiz, and D. Vivas prepared the original draft. R. Campuzano Ruiz, L. Castilla-Guerra, D. Vivas, and J. Cosín Sales contributed to the review and editing of the manuscript. All the authors reviewed and approved the final manuscript, and they agree to assume responsibility for all aspects of the article and to investigate and resolve any issues related to the accuracy and truthfulness of any part of the work.

Conflicts of interest

S. Raposeiras-Roubín is editor-in-chief of REC: CARDIOCLINICS; the journal's editorial procedure to ensure impartial handling of the manuscript has been followed. J. Cosín Sales has received honoraria for educational lectures, scientific consultancy, or participation in research projects from Almirall, Amarin, Amgen, Bayer, BMS-Pfizer, Boehringer Ingelheim, Casen Recordati, Daiichi-Sankyo, Esteve, Ferrer, Lilly, MSD, Mylan, Novartis, Novo Nordisk, Organon, Rovi, Sanofi, and Viatris. All other authors declare no conflicts of interest.

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Appendix. Supplementary data

Supplementary data associated with this article can be found in the online version available at <https://doi.org/10.1016/j.rccl.2026.03.001>.

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