



Facilitators and barriers to the adoption of healthy lifestyles after first myocardial infarction in Chile: A qualitative study.

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Background: Factors associated with therapeutic lifestyle change (TLC) after myocardial infarction (MI) have not been fully investigated in Chile. This study aimed to provide a descriptive examination of facilitators and barriers to TLC after first MI.

Methods: Qualitative study based on in-depth interviews and focus groups with cardiologists and patients who had first MI one-year±2 months before the beginning of the study. Grounded theory research methods were used to guide sampling and coding of data.

Results: Twenty-one patients who had first myocardial infarction and 14 cardiologists participated in in-depth interviews and focus groups until the point of theoretical saturation. Facilitators for TLC included optimism, self-efficacy, faith-based life purpose, positive attitudes by family and friends, social participation, good patient-physician relationship, and positive medical advice. Barriers were: individual (older age, female sex, lower educational level,

limiting beliefs, ambivalence, depressive mood, lack of knowledge on strategies to achieve TLC, financial constraints), family (family crisis, overprotection, imposing attitudes, unhealthy habits at home), work (work overload and competition between work recovery and TLC), socio-environmental (neighborhood unsafety), and health provider-related (poor patient-physician relationship, limiting beliefs among physicians, medical advice centered on restrictions or imprecise, medical training focused on pharmacological therapies and interventional procedures over preventive care, and organizational issues).

Conclusions: Reported facilitators and barriers enhance understanding of the process of lifestyle change after first myocardial infarction, and might be targets for optimization of secondary preventive strategies among Chilean patients.

Keywords: Lifestyle; myocardial infarction; prevention; qualitative research; health care

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Facilitadores y Barreras para la adopción de estilos de vida saludable después de un primer infarto del miocardio en Chile: estudio cualitativo

Antecedentes: Los factores asociados con el cambio terapéutico de estilos de vida (TLC) después de un infarto agudo al miocardio (IAM) no han sido suficientemente investigados en Chile. El objetivo de este estudio fue explorar y describir los facilitadores y barreras para la adopción de TLC en pacientes que han sufrido un primer IAM.

Métodos: Estudio cualitativo basado en entrevistas en profundidad y grupos focales con cardiólogos y pacientes que tuvieron un primer IAM un año \pm 2 meses antes del inicio del estudio. Se usó metodología de Teoría Fundada para guiar el muestreo y la codificación de los datos.

Resultados: Veintiún pacientes con un primer IAM y 14 cardiólogos participaron en las entrevistas en profundidad y grupos focales, hasta el punto de saturación teórica. Facilitadores para TLC incluyeron optimismo, autoeficacia, propósito de vida basado en la fe, actitudes positivas por familiares y amigos, participación social, buena relación médico-paciente, y un consejo médico positivo. Las barreras fueron: in-

dividuales (edad avanzada, sexo femenino, bajo nivel educacional, creencias limitantes entre los pacientes, ambivalencia, estado de ánimo depresivo, falta de conocimiento sobre estrategias para lograr TLC, limitaciones financieras), a nivel familiar (crisis de la familia, sobreprotección, imposición de actitudes, hábitos no saludables en el hogar), a nivel laboral (sobrecarga de trabajo y competencia entre la recuperación del trabajo y la adopción de TLC), a nivel socio-ambiental (inseguridad del barrio), y a nivel del proveedor de salud (mala relación médico-paciente, creencias limitantes entre los médicos, consejo médico impreciso o basado en restricciones, formación médica centrada en aspectos farmacológicos e intervencionales por sobre lo preventivo, y problemas de organización).

Conclusiones: Los facilitadores y barreras reportados mejoran la comprensión del proceso de cambio de estilos de vida después del primer infarto agudo al miocardio, y pueden contribuir a la optimización de estrategias de prevención cardiovascular secundaria en pacientes chilenos.



Background: Coronary heart disease (CHD) is the leading cause of death and a major contributor to morbidity and premature disability among Chilean adults¹⁻²⁻³. Myocardial infarction (MI) survivors are at an increased risk of recurrent coronary events and death, and have complex therapeutic requirements that account for high health-care costs⁴.

Therapeutic lifestyle changes (TLC) -especially smoking cessation, improvement of dietary habits, regular physical activity and weight loss- have been associated with improved outcome following first MI, including higher survival rates, fewer recurrent MIs, less frequent hospitalizations, better control of metabolic risk factors (e.g. hypertension, dyslipidemia, diabetes), improvement of psychosocial profile and quality of life, and considerable decrease in medical expenses among CHD patients⁵⁻⁶. However, fewer than 50% of Chilean patients who were hospitalized for cardiovascular events achieve healthy lifestyles at one-year⁷ and similarly poor results have been described in developed countries⁸.

Several groups have questioned the futility of salvaging acutely ischemic myocardium without addressing the underlying causes of the disease, specifically those related to TLC⁸⁻⁹. An increasing number of studies have addressed this topic, including qualitative research on facilitators of and barriers to lifestyle change among people with cardiovascular risk factors as well as those with established CHD in USA and European countries¹⁰⁻¹¹⁻¹²⁻¹³⁻¹⁴. A recent review of 22 qualitative observational studies from USA, England, Taiwan and Australia, found that factors such as social support, beliefs and psychological factors not only influence lifestyle change, but are important for maintaining healthy behaviours over time¹⁵. Qualitative work regarding lifestyle change among Hispanic populations is limited, and most of it has been conducted among groups of Latinos living in developed countries¹⁶⁻¹⁷. Moreover, heterogeneity of Hispanics according to their country of origin, and variety in their culture and identity make difficult to apply findings to a different sociocultural context¹⁸. This study presents the first descriptive qualitative examination of factors that may enhance (facilitators) or hinder (barriers) adoption of TLC after a first MI among Chilean participants.

Methods

Setting

This study took place at two cardiac practices located in areas of low and middle socioeconomic levels in Santiago, Chile: Dr. Sótero del Río and San Joaquín, respectively.

Both cardiac practices serve as clinical campuses for the School of Medicine of the Pontificia Universidad Católica de Chile. Participants of this study had no access to a rehabilitation program after MI, mainly due to lack of coverage by the Chilean health system. Local ethics committees approved the study and written informed consent was obtained.

Study design and Sample

Between April and October 2008, we conducted a qualitative study based on in-depth interviews and focus groups with cardiologists and patients who had first MI one year \pm 2 months before the beginning of the study. A qualitative approach was chosen due to the nature of the research questions being asked (dealing with why, how, beliefs, and experiences of post-MI patients and physicians regarding lifestyles)¹⁹⁻²⁰.

Patients were purposively sampled from clinical CHD registries irrespective of knowledge of their achievement of TLC. Maximum variation method²⁰⁻²¹ was used in order to cover a range of post-MI experiences (diversity of sex, age, educational level and type of revascularization therapy). Two groups of cardiologists were selected based on their experience on the topic under study (preventive cardiology experts) and on their work in the participating practices. Preventive cardiology experts were identified among their peers using a snowball sampling method²², starting with those who were known by the research team, whom then referred the researchers to other colleagues along the country. Patients and physicians were contacted by phone, project details and time commitment were explained, and an interview was arranged.

Data collection

In-depth, open-ended interviews¹⁹⁻²³ were conducted in person with 21 post-MI patients (13 patients from Dr. Sótero del Río and 8 patients from San Joaquín) and 8 preventive cardiology experts. Other 6 cardiologists from participating practices took part in focus group discussion. A total number of 35 respondents participated in the study. Interviews were each 60 to 90 minutes in length. Two interviewers with expertise in qualitative interviewing and the topic under study (LL and CB) were present at nearly all interviews and the focus group. Interviews and focus group were audio-taped and transcribed verbatim by an independent transcriptionist. Interviewers also made written records of nonverbal communication and field notes.

Individual interviews with patients were conducted using a standard semistructured guide that began with the general



questions “please describe what a typical day in your life is like” and “what aspects of your life have changed as a result of the MI?” Specific probes concerning description of TLC followed and patients were asked to identify aspects that facilitated or hindered TLC after MI. Adequacy of interview guide (language and contents) was pre-tested on two post-MI patients from cardiac practices similar to study participating centres. A full version of patients’ interview guide is available as supplement in Spanish and English (see Additional file 1).

Focus group and individual interviews with cardiologists included questions about physicians’ own views on factors that might either facilitate or hinder TLC among post-MI patients. They were also asked to describe post-MI patients in terms of achievement of TLC. A full version of physicians’ interview guide is available as supplement in Spanish and English (see Additional file 2).

Definition of lifestyle changes

Three self-reported TLC following MI were explored: Smoking cessation for >6 months, adoption of regular physical activity (at least brisk walking 30 minutes per day on most days), and weight lost $\geq 5\%$ for overweight and obese patients. As an additional measure of smoking status, carbon monoxide (CO) concentration in expired air was measured to all patients. Using standard technique for monitor Smoke Check®, any value >6 parts per million was considered indicative of smoking²⁴. Change in dietary patterns and other lifestyles spontaneously reported by patients were also registered and included in analysis.

Data Analysis

Grounded theory research methods were used to guide sampling and open coding of data¹⁹. Three researchers from different disciplines (medicine, psychology and philosophy) performed analysis in 4 steps: First, each researcher examined independently the transcripts deriving an initial coding frame; second, a total of 56 specific codes were refined and classified as facilitators for or barriers to TLC, using a group negotiated process; third, facilitators and barriers were grouped into five levels of factors according to the model of determinants of health²⁵, even though the research team was open to the emergence of factors other than those included by the model of determinants of health; and fourth, distinctions between patients achieving greater TLC (2 or more) and those with lesser degree of TLC (less than 2) were explored. The cut-point of two TLC was arbitrarily chosen, being judged by the research team to be clinically relevant in order to contrast groups

of greater and lesser TLC. Data collection and analysis on the first interviews influenced the collection of information on subsequent participants. Iteration between data collection and analysis continued until the point of data saturation¹⁹⁻²⁶, e.i., until further interviews added no new concepts or insights to the research objectives. Deviant-case analysis²⁷ was used in cases seeming to contradict the emerging facilitators and barriers for TLC.

Original quotations underwent a careful process of translation from Spanish to English, with special attention to colloquial language and to maintain linguistic and cultural context of participants’ speech.

Results

Demographic and Clinical Characteristics

Saturation point²⁶ was reached after having interviewed 21 patients and 14 cardiologists and that defined the end of data collection. One patient from San Joaquín Medical Centre declined to participate, and an additional patient with similar sampling characteristics was invited. Table 1 presents demographic and clinical characteristics of post-MI patients. Median age of the patients was 57 (range 41 to 73 years). Fifteen patients (71.4%) had at least 8 years of education, including 5 patients who had completed college (23.8%). Most patients (81%) reported living with a spouse or partner and 48% identified themselves as being heads of households with dependent children. Patients

Table 1: Demographic and clinical characteristics of post myocardial infarction patients

Characteristic	Total patients n=21
Men: women ratio	13:8
Age in years, median (range)	57 (41-73)
Educational level in years, n (%)	
<8	6 (28.6)
8 to 12	7(33.3)
>12	8 (38.1)
Married/partnered, n (%)	17 (81.0)
Household head with dependent children, n (%)	10 (47.6)
Type of MI treatment, n (%)	
PTCA*	16 (76.2)
CABG**	5 (23.8)
Cardiac Practice, n (%)	
Sótero del Río	13 (62.0)
San Joaquín	8 (38.0)
Lifestyles at the time of MI, n (%)	
Cigarette smoking	14 (66.7)
Sedentary lifestyle	14 (66.7)
Overweight or obese	17 (81.0)
*PTCA: Percutaneous Transluminal Coronary Angioplasty	
**CABG: Coronary Artery Bypass Grafting	



Table 2: Selected dimensions and quotations illustrating facilitators and barriers to lifestyle change at individual, family, work and socio-environmental levels.

Level	Dimensions	Illustrative quotations	Family	Unhealthy habits at home
Individual	Demographic	“There is a huge difference between seniors and younger patients. My perception is that people who are in the workforce, those who have to provide for their families take more responsibility for their health. Also, people with higher education tend to seek more information and take this more seriously.” (Preventive cardiology expert).		
	Psychological: Optimism	“I took the heart attack as a warning, and thanks to this, I am taking care of myself. Now I have a much healthier life than before, and this is thanks to the heart attack, although this may seem stupid. I had the heart attack, and the change was noticeable, I took it positively.” (Man, 43 years old, quit smoking, lost ≥5% weight and became physically active after MI).		Positive attitude
	Psychological: Ambivalence	“After a period of time, the average patient has already forgotten this vital experience. Some even purpose to forget it, pretending that it never happened. Some patients never accept that this is a chronic disease.” (Cardiologists, focus group) “I see my health as being back to normal. Around one month after having the heart attack I had already forgotten about it. I have carried on a normal life because I have felt well. Honestly, I have forgotten about my disease.” (Man, 63 years old, continued to smoke after MI, maintained normal weight and physical activity after MI).		Overprotection and imposing behaviors
			Work	Competition between work recovery and lifestyle change
			Socioenvironmental	Perception of insecurity in the streets

were treated with either percutaneous transluminal coronary angioplasty (76.2%) or coronary artery bypass grafting (CABG) (23.8%) when MI occurred.

Cardiologists from participant practices (n=6) reported a median of 12 years in cardiology (range 1 to 38). Preventive cardiology experts (n=8) had a median of 18 years of practice as cardiologists (range 9 to 29) and a median of 15 years of experience dedicated to CHD prevention (range 7 to 27). Cardiologists who participated as experts belonged to Universidad Católica de Chile, Universidad de Chile, Hospital DIPRECA, Universidad de Los Andes and Universidad de la Frontera.

Lifestyle changes among post-MI patients

All patients reported at least one unhealthy lifestyle (smoking, lack of regular physical activity or being overweight

or obese) when they suffered the MI (Table 1), 57.1% had two or more, and 33.3% had all three unhealthy behaviors. Smoking cessation was the most frequently reported TLC. Eleven out of 14 smoker patients (78.6%) reported having quit smoking and maintained their non-smoking status at one-year post- MI. No cases of new smokers were found



Table 3: Selected dimensions, contents and quotations illustrating facilitators and barriers to lifestyle change at health-care-provider level.

Dimension	Contents	Illustrative quotations
Patient-physician relationship	Poor communication	"The follow-up appointments are done in such a way that one barely has the chance to ask a question, and the conversation is very limited." (Man, 49 years old, quit smoking, continued sedentary and overweight after MI).
	Good communication	"My doctor is a good person and an excellent professional as well. I cannot thank him enough. He has been very honest with me, and I have followed his instructions in terms of diet and medication." (Man, 60 years old, quit smoking, lost $\geq 5\%$ weight and became sedentary after MI).
Physician's beliefs	Struggling with lifestyle change	"Lifestyle change is also difficult for physicians. The truth is that even I would like to make some changes in my habits, and it is difficult. It's hard for all of us." (Preventive cardiology expert).
Medical advice	Omission of relevant elements	"Physicians sometimes don't ask. For instance, not smoking seems so obvious that sometimes they simply don't ask patients about that." (Preventive cardiology expert).
	Permissiveness	"Before the heart attack I used to smoke ten cigarettes per day, now I smoke six... my doctor said that I have to cut down up to four, because quitting smoking at all would be impossible for me." (Man, 63 years old, continued to smoke after MI, maintained normal weight and physical activity after MI).
	Lack of definition of lifestyle goals	"I am not sure which exercises a person who has had a heart attack can do. If someone would tell me how much I must exercise, I would do it. But the truth is I really don't know." (Woman, 60 years old, non-smoker, continued sedentary and overweight after MI).
Medical training	Focus on pharmacological therapies and interventional procedures over preventive care	"As physicians we were educated with a curative outlook, not a preventive one. We are used to quick definitions, quick rewards regarding treatment of diseases. I think the flaw comes from the beginning, because Medical Schools focus on teaching pharmacological therapies and interventional procedures over preventive care. Consequently, we are not prepared for prevention." (Preventive cardiology expert).
Organizational issues	Lack of access to health care	"I got tired of the fight. I have to pay for locomotion, and then I wait all morning in the lineup, to then be told that the doctor isn't in, and that there are no more appointments available that month. That's reality, and that's why I got fed up coming here. It's been six months since the doctor has seen me." (Woman, 43 years old, continued to smoke after MI, lost $\geq 5\%$ weight and maintained level of physical activity after MI).
	Physicians overload	"The workload is so heavy that us physicians do not always have the necessary time, or the willingness to educate." (Cardiologists, focus group)

and concentration of CO in expired air coincided with patients' self-report of smoking status in all cases. Overall, fourteen patients (67%) reported adoption of regular physical activity, while seven patients remained or became sedentary after MI. Seventeen patients (81%) were overweight or obese when MI occurred. Eleven patients (53%) reported having lost $\geq 5\%$ weight, and the rest either maintained or increased weight after MI, including two previously normal weight patients who reported an increa-

se $>10\%$ of body weight along with quitting smoking.

Facilitators of and barriers to lifestyle change

Facilitators and barriers were organized into five levels. Table 2 presents selected dimensions and quotations illustrating facilitators of and barriers to lifestyle change at individual, family, work and socio-environmental levels. Selected dimensions, contents and quotations illustrating facilitators of and barriers to lifestyle change at health-ca-



reprovider level are presented in Table 3. Unless specifically noted, all results presented below correspond to consensus among post-MI patients and physicians.

Individual factors

Five distinct dimensions of individual factors affecting TLC were identified: Demographics, psychological characteristics, knowledge and financial issues. Older age, female sex, lower educational level and financial constraints acted as barriers to TLC. Optimism, high-perceived self-efficacy, and faith-based life purpose acted as psychological facilitators for TLC. Psychological barriers to TLC included depressive mood and ambivalence between acceptance of CHD as a chronic condition versus wish to get back to normal life and forget MI. Additional barriers for TLC were patients' belief that TLC are unachievable, belief that physical exercise may trigger a second heart attack, and beliefs about causal attribution of MI, all which acted as patients' limiting beliefs about their ability to carry out the necessary TLC. For instance, patients who continued smoking believed that stress could have played a more significant role than cigarette smoking in causing their MI. In terms of knowledge, even less educated patients were informed about risk factors for CHD and all of them reported awareness of risks and fear of recurrence. However, patients' lack of knowledge of TLC goals and of practical strategies to achieve them acted as barriers for TLC. See Table 2.

Family and friends factors

Emotional factors, practical care and attitudes of family members and close friends played a relevant role on patients' TLC. Family, friends and especially children were described as main source of motivation for TLC after MI, while family crisis acted as an important barrier. Unhealthy habits by family members, especially spouses, as well as lack of exercise partner were seen as practical barriers. Positive attitude by family members and engaging in healthy activities along with patients facilitated TLC, while imposing attitudes and overprotection by family members acted as barriers. See Table 2.

Work factors

Returning to work and resuming previous work routine were viewed as a source of personal enjoyment and motivation for TLC. However, competition between work recovery and patients' efforts toward TLC was identified as a barrier, especially among 9 young males who identified themselves as being heads of households. Work overload

and extended work-hours were additional barriers to TLC, especially for physical activity. See Table 2.

Socio-community and environmental factors

Post-MI patients described participation in community groups as a source of enjoyment and emotional support after MI. Social groups also provided practical care in achieving TLC (e.g., having reminders about not smoking and checking for patients' adherence to diet and medication). Physicians did not identify social participation among relevant factors that promoted patient's TLC. Patients' perceived insecurity in the streets emerged as an important environmental barrier, especially for physical activity post-MI. See Table 2.

Factors related to the health-care provider

Five dimensions of health-care-provider related factors were identified (Table 3). First, most patients emphasized the importance of the patient-physician relationship, especially communication with their physicians, as a crucial element affecting their achievement of TLC. Few patients reported support from nurses, dietitians and other clinical staff as facilitators for TLC. Second, physicians' beliefs regarding ineffectiveness of lifestyle versus pharmacological interventions, perceived lack of long-term success of TLC, and perception that lifestyle is something physicians also struggle with limited their efforts toward promotion of TLC among their patients. Third, focus on restrictions, omission of relevant elements (e.g., missing checking smoking status at every visit), permissiveness (e.g., accepting cigarette smoking reduction instead of quitting smoking as a therapeutic goal), and lack of clear definition of TLC goals were identified as elements of medical advice that hindered patients' TLC. In contrast, precise and positive medical advice was seen as facilitator for TLC. Fourth, physicians reported that having been trained with focus on pharmacological therapies and interventional procedures over preventive care, being able to manage a limited variety of strategies to implement TLC, and having received deficient training on communication skills were factors that affected their performance when approaching TLC with patients. Finally, patients and physicians identified organizational barriers for TLC, including lack of access to healthcare, lack of coverage for cardiac rehabilitation programs, time constraints during visits, work overload for physicians, and poor collaboration between secondary and primary care teams. Financial constraints at organizational level played a signi-



ficant barrier role at Dr. Sótero del Río's cardiac practice.

Distinctions among post-MI patients

Two groups of post-MI patients were contrasted according to achievement of lifestyle goals. Twelve out of 20 patients reported having achieved two or more TLC, including smoking cessation when applicable. The remaining 9 participants reported having achieved zero to one TLC. Patients who achieved greater TLC tend to be younger, predominantly males and with higher education; they had an optimistic view about future, a greater perception of self-efficacy and of their role as active agents in their own health. They reported higher interaction with health-care providers and their dependence on family support for TLC was lower than that of their counterparts who reported lesser TLC. All CABG patients fell into this group. Six out of nine (67%) patients with lesser degree of TLC corresponded to the cardiac practice located in a low socioeconomic area (Dr. Sótero del Río).

Discussion

This qualitative study explored the process of lifestyle change from the perspective of post-MI patients and cardiologists in Chile. Variables that acted as facilitators of and barriers to lifestyle change were identified.

Findings in relation to other studies

Our study adds to previous research by providing a comprehensive examination of facilitators of and barriers to TLC among Chilean post-MI patients. In consistency with previous studies, we identified individual factors such as older age, low education, depressive mood, ambivalence, causal attribution and beliefs regarding physical exercise as barriers for TLC among post-MI patients¹¹⁻²⁸⁻²⁹. Lack of knowledge regarding TLC goals and the means to adopt them emerged as an important barrier post-MI, which may be explained in part by the lack of clear definition of TLC goals and poor medical training on strategies to implement TLC reported by physicians. Previous studies have also shown that CHD patients find difficult to identify their lifestyle goals²⁹.

Increasing evidence supports our findings regarding optimism, perceived self-efficacy, positive attitudes by family and friends, faith-based life purpose and our observation that medical advice facilitated TLC when focused on positive messages, but hindered them when focused on restrictions such as strict eating plans³⁰⁻³¹⁻³²⁻³³. Indeed, facilitating healthy lifestyles is one of the proposed mechanisms through which these positive psychological traits and po-

sitive care environment might impact cardiovascular outcomes³⁰⁻³⁴.

In terms of work and social factors, our findings coincide with previous studies¹¹⁻³⁵ in that resuming a normal working and social routine was an important goal for post-MI patients. However, our participants reported that this goal was in direct competition with efforts toward TLC. Additionally, the high relevance assigned by patients to participation in socio-community groups as a facilitator for TLC contrasts with physicians' accounts, in which social participation was scarcely mentioned. Explanation of this observation is likely multifactorial, and may include focus on biomedical aspects over social and psychological aspects of health during clinical encounters.

Meaning of the study

To the best of our knowledge, this is the first Chilean study in examining patients and cardiologists' perspectives about potential facilitators of and barriers to TLC after a first MI, thus contributing to generate local evidence that might be useful for the design of improved secondary preventive strategies in our country. Our study also contributes to highlight the unique contribution of qualitative research to the understanding of lifestyle change after MI in a population of Hispanics living in their country of origin, among which this kind of research is scarce. Through providing insight into social, emotional and experiential aspects of TLC after first MI, our findings enhance understanding of why TLC can be hard to achieve or maintain by cardiac patients, and what factors play a role as facilitators of or barriers to TLC. In addition, our study identified differences between subgroups of patients with greater and lesser achievement of TLC, which seem to differ in their distribution of facilitators of and barriers to TLC. This constitutes a preliminary finding that needs to be confirmed and further explored in future studies.

In particular, our study offers an itemized description of health-care-provider factors that affected patients' TLC. Patient-physician relationship, focus on pharmacological over lifestyle interventions, physicians' perceptions of ineffectiveness of TLC and a variety of organizational issues have also been previously shown to influence patients' attitudes and health behaviors, as well as professionals efforts toward promotion of TLC during clinical encounters⁹⁻³⁶⁻³⁷. Our study is the first to report that physicians associate themselves with patients in terms of being struggling with lifestyles, and that this acted as an important barrier to promotion of TLC among their patients. Our study also identified aspects of medical training that negatively affected



physicians' effectiveness in promoting TLC among their patients. This observation offers valuable information for curriculum design, especially due to findings represent the unique perspective of Chilean practicing cardiologists with a wide range of experience.

The fact that most of the barriers to TLC reported here correspond to modifiable factors is encouraging for clinicians and policymakers as well. Evidence is clear that TLC are achievable and that even modest improvements in lifestyles are associated with significant benefits in health⁹⁻³⁸. Furthermore, an array of behavioral strategies has been used for decades in the field of lifestyle modification, including the stages of change model³⁹, motivational interviewing (MI)⁴⁰, and goal setting⁴¹. Our findings support the concept that components of motivational interviewing (specially expressing empathy and supporting patients' self-efficacy) and goal setting are particularly well-suited for addressing TLC among post-MI patients in Chile.

We acknowledge that overcoming the multiple barriers presented here, especially socio-cultural, environmental and organizational barriers will require initiatives that go beyond the factors examined in this work, including improvement of social conditions, health policies that favour healthy lifestyles and discourage unhealthy options, better insurance coverage for preventive interventions and better organization of health services. Low coverage for cardiac rehabilitation programs and scarcity of formally trained cardiac preventive professionals in Chile⁴² makes imperative that healthy lifestyles be promoted and pursued as therapeutic goals in all settings where post-MI patients encounter the health system. Effective collaboration between cardiologists and primary care physicians, as well as nurses, other healthcare professionals and non-professional community members will be also needed if secondary prevention of CHD is to be improved. Initiatives such as EUROACTION⁴³ and Coaching patients On Achieving Cardiovascular Health (COACH)⁴⁴ are good examples of family-based, nurse-coordinated programs that have demonstrated significant improvements of TLC among CHD patients.

Strengths and limitations of the study

This study shares the strengths and limitations of qualitative research. Several qualitative techniques were used in order to ensure comprehensive analysis of data²⁷ including triangulation at methodological (two methods of data collection), disciplinary (clinical, psychological and philosophical perspective) and informant (post-MI patients and cardiologists) levels. The use of maximum variation

sampling and deviant case analysis also contributed to refine analysis and maximize credibility and transferability of our findings²⁷. Among the limitations of this study is the inability to exclude the influence of prior assumptions and experience of researchers over data collection and interpretation of findings. Furthermore, this study was carried out in two medical practices which are university clinical campuses and we did not have access to patients lost to follow-up after MI. Therefore, these data are likely to correspond to a "best-case-scenario" and the reality of TLC in post-MI Chilean patients might be worse. Finally, our results reflect patients and physicians' perspectives and experiences regarding TLC and we have no data on what actually took place in the medical encounters that are referred to. However, perceptions and beliefs represent a valuable source of knowledge and they may be as important as reality on influencing health behaviours⁴⁵⁻⁴⁶.

Future research

Our findings might be useful for the design of future secondary CHD prevention strategies in Chile, targeting the barriers found in this work. Further research that assesses aspects such as design, applicability, effectiveness and cost of such strategies is warranted. Additionally, the contrast that we found between a group with greater and lesser TLC needs to be considered as a preliminary finding, which needs to be confirmed and better characterized by future studies. Indeed, statistical differences could not be tested based on the qualitative design of this study. In addition, the views expressed in this study are those of post-MI patients and cardiologists. Future research may include family members, members of community groups, co-workers, and other health professionals such as nursing staff and primary care physicians, whom might provide different and valuable insight on the topic of interest.

In conclusion, reported facilitators and barriers enhance understanding of the process of lifestyle change after first myocardial infarction, and might be targets for optimization of secondary preventive strategies among Chilean patients.

Abbreviations

TLC: Therapeutic lifestyle change
MI: Myocardial infarction
CHD: Coronary heart disease
CABG: Coronary artery bypass grafting

Competing interests

The authors declare that they have no competing interests.



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Authors' contributions

All authors were responsible for the study concept and design, and participated in the analysis and interpretation of data. CB had full access to all the data in the study and is the study guarantor. MXS was involved in supervising the study, discussing data collection and analysis and writing the paper. LL participated in data collection, analysis and writing the manuscript. FB gave on-going support to the study in recruiting patients and cardiologists, provided clinical advice and contributed to interpretation of results. PM and CP contributed to interpretation of results and development of manuscript. AMR contributed to the study preparation and conduct, and interpretation of results. All

authors critically revised and approved the manuscript and can take responsibility for the integrity of the data and the accuracy of the data analysis.

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