CIÊNCIAS DA VIDA E DA SAÚDE
LIFE AND HEALTH SCIENCES
CIENCIAS DE LA VIDA Y LA SALUD

millenium 41

Millenium, 2(15), 41-51.

UMA REVISÃO SISTEMÁTICA DAS INTERVENÇÕES DE GESTÃO DE RISCO CARDIOVASCULAR ENTRE PESSOAS QUE VIVEM NA COMUNIDADE COM DOENÇA CRÓNICAS

A SYSTEMATIC REVIEW OF CARDIOVASCULAR RISK MANAGEMENT INTERVENTIONS AMONG COMMUNITY-DWELLING PEOPLE WITH CHRONIC DISEASE.

UNA REVISIÓN SISTEMÁTICA DE LAS INTERVENCIONES DE MANEJO DEL RIESGO CARDIOVASCULAR ENTRE LAS PERSONAS QUE VIVEN EN LA COMUNIDAD CON ENFERMEDADES CRÓNICAS

Helga Rafael Henriques[1] https://orcid.org/0000-0003-2946-4485
Joana Pinto[2] https://orcid.org/0000-0002-3350-2512
José Faria[2] https://orcid.org/0000-0001-7346-9086
Augusto Silva[3] https://orcid.org/0000-0003-4064-1198

[1] Escola Superior de Enfermagem de Lisboa, Departamento de Fundamentos de Enfermagem, CIDNUR -Centro de Investigação, Inovação e Desenvolvimento em Enfermagem, Lisboa, Portugal
[2] Centro Hospitalar Universitário de Lisboa Central, Serviço de Cardiologia, Lisboa, Portugal
[3] Centro Hospitalar Lisboa Norte, Lisboa, Portugal

Helga Rafael Henriques - hrafael@esel.pt | Joana Pinto - joanapinto@esel.pt | José Faria - jose.faria@chlc.min-saude.pt | Augusto Silva - gusto.silva.83@gmail.com

Corresponding Author
Helga Marília da Silva Rafael Henriques
Rua do Sobreiro Velho, nº 4, Furadouro
2565-183 - Torres Vedras - Portugal
hrafael@esel.pt

RECEIVED: 01th December, 2020
ACCEPTED: 25th February, 2021

Henriques, H. R., Pinto, J., Faria, J., & Silva, A. (2021). A systematic review of cardiovascular risk management interventions among community-dwelling people with chronic disease. *Millenium, 2*(15), 41-51.
DOI: https://doi.org/10.29352/mill0215.22231

RESUMO

Introdução: As doenças cardiovasculares (DCV) representam a principal causa de mortalidade no mundo. A hipertensão arterial, obesidade, diabetes, dislipidémia, sedentarismo e tabagismo são fatores de risco das DCV e das principais doenças crónicas. A evidência sobre a efetividade de intervenções de promoção da gestão do risco cardiovascular na doença crónica é ainda lacónica.
Objetivo: Identificar os componentes dos programas de gestão do risco cardiovascular para pessoas com doença crónica na comunidade, bem como as técnicas de mudança comportamental utilizadas.
Métodos: Realizou-se uma revisão sistemática da literatura em novembro de 2020, seguindo as recomendações da *PRISMA. Recorremos às* bases de dados MEDLINE, CINAHL, SCOPUS, Web of Science, Cochrane, Academic Search Complete e Mediclatina. A amostra bibliográfica foi constituída por 21 artigos, envolvendo 26040 pessoas com doença crónica.
Resultados: Os programas de intervenção são heterogéneos, no que diz respeito aos seus componentes, disciplinas do conhecimento envolvidas, duração e estratégias utilizadas. As técnicas de mudança comportamental mais frequentemente usadas são as de aconselhamento e negociação.
Conclusão: Podemos concluir que as intervenções educacionais são uma abordagem consensual na gestão do risco de DCV em pessoas com doenças crónicas. A heterogeneidade das intervenções impede determinar a efetividade dos programas analisados. É necessário continuar a investigar para tornar os resultados mais consistentes.

Palavras-chave: doença crónica; autogestão; gestão do risco; programa

ABSTRACT

Introduction: Cardiovascular diseases (CVD) represent the main cause of mortality in the world. Arterial hypertension, obesity, diabetes, dyslipidemia, sedentary lifestyle and smoking are risk factors for CVD and the main chronic diseases. The evidence on the effectiveness of interventions to promote cardiovascular risk management in chronic disease is still laconic.
Objective: To identify the components of cardiovascular risk management programs for people with chronic illness in the community, as well as the behavioral change techniques used.
Methods: A systematic literature review was carried out in November 2020, following the recommendations of PRISMA. We used the MEDLINE, CINAHL, SCOPUS, Web of Science, Cochrane, Academic Search Complete and Mediclatina databases. The bibliographic sample consisted of 21 articles, involving 26040 people with chronic disease.
Results: The intervention programs are heterogeneous, concerning their components, knowledge disciplines involved, duration and strategies used. The most frequently used behavioral change techniques are advice and negotiation.
Conclusion: We can conclude that educational interventions are a consensual approach to the management of CVD risk in people with chronic diseases. The heterogeneity of the interventions doesn't allow us to determine the program's effectiveness. Further research is needed to make the results more consistent.

Keywords: chronic disease; self-management; risk management; program

RESUMEN

Introducción: Las enfermedades cardiovasculares (ECV) representan la principal causa de mortalidad en el mundo. La hipertensión arterial, obesidad, diabetes, dislipidemia, estilo de vida sedentario y tabaquismo son factores de riesgo de ECV y de las principales enfermedades crónicas. La evidencia sobre la efectividad de las intervenciones para promover el manejo del riesgo cardiovascular es todavía lacónica.
Objetivo: Identificar los componentes de los programas de manejo del riesgo cardiovascular para personas con enfermedades crónicas en la comunidad, así como las técnicas de cambio de comportamiento utilizadas.
Métodos: En noviembre de 2020 se realizó una revisión sistemática de la literatura, siguiendo las recomendaciones de PRISMA. Se utilizaron las bases de datos MEDLINE, CINAHL, SCOPUS, Web of Science, Cochrane, Academic Search Complete y Mediclatina. La muestra bibliográfica contó con 21 artículos, involucrando a 26040 personas con enfermedad crónica.
Resultados: Los programas de intervención son heterogéneos en sus componentes, disciplinas de conocimiento, duración y estrategias utilizadas. Las técnicas de cambio de comportamiento más utilizadas son el asesoramiento y negociación.
Conclusión: Podemos concluir que las intervenciones educativas son un enfoque consensuado para el manejo del riesgo de ECV en personas con enfermedades crónicas. La heterogeneidad de las intervenciones impide determinar la efectividad de los programas. Se necesita más investigación para que los resultados sean más consistentes.

Palabras Clave: enfermedad crónica; autogestión; gestión de riesgos; programa

INTRODUCTION

Cardiovascular diseases (CVD) are those that affect the heart or blood vessels. The most common are lesions of the coronary or cerebral arteries and peripheral arterial disease (WHO, 2017). About 17.9 million people died of CVD in 2016, representing 31% of all global deaths (WHO, 2018). Portugal, whose mortality rate exceeds 30%, follows this trend, (DGS, 2016). In this context, the country's strategic proposal has chosen the reduction of premature mortality (<70 years) as a priority through the National Program for Cerebro-cardiovascular Diseases (DGS, 2016).

The control of CVD risk factors, such as smoking, hypertension, dyslipidaemia, obesity, diabetes, physical inactivity, among others, can be achieved through the adoption of a healthy lifestyle (WHO, 2017). It is possible to verify that the adoption of healthy behaviours, such as physical activity, is effective in the prevention and treatment of chronic diseases, such as CVD, cancer, diabetes and chronic respiratory diseases (Bullard, Ji, An, Trinh, Mackenzie & Mullen, 2019). Similarly, positive lifestyle changes, such as increased physical activity and changes in diet, have been considered central to controlling hypertension and pre-diabetes (Pengpid, Peltzer, Puckpinyo, & Chantarasongsuk, 2019).

Cardiovascular risk management has a broad scope of action, in order to work on the various risk factors simultaneously. However, available evidence does not always investigate the implementation of these interventions in a combined manner. This does not allow us to draw conclusions about their effectiveness on CVD risk management (Uthman et al., 2015).

The management of chronic disease presupposes a structured approach, which, according to the Chronic Care Model (Wagner, 2001), should include the following dimensions: organization of health care, service network, support for decision making, clinical information system, support for self-management and community resources. Support for chronic disease self-management is the intervention with the most significant results (Reynolds et al., 2018), with evidence that collaborative care can bring statistically significant and positive results in people with multiple chronic diseases (Luijks et al., 2015; Kastner et al., 2018). Thus, self-management of chronic disease is understood as a systematic intervention, directed at the person, allowing them to actively participate in self-monitoring (of symptoms or physiological processes) and in decision-making (management of the disease and its impact) (Chodosh et al., 2005).

A programmatic approach, according to the Chronic Care Model, is an essential tool for caring for people with chronic illnesses at home. The system that is created, through the model, is person-centred, based on scientific evidence and builds meaningful supportive interactions between informed person-clients and a proactive and prepared team.

On the other hand, behaviour change techniques are essential for the design and implementation of programs that promote chronic disease self-management. A behaviour change technique is an observable, replicable and irreducible component of an intervention designed to alter or redirect causal processes that regulate behaviour, that is, it is proposed that a technique be an 'active ingredient' (Michie et al., 2013).

The available evidence regarding the effectiveness of interventions to promote the management of chronic disease is manifestly insufficient, so research into new forms of healthcare is a priority (Xu, Mishra, & Jones, 2017; Van der Heide, 2018). Thus, the aim of this study is to identify the components of cardiovascular risk management programs in the adult population in the community with cardiovascular disease, paying attention to the characteristics of the interventions, benefits and behavioural change techniques used. It should be noted that this study started in April, 2020, with preliminary results already presented at the Ibero-American Congress on Qualitative Research 2020 (Henriques et al., 2020).

1. METHODS

This systematic review of the literature followed the guidelines of the *Preferred Reporting Items for Systematic Reviews and Meta-Analyses* (PRISMA)(Moher et al., 2015). We conducted our research in November 2020, where we included randomized studies, published between 2015 and 2020, assessing the effect of cardiovascular risk management interventions on the adult population with chronic disease in the community. Participants are over 18 years old and diagnosed with one or more chronic diseases. Studies where cardiovascular risk management were not the objective of the intervention were excluded. Studies whose participants were health professionals, people with communicable diseases, children, pregnant women or women who had recently given birth were also excluded. Qualitative studies, opinion articles, research protocols and literature reviews were also excluded. Due to limited resources for translation, this review was restricted to studies in English, Portuguese, Spanish and French.

MEDLINE, CINAHL, SCOPUS, Web of Science, Cochrane, Academic Search Complete and Mediclatina databases were used to search for relevant studies. The research strategy combined keywords related to the population ("Chronic Disease" or "Noncommunicable Diseases"), related to intervention ("Program Development" or to program or "Long-Term Care" or "Community Health Planning") and related to expected results (("Risk" or "Health Risk Behaviours" or "Risk Management" or "Risk Factors") and ("Cardiovascular Diseases")).

The first author searched databases. With the aid of the Rayyan® application, he removed duplicates and, in pairs, each of two independent researchers reviewed the titles and abstracts of the studies included in the initial sample. Divergent situations were discussed until consensus was reached. All articles that met the inclusion criteria were subjected to an evaluation of the full text

Henriques, H. R., Pinto, J., Faria, J., & Silva, A. (2021). A systematic review of cardiovascular risk management interventions among community-dwelling people with chronic disease. *Millenium, 2*(15), 41-51.
DOI: https://doi.org/10.29352/mill0215.22231

by the researchers. The first author reviewed all of the studies. Additionally, a search was carried out in the bibliographic references of the final sample of articles to identify potential articles that met the inclusion criteria.
The analysis of the studies was based on the Chronic Care Model (Wagner, 2001) and the behaviour change techniques proposed by Michie, Atkins & West (2014).

2. RESULTS

The research carried out in databases made it possible to identify 774 articles. Four articles were added to these resulting from the search in bibliographic references. After removing duplicates, we obtained a sample of 571 articles. During the selection and eligibility of documents, a total of 550 articles were excluded, with the final sample consisting of a total of 21 articles (Figure 1).

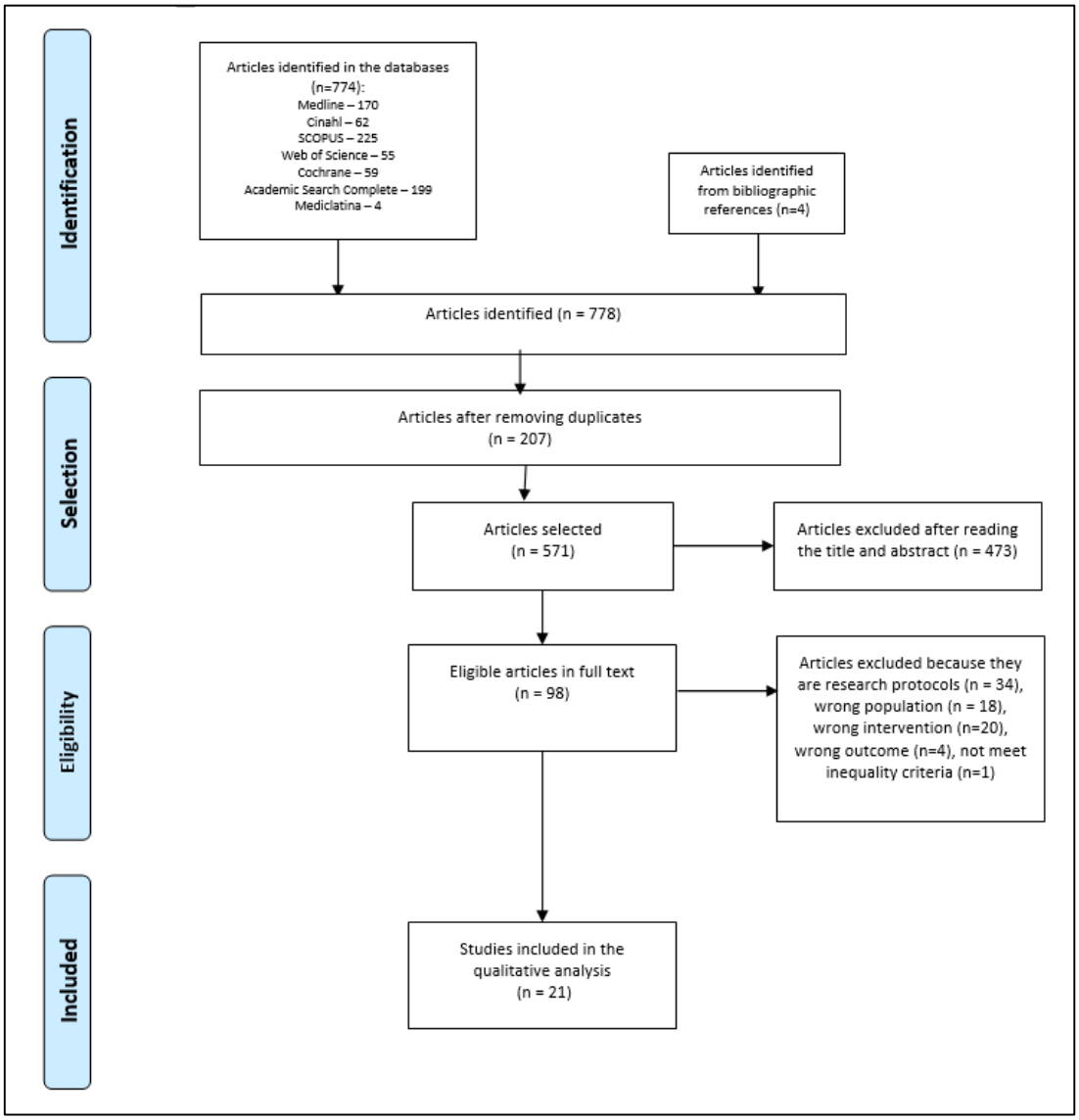

Figure 1 - Diagram of the Systematic Literature Review

In order to guarantee the quality of the studies, randomized experimental studies (12), quasi-experimental studies (8) and a cohort study (1) were included, according to the methodological quality levels (Meader, et al., 2014).
The bibliographic sample involves a total of 26040 people with chronic illness, coming from countries such as the USA, Turkey, the United Kingdom, Spain, Australia, Iran, Malaysia, Thailand, Finland, Italy, Germany, the Republic of Korea, Canada and China. The aim of all of the studies is to change the participants' lifestyle, with a view to better manage cardiovascular risk. The different programs presented are heterogeneous in the components of the intervention and may focus, alone or in combination, on health surveillance, physical exercise, diet, management of the medication regime or motivation. Likewise, there are interventions

conducted by nurses, nutritionists, pharmacists, physical trainers or health educators. The duration of the intervention varies between 3 and 52 weeks, with a mean of 16 (SD = 13.6) and a mode of 12 weeks. Participants are adults with one or more chronic diseases, including type 2 diabetes mellitus, hypertension, obesity, metabolic syndrome, cardiovascular diseases. Overall, there was a decrease in the risk of CVD associated with the implementation of the programs. The following stand out as results: increase in the practice of physical exercise, improvement in anthropometric parameters, acquired knowledge of health and, consequently, control of analytical parameters (HgA1C, glycaemia, lipidemia and blood pressure) (Table 1).

Table 1 – Selected studies

Code/ Study	Type of study	N	GI	GC	Chronic Disease	Intervention	Measuring instruments	Outcomes	Results
1 /Abbott, Slate, & Graven (2020)	RCT (cluster)	146	75	71	Diabetes	3 Group education sessions on diabetes (90-120 minutes). 3-week duration	The Summary of Diabetes Self-care Activities Scale; Revised Diabetes Knowledge Test; Diabetes Fatalism Scale; Medical Outcomes Study Social Support	Knowledge about diabetes, self-care, fatalism and social support	The intervention group had significant changes in knowledge about diabetes and diet-related behaviours and blood glucose tests.
2/Al Hamarneh, Hemmelgarn, Hassan, Jones, & Tsuyuki (2017)	RCT (multicentric)	573	286	287	Diabetes	Consultations performed by a pharmacist every 4 weeks for 3 months	United Kingdom Prospective Diabetes Study risk-assessment equation; Framingham risk-assessment; Model to Predict Recurrent Cardiovascular Disease risk-assessment	Cholesterol HDL LDL HbA1C BP Tobacco medication lifestyle (diet and exercise). CVD risk	Cardiovascular risk reduced and improved individual control of CV risk factors in intervention group
3/Blackford, Jancey, Lee, James, Waddell & Howat (2016)	RCT	401	201	200	Metabolic syndrome	Physical exercise at home and nutritional counselling, for 6 months	International Diabetes Federation criteria	Anthropometry Cholesterol HDL LDL Glycaemia	The intervention group significantly improved their triglyceride, total cholesterol and LDL profile compared to the control group. Abdominal perimeter, waist-hip ratio and body mass index also improved.
4/Chao et al. (2017)	Cohort Study	15 310	11 843	3 467	Excess weight and obesity	Food education, 6-month duration	---	Anthropometry	Participants in the intervention group lost more weight than people in the control group.
5/Fitzpatrick et al., 2016	RCT	182	G1-45; G2 -46; G3-46	46	Diabetes	Education for individual health (G1), group sessions (G2) and autonomous study (G3) 18-20 weeks	Wide Range Achievement Test (WRAT-3); Patient Health Questionnaire-2 (PHQ-2); Health Problem-Solving Scale (HPSS)	Literacy, Symptoms of depression, HDL LDL BP HbA1C	The DECIDE modalities showed benefits after the intervention. The stand-alone study demonstrated robust improvements in clinical and behavioural outcomes.

Henriques, H. R., Pinto, J., Faria, J., & Silva, A. (2021). A systematic review of cardiovascular risk management interventions among community-dwelling people with chronic disease. *Millenium, 2*(15), 41-51.
DOI: https://doi.org/10.29352/mill0215.22231

Code/ Study	Type of study	N	GI	GC	Chronic Disease	Intervention	Measuring instruments	Outcomes	Results
6/Kempf et al., 2017	RCT	202	102	100	Diabetes	Group education, nutrition consultation, medical consultation and telephone service, for 12 weeks.	12-Item Short-Form Survey [SF-23]; German version of the Centre for Epidemiological Studies-Depression [CES-D] Scale; German version of the Three-Factor Eating Questionnaire [TFEQ]; Ten-year Framingham Risk	Anthropometry HDL LDL Triglycerides BP Glycaemia HbA1C Medication Quality of life Depression Risk of CVD	The reduction in HbA1c was significantly greater in the TeLiPro group. In advanced type 2 diabetes, TeLiPro can improve glycaemic control and can offer new options to prevent pharmacological intensification.
7/Kleist et al., 2017	RCT	82	38	44	Excess weight and obesity	Outdoor walking and nutritional intervention, for 12 weeks	—	Anthropometry Cholesterol HDL LDL BP FC Glycaemia	This intervention brought significant improvements in biomarkers to reduce the risk of cardiovascular disease.
8/ Radler, Marcus, Griehs & Touger-Decker, 2015	Quasi-experimental, "Pre-post" design	79	79	79	Excess weight and obesity	Educational sessions, online or in person Individual nutrition consultations for 12 months	Framingham 10-year CVD Risk	Anthropometry Cholesterol HDL LDL BP CVD risk	There were statistically significant improvements in weight and waist circumference.
9/Marra, Lilly, Nelson, Woofter & Malone (2019)	RCT	59	29	30	Obesity and/or hypertension, or dyslipidaemia or diabetes	Telenutrition intervention for weight loss for 12 weeks	---	Adherence to program Anthropometry Calorie intake	Greater weight loss was found in the experimental group. Retention, adherence and satisfaction rates reported by the participants were ≥80% in the telenutrition group.
10/Mills, Gatton, Mahoney & Nelson (2017).	Quasi-experimental, "Pre-post" design	85	85	85	CVD or risk factors	Education for health and physical exercise for 12 weeks	Six-minute walk test	Anthropometry BP Walking distance	Walking distance improved on average 0.053 km. People with obesity reduced their weight by 1.6 kg on average. Participants with high systolic BP decreased by an average of 11 mmHg.
11/Rigamonti, De Col, Tamini, Cicolini, Caroli, De Micheli, Tringali, Abbruzzese, Marazzi, Cella & Sartorio (2019)	Quasi-experimental, "Pre-post" design	684	684	684	Obesity	Diet with calorie restriction, nutritional education, psychological counselling, physical activity for 12 weeks	Coronary Heart Disease Risk, (CHD-R), Fatigue Severity Scale, (FSS), Stair Climbing Test, (SCT)	Cardiovascular Risk, Fatigue, Lower limb muscle performance	A 4% reduction in body weight is associated with musculoskeletal and cardiometabolic benefits, which can favourably influence one's general well-being and improve autonomy in carrying out daily activities.

Code/ Study	Type of study	N	GI	GC	Chronic Disease	Intervention	Measuring instruments	Outcomes	Results
12/Teychenne, Ball, Salmon, Daly, Crawford, Sethi, Jorna & Dunstan, (2015)	RCT (Cluster)	318	162	156	T2 Diabetes or excessive weight	1 year motivational and strength training program	CHAMPS (Community Healthy Activity Models Program for Seniors) instrument; three-repetition maximum strength (3-RM)	Anthropometry Glycaemia Muscle strength HbA1C	The behavioural intervention in the community was effective in adopting strength training with a significant reduction in HbA1c in diabetics.
13/Yazdanpanah, Moghadam, Mazlom, Beigloo & Mohajer, (2019)	Quasi-experimental, "Pre-post" design	20	10	10	HTN	Group educational sessions for 4 weeks (8 60-minute sessions)	8-Item Morisky Medication Adherence Scale (MMAS-8)	Adherence to medication	Adherence to medication obtained after the intervention was significantly higher.
14/Abkenar, Ghofranipour, Kashi, Montazeri, (2020)	RCT	110	55	55	Diabetes	2-month educational program (Islamic self-care, with the intention of pleasing God)	___	Triglycerides, LDL HDL Total Cholesterol Medication used	The experimental group improved significantly their triglyceride and LDL levels and did not register an increase in the use of hypoglycaemic drugs.
15/Ladee, Lagampan, Pichayapinyo, Mayurasakorn, Lagampan, (2020)	Quasi-experimental, "Pre-post" design	78	39	39	HTN	10-week educational program: 10 Educational sessions in small groups Phone calls, Messages	35-item questionnaire on self-management behaviour to prevent CVD	BP Self-care	Participants in the experimental group significantly improved their BP control.
16/Mahadzir, Quek & Ramadas, (2020)	Quasi-experimental, "Pre-post" design	48	48	48	Metabolic syndrome	12-week peer support PERSUADE program	Satisfaction assessment questionnaire	Satisfaction Intervention adherence anthropometry Cholesterol HDL LDL BP	Significant reductions were found in all anthropometric and metabolic parameters evaluated after the intervention, except for diastolic blood pressure.
17/Jahangiry, Montazeri, Najafi, Yaseri, Farhangi, Jahangiry, Montazeri, Najafi, Yaseri; Farhangi, (2017)	RCT	160	64	53	Metabolic syndrome	6-month online educational program	SF-36 International Physical Activity Questionnaire at last 7 days (IPAQ); Iranian version of Food Frequency Questionnaire (FFQ)	Anthropometry Glycaemia Cholesterol HDL LDL BP Quality of life; Physical activity; Eating frequency	Compared to the control group, the intervention group showed significant changes in physical activity, diet, and quality of life.
18/Riddell, Dunbar, Absetz, Wolfe, Li, Brand, Aziz & Oldenburg, 2016	RCT (Cluster)	236	113 (11 clusters)	123 (12 clusters)	Diabetes	12-week peer Education Program	Five year Cardiovascular Disease Risk (UKPDS risk score)	Anthropometry Glycaemia Cholesterol HDL LDL BP HbA1c CVD risk	Positive changes in the intervention group's behaviours did not reduce CVD risk, possibly because half of the participants already had well-controlled DM2 at the beginning of the study.

Henriques, H. R., Pinto, J., Faria, J., & Silva, A. (2021). A systematic review of cardiovascular risk management interventions among community-dwelling people with chronic disease. *Millenium, 2*(15), 41-51.
DOI: https://doi.org/10.29352/mill0215.22231

Code/ Study	Type of study	N	GI	GC	Chronic Disease	Intervention	Measuring instruments	Outcomes	Results
19/Sayón-Orea et al., 2019	RCT	6874	3406	3468	Metabolic syndrome	12-week education program (encouraged a low energy Mediterranean diet and physical activity)	er-Med Diet score (adherence to diet); MDS (quality of diet); MEDAS score (quality of diet); PDQS (quality of diet)	Adherence to the diet Anthropometry HDL LDL Cholesterol BP	The intervention compared to the advice to follow a Mediterranean diet without energy restriction, resulted in a significant increase in adherence to the diet after 12 months.
20/Yamane et al., 2020	Quasi-experimental, "Pre-post" design	24	24	24	HTN, DM2	3-month education program and decision making support	___	BP Medication use	The intervention increased the patient's knowledge about medicines and hypertension lifestyle management.
21/ Ayfer, Şeyda, İlhan, 2015	Quasi-experimental, "Pre-post" design	139	139	139	DM2	1-month telephone nutritional training program	Atherosclerotic Cardiovascular Disease (ASCVD) Estimator Risk Plus score	Anthropometry Glycaemia Cholesterol HDL LDL BP HbA1c Tobacco Consumption CVD risk	Consumption of red meat, processed foods and HbA1C all decreased. Consumption of water, frequency of exercise and use of aspirin increased. The program was effective in improving nutrition, lifestyle and glycaemic control.
	TOTAL	26040	8377	17910					

The intervention programs for the management of chronic disease in the studies analysed focus on supporting decision-making and self-management. The remaining dimensions of the "Chronic Care Model" (Wagner, 2001) have a residual expression in the programs analysed (Table 2).

Table 2 - Dimensions of the *Chronic Care Model* found in the studies (adapted from Wagner, 2001)

Dimensions *Chronic Care Model*	Fi	%
Health care organization	6	28.57
Service network	8	38.09
Decision making support	21	100.00
Information systems	6	28.57
Self-management support	18	85.71
Community resources	6	28.57

The programs implemented in these studies used several techniques to promote behavioural change (Michie, Atkins & West, 2014). The ones used most are in the domain of feedback and monitoring and those in the domain of knowledge modelling (Table 3).

Table 3 -Behaviour Change Techniques identified (adapted from Behaviour Change Technique Taxonomy (V1), de Michie, Atkins & West, 2014)

Behaviour change techniques	Definition	Fi	%
1. Objectives and planning:			
1.1 /1.3 Establish objectives (behaviour/results)	Negotiate an objective in terms of (results) behaviour to be achieved	7	33.3
1.2 Problem solving	Analyse with the person factors that influence behaviour and create strategies to overcome barriers or empower facilitators	7	33.3
1.4 Action planning	Define a detailed plan to perform the behaviour	8	38.1
2. Feedback and monitoring:			
2.1 Monitoring behaviour by others	Observe or record the behaviour with the person's knowledge as a behaviour change strategy	12	57.1
2.2 Feedback on behaviour	Monitor and provide feedback on the performance of the behaviour	13	61.9
2.3/2.4 Self-monitoring of behaviour/results	Establish a method for the person to monitor and record their behaviours/results as part of the behavioural change strategy	5	23.8

Behaviour change techniques	Definition	Fi	%
4. Modelling knowledge			
4.1 Instructing how to develop behaviour	Advise or negotiate ways to develop behaviour (includes skills training)	17	81.0
4.2 Background information	Provides background information that predicts behavioural performance	8	38.1
5. Natural consequences			
5.1 Information on consequences for health	Provides information on health consequences of a particular behaviour	7	33.3
6. Comparison of behaviour			
6.1 Demonstration of behaviour	Provides an observable example of the desired behaviour, directly or indirectly via film or an image, to inspire the person or for imitation	8	38.1
8. Repetition and substitution			
8.3 Habit formation	Repetition of behaviour in the same context so that the context provokes the behaviour	7	33.3
10. Reward and threat			
10.1 Material incentive	Inform what money, vouchers or other objects of value will be offered if, and only if, there is an effort and/or progress in behaviour, includes positive reinforcement	2	9.5
10.3 Non-specific incentive	Reward if, and only if, there is effort and/or progress in behaviour, includes positive reinforcement	4	19.0

The intervention programs intended to manage cardiovascular risk in people with chronic disease bring gains in health at the cognitive, behavioural and clinical levels (Table 4). It is at the level of knowledge acquisition that the gains are most expressive, with evident repercussions of this gain in healthy behavioural changes. Because each program focuses on different risk factors, there is a great heterogeneity in terms of gains, in the different studies.

Table 4 - Distribution of health gains of the participants by the studies analysed

HEALTH GAINS		Fi	%
Cognitive	Knowledge acquired	18	85.7
Behavioural	Balanced diet	5	23.8
	Control of glycaemia	7	33.3
	Practice of physical exercise	5	23.8
	Self-monitoring	3	14.3
	Adherence to the medication regime	2	9.5
Clinical indicators	Normalization of HbA1c values	4	19.0
	Weight loss	7	33.3
	Normalization of waist/hip perimeter	7	33.3
	Control of blood pressure	4	19.0
	Control of the lipid profile	5	23.8

3. DISCUSSION

After analysing the content of the articles, it was possible to verify the heterogeneity of the programs in the various dimensions: nature, composition, duration and behavioural change techniques used. In response to the people's various health conditions, within the specificity of their community, the set of CVD risk management programs under analysis included the components of health education, physical exercise, food, medication regimen, monitoring/counselling and motivational psychology. It is possible to find in this review that more than 85% of the programs included at least 2 of the 6 dimensions of the model concerned in their structure. The implementation of programs based on the Chronic Care Model has proven to be effective in reducing the use of health services and reducing cardiovascular risk (Yeoh et al., 2018).

It is a fact that many of the programs in our sample deal with communities with unequal opportunities. Digital tools are an opportunity to implement the intervention with the participants (Chao et al., 2017) or to monitor or complement the intervention developed (Marra et al., 2019; Hung et al., 2016; Koniak-Griffin et al., 2015; Kempf et al., 2017). Scientific evidence demonstrates that digital tools contribute not only to self-management of chronic disease, but also contribute to the democratization of health services (Wade & Stocks, 2017).

As found in our sample, all intervention programs included some behavioural change technique. The implementation of behavioural change techniques is effective in managing chronic disease (Sawyer et al., 2019; Duff et al., 2017).

The analysis of the participants' health gains in our sample shows that opportunities for intervention in altering erroneous lifestyles mostly result in clear benefits for people. Mudaliar et al. (2016) refer that changing lifestyles is important in managing CVD risk in people with chronic disease, leading not only to good health outcomes, but also to reinforce cost-effectiveness.

Physical activity is widely included in the intervention programs, as well as the reference to physical exercise. Although they are two similar concepts, the difference between them produces different strategies in approach. In this field, there is a need for a greater specification in the approaches, an issue we believe is propitious for future investigation.

Henriques, H. R., Pinto, J., Faria, J., & Silva, A. (2021). A systematic review of cardiovascular risk management interventions among community-dwelling people with chronic disease. *Millenium, 2*(15), 41-51.
DOI: https://doi.org/10.29352/mill0215.22231

The importance of smoking cessation to control CVD is an essential contribution to health gains (WHO, 2017). However, in the sample in this review, this risk factor is not showcased in the intervention programs. This fact suggests there is a need for research on the implementation of programs with a focus on smoking as a risk factor for CVD, or a review research directed specifically at smoking cessation programs.

CONCLUSION

Currently CVDs are associated with high morbidity and mortality worldwide. With the knowledge of risk factors and pathophysiology, several measures have been proposed that can contribute to a reduction in the impact of these diseases. According to current scientific evidence, intervention programs in managing CVD risk in people with chronic disease are essential for obtaining health gains.

The main non-pharmacological domains subject to intervention are: physical exercise, changes in eating habits, motivational psychology and education of the population about healthy lifestyles, which may involve all the dimensions recommended to care for the person with chronic illness.

In recent years, multiple studies have been carried out to evaluate the benefit of each of these components, in which the authors resorted to various behavioural change techniques to design programs. Overall, there was a focus on improving knowledge and monitoring.

In the studies analysed herein, a reduction in the risk of CVD associated with the implementation of behavioural change measures was identified. The following stand out as results: increase in the practice of physical exercise, the loss of body weight, knowledge of health acquired and, consequently, control of analytical parameters (blood glucose, lipoedema and blood pressure).

Thus, based on the results of the studies presented here, we may conclude that some interventions are promising in managing CVD risk in people with chronic diseases. However, the heterogeneity of the programs and the inconsistency of some results prevent reaching solid conclusions.

In future studies, it is important to continue to investigate the impact of different interventions so as to achieve more consistent results. It would be interesting if the programs included other components such as the managing smoking or alcohol habits and stress.

REFERENCES

Bullard, T., Ji, M., An, R., Trinh, L., Mackenzie, M., & Mullen, S. P. (2019). A systematic review and meta-analysis of adherence to physical activity interventions among three chronic conditions: cancer, cardiovascular disease, and diabetes. *BMC Public Health, 19*(1), 636. https://doi.org/10.1186/s12889-019-6877-z

Chodosh, J., Morton, S. C., Mojica, W., Maglione, M., Suttorp, M. J., Hilton, L., Rhodes, S., & Shekelle, P. (2005). Meta-analysis: chronic disease self-management programs for older adults. *Annals Of Internal Medicine*, *143*(6), 427–438. https://doi: 10.7326/0003-4819-143-6-200509200-00007.

Portugal, Direção-Geral da Saúde, Direção de Serviços de Informação e Análise (2016). *A saúde dos Portugueses 2016.* Lisboa: DGS.

Duff, O. M., Walsh, D. M., Furlong, B. A., O'Connor, N. E., Moran, K. A., & Woods, C. B. (2017). Behavior change techniques in physical activity eHealth interventions for people with cardiovascular disease: systematic review. *Journal of Medical Internet Research, 19*(8), e281, 1-12. DOI: 10.2196/jmir.7782.

Henriques, H. R. , Pinto, J. , Faria, J., & Silva, A. (2020). Gestão do risco cardiovascular em pessoas com doença crónica na comunidade: uma revisão sistemática da literatura. *New Trends in Qualitative Research*, *3*, 846-857. https://doi.org/10.36367/ntqr.3.2020.846-857

Kastner, M., Cardoso, R., Lai, Y., Treister, V., Hamid, J. S., Hayden, L., ... Holroyd-Leduc, J. (2018). Effectiveness of interventions for managing multiple high-burden chronic diseases in older adults: a systematic review and meta-analysis. *Cmaj*, *190*(34), E1004-E1012. https:// doi: 10.1503/cmaj.171391.

Luijks, H., Lucassen, P., Van Weel C., Loeffen, M., Lagro-Jansen, A. & Schermer, T. (2015).How GPs value guidelines applied to patients with multimorbidity: a qualitative study. *BMJ Open, 5*(10), e007905. https://doi: 10.1136/bmjopen-2015-007905

Meader, N., King, K., Llewellyn, A., Norman, G., Brown, J., Rodgers, M., ... Stewart, G. (2014). A checklist designed to aid consistency and reproducibility of GRADE assessments: development and pilot validation. *Systematic reviews*, *3*(1), 82. https:// doi: 10.1186/2046-4053-3-82

Michie, S., Atkins, L., & West, R. (2014). *The behavior change wheel: A guide to designing interventions* (1st ed.). London: Silverback Publishing.

Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., ... Wood, C. E. (2013). The behavior change technique taxonomy (v1) of 93 hierarchically clustered techniques: building an international consensus for the reporting of behavior change interventions. *Annals of behavioral medicine*, *46*(1), 81-95. https:// doi: 10.1007/s12160-013-9486-6

Moher, D., Shamseer, L., Clarke, M., Ghersi, D., Liberati, A., Petticrew, M., ... Stewart, L. A. (2015). Preferred reporting items for systematic review and meta-analysis protocols (PRISMA-P) 2015 statement. *Systematic reviews*, *4*(1), 1-9. https://doi.org/10.1186/2046-4053-4-1

Mudaliar, U., Zabetian, A., Goodman, M., Echouffo-Tcheugui, J. B., Albright, A. L., Gregg, E. W., & Ali, M. K. (2016). Cardiometabolic risk factor changes observed in diabetes prevention programs in US settings: A systematic review and meta-analysis. *Plos Medicine, 13*(7), e1002095. https://doi.org/10.1371/journal.pmed.1002095

Pengpid, S., Peltzer, K., Puckpinyo, A., & Chantarasongsuk, I. J. (2019). Effectiveness of a cluster-randomized controlled trial community-based lifestyle intervention program to control prehypertension and/or prediabetes in Thailand. *International Journal of Diabetes in Developing Countries*, *39*(1), 123-131. https://doi.org/10.1007/s13410-018-0641-2

Peters, R., Ee, N., Peters, J., Beckett, N., Booth, A., Rockwood, K., & Anstey, K. J. (2019). Common risk factors for major noncommunicable disease, a systematic overview of reviews and commentary: the implied potential for targeted risk reduction. *Therapeutic advances in chronic disease*, *10*, 2040622319880392. https://doi: 10.1177/2040622319880392

Reynolds, R., Dennis, S., Hasan, I., Slewa, J., Chen, W., Tian, D., ... Zwar, N. (2018). A systematic review of chronic disease management interventions in primary care. *BMC family practice, 19*(1), 11. https://doi: 10.1186/s12875-017-0692-3

Sawyer, A., Lewthwaite, H., Gucciardi, D. F., Hill, K., Jenkins, S., & Cavalheri, V. (2019). Behaviour change techniques to optimise participation in physical activity or exercise in adolescents and young adults with chronic cardiorespiratory conditions: a systematic review. *Internal Medicine Journal*, *49*(10), 1209–1220. https://doi.org/10.1111/imj.14141

Uthman, O. A., Hartley, L., Rees, K., Taylor, F., Ebrahim, S., & Clarke, A. (2015). Multiple risk factor interventions for primary prevention of cardiovascular disease in low-and middle-income countries. *Cochrane Database of Systematic Reviews*, 8, CD011163. https:// doi: 10.1002/14651858.CD011163.pub2

Van der Heide, I., Snoeijs, S., Quattrini, S., Struckmann, V., Hujala, A., Schellevis, F., & Rijken, M. (2018). Patient-centeredness of integrated care programs for people with multimorbidity. Results from the European ICARE4EU project. *Health Policy*, *122*(1), 36-43. https://doi: 10.1016/j.healthpol.2017.10.005

Wade, V., & Stocks, N. (2017). The use of telehealth to reduce inequalities in cardiovascular outcomes in Australia and New Zealand: A critical review. *Heart, Lung & Circulation*, *26*(4), 331–337. https://doi.org/10.1016/j.hlc.2016.10.013

Wagner, E. H., Austin, B. T., Davis, C., Hindmarsh, M., Schaefer, J., & Bonomi, A. (2001). Improving chronic illness care: translating evidence into action. *Health affairs*, *20*(6), 64-78. https:// doi: 10.1377/hlthaff.20.6.64

World Health Organization (2017, may 17). Cardiovascular diseases (CVDs). Retrieved from https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)

World Health Organization. (2018). Noncommunicable diseases country profiles 2018. Geneva, WHO. Retrieved from https://www.who.int/nmh/publications/ncd-profiles-2018/en/

Xu, X., Mishra, G. D., & Jones, M. (2017). Evidence on multimorbidity from definition to intervention: an overview of systematic reviews. *Ageing research reviews*, *37*, 53-68. https://doi: 10.1016/j.arr.2017.05.003

Yeoh, E. K., Wong, M. C. S., Wong, E. L. Y., Yam, C., Poon, C. M., Chung, R. Y., ... Coats, A. J. S. (2018). Benefits and limitations of implementing Chronic Care Model (CCM) in primary care programs: A systematic review. *International Journal Of Cardiology*, *258*, 279–288. https://doi.org/10.1016/j.ijcard.2017.11.057