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LIFESTYLE AND HEART DISEASES: A SYSTEMATIC REVIEW

1 2 3 JUSTIN V SEBASTIAN , NEENUMOL K JOSE , SHANTI JOYE

ABSTRACT

Background: Coronary heart disease (CHD) is the most common cause of death worldwide the literature shows a wide variation in the arrangement of cardiac rehabilitation and achieved lifestyle changes. Aim: The purpose of this study was to evaluate the lifestyle components (such as diet and exercise, smoking, stress and anxiety, blood pressure and diabetes, etc.) in reducing the risk for cardiovascular events in patients with established heart disease. Method: A systematic literature review of articles published in the databases PubMed and CINAHL between 1989 and 2016 was conducted. This resulted in 720 hits of which 14 articles finally met the set criteria for inclusion. Results: The majority of significant positive results on lifestyle factors were shown emphasise on the combination of activities like healthy diet, physical activity or exercise, weight control, smoking cessation, stress management, blood pressure and diabetes control, need of hormonal therapy after menopause and adherence to medical treatment. Conclusion: This systematic review results highlights very high prevalence and clustering of CVD-related lifestyle factors, particularly healthy diet, physical activity or exercise, weight control, smoking cessation, stress management, blood pressure and diabetes control, need of hormonal therapy after menopause and adherence to medical treatment. These interventions should be based on a comprehensive and integrated approach covering all of these lifestyle factors rather than any single factor to anticipate their cumulative effects.

keywords:Coronary Heart Disease; Risk factors; Secondary Prevention; Cardiac Rehabilitation; Lifestyle; Systematic Review.

1. Introduction

Heart disease is sometimes called coronary heart disease (CHD). It's the leading cause of death among adults in the United States. It is also a major cause of disability. There are

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many things that can raise risk for heart disease. They are called risk factors. Some of them

2

cannot control, but there are many that can control. Making healthy changes to lifestyle can help prevent and manage heart disease. Some factors that can affect heart health include depression, chronic stress, excess weight, physical inactivity, trouble sleeping,

3

smoking, or substance use. A healthy heart is central to overall good health. Embracing a healthy lifestyle at any age can prevent heart disease and lower risk for a heart attack or stroke. Choosing healthier foods and exercising are two of the best ways to contribute to

4

good heart health.

2. Methods

2.1. Eligibility Criteria

The articles that met the following inclusion criteria were included in the systematic review:

- I. Study Design. Cross-sectional studies, prospective studies and cohort studies.
- II. Outcome. Studies that provide quantitated outcomes (magnitude, frequency, or prevalence of heart diseases).
- III. Study Area. Studies conducted in developed and/or developing countries.
- IV. Language. Full-text articles published in the English language.
- V. Population. Healthcare workers, medical students and patients regardless of their occupation.
- VI. Publication Issue. Articles published in peer-reviewed journals from 1989 to 2016

 On the contrary, case reports, case series, qualitative studies, review articles, surveillance data/reports, conference abstracts, personal opinions, articles written in non-English language, high risk of bias articles, study not available in full texts, and studies published before 1989 were excluded from the study.

2.2. Information Sources and Search Strategy

Vol. 7 Issue 1, January 2018,

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The articles were searched using nine electronic databases (PubMed, Google Scholar,

CINAHL, MEDLINE, Cochrane library, Web of Science, SCOPUS, MedNar, and

ScienceDirect) using a combination of Boolean logic operators (AND, OR, and NOT),

Medical Subject Headings, and keywords such as Coronary Heart Disease; Risk factors;

Secondary Prevention; Cardiac Rehabilitation; Lifestyle; Systematic Review.

The articles were searched using a combination of Boolean logic operators (AND, OR, and

NOT), Medical Subject Headings (MeSH), and keywords. The following is a search term

used in the initial searching ((("Coronary Heart Disease" [MeSH Terms] OR "Coronary

Heart Disease" [All Fields]) AND (("Risk factors" [MeSH Terms] OR "Risk factors" [All

Fields], OR "Secondary Prevention;" [All Fields] OR "Secondary Prevention;" [MeSH]))

AND (("Cardiac Rehabilitation" [MeSH Terms] OR ("Cardiac Rehabilitation" [All Fields]

AND "Lifestyle" [All Fields]) OR "Lifestyle" [All Fields])).

3. Results

3.1. Study Selection

A total of 720 studies published from 1989 to 2016 were identified. Then, 508 duplicate

articles were excludedbased on the exclusion criteria. Furthermore, 212 full-text studies

were further assessed to determine their eligibility, of which 198 studies were excluded as

they not reachable, not in full text, no empirical data, non representative patient group,

absence or poorly described intervention and lack of focus on the result of lifestyle

changes.

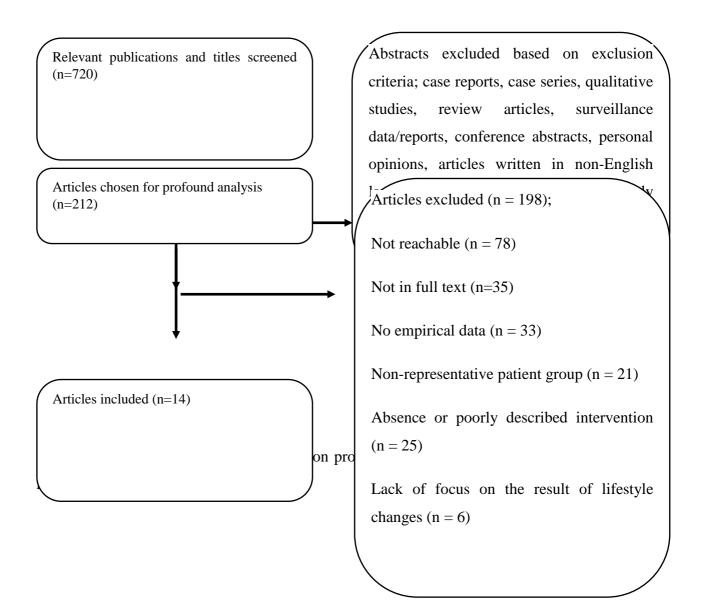
Vol. 7 Issue 1, January 2018,

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Finally, 14 articles that met the inclusion criteria were included in the review (Figure 1).



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SL	Article	Sample	Study Procedures	Key Results
NO				
1	Karen A. Matthews, Ph.D., Elaine Meilahn, M.P.H., et al, (1989), Menopause and Risk Factors for Coronary Heart Disease, N Engl J Med 1989; 321:641-646	initially premenopausa 1 women 42 to 50 years of	Prospective study Self-reported questionnaires	• In women who had a natural menopause and did not receive hormone-replacement therapy, serum levels of high-density lipoprotein (HDL) cholesterol declined as compared with those of premenopausal controls (-0.09 vs. 0.00 mmol per liter; P = 0.01), and levels of lowdensity lipoprotein (LDL) cholesterol increased (+0.31 vs. +0.14 mmol per liter; P = 0.04).

Vol. 7 Issue 1, January 2018,

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2	Dean Ornish,	Forty-eight	Randomized controlled	• In the experimental
	MD; Larry	patients with	trial	group, the average
	W.	moderate to		percent diameter
	Scherwitz,	severe		stenosis at baseline
	PhD; James	coronary heart		decreased 1.75
	H. Billings,	disease		absolute percentage
	PhD, (1998),			points after 1 year (a
	Intensive			4.5% relative
	Lifestyle			improvement) and by
	Changes for			3.1 absolute
	Reversal of			percentage points after
	Coronary			5 years (a 7.9%
	Heart			relative improvement).
	Disease,			• In contrast, the
	JAMA,			,
	December			average percent diam-
	16, 1998—			eter stenosis in the
	Vol 280, No.			control group increased by 2.3
	23			percentage points after
				1 year (a 5.4% relative
				worsening) and by
				11.8 percentage points
				after 5 years
				arter 5 years

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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3	Iseu Gus,	1,066 adults	Observational, cross-	The sample composition
	Airton	older than 20	sectional study	was of 51.8% females.
	Fischmann,	years in the		The risk factors
	et al, (2002),	Brazilian		prevalences were: 1)
	Prevalence	State of Rio		sedentary lifestyle
	of Risk	Grande do Sul		71.3%; 2) familial
	Factors for			antecedents: 57.3%; 3)
	Coronary			overweight/obesity
	Artery			(body mass index >25):
	Disease in			54.7%; 4) smokers:
	the Brazilian			33.9%; 5) hypertension:
	State of Rio			31.6% (considering
	Grande do			>140/90mmHg) and
	Sul			14.4% (considering
				>160/95mmHg); 6) high
				glycemia (>126 mg/dL):
				7%; 7) high cholesterol
				>240 mg/dL): 5.6%.

Vol. 7 Issue 1, January 2018,

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	Ι			
4	Sabita S.	2,329 type 1	EURODIAB	Multivariate
	Soedamah-	diabetic	Prospective	standardized Cox
	Muthu,	patients	Complications Study.	proportional hazards
	PHD, Nish			models showed that
	Chaturvedi,			age (hazard ratio 1.5),
	MD, et al,			AER (1.3 in men and
	(2004), Risk			1.6 in women), WHR
	Factors for			(1.3 in men), smoking
	Coronary			(1.5 in men), fasting
	Heart			triglycerides (1.3 in
	Disease in			women) or HDL
	Type 1			cholesterol (0.74 in
	Diabetic			women), and systolic
	Patients in			BP (1.3 in women)
	Europe,Diab			were predictors of
	etes Care			CHD.
	2004 Feb;			
	27(2): 530-			
	537.			

Vol. 7 Issue 1, January 2018,

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5	Jonathan	6452 men	Prospective study	• A major CVD event
	Robert	aged 40-59		within the first 20
	Emberson,			years was observed in
	Peter H.			1194 men (18.5%).
	Whincup, et			
	al, (2005),			• Use of baseline
	Lifestyle and			assessments of ciga-
	cardiovascul			rette smoking and
	ar disease in			physical activity in
	middle-aged			analyses resulted in
	British men:			underestimation of the
	the effect of			associations between
	adjusting for			average cumulative
	within-			exposure to these
	person			factors and major
	variation,			CVD risk.
	European			After correction for
	Heart			within-person
	Journal			variation, major CVD
	(2005) 26,			rates were over four
	1774–1782			times higher for heavy
				smokers (>40
				cigarettes/day) com-
				pared with never
				smokers and three
				times higher for
				physically inactive
				men compared with
				moderately active
				men.

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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6	Stephanie E.	42847 men in	Prospective study	• Over 16 years, we
	Chiuve,	the Health	G 10	documented 2183
	ScD;	Professionals	• Self-reported	incident cases of CHD
	Marjorie L.		questionnaires	(nonfatal myocardial
	McCullough,			infarction and fatal
	RD, ScD; et			CHD).
	al, (2006),			1.1
	Healthy			• In multivariate-
	Lifestyle			adjusted Cox
	Factors in			proportional hazards
	the Primary			models, men who
	Prevention			were at low risk for 5
	of Coronary			lifestyle factors had a
	Heart			lower risk of CHD
	Disease			(relative risk: 0.13;
	Among Men,			95% confidence
	doi.org/10.1			interval [CI]: 0.09,
	<u>161/CIRCU</u>			0.19) compared with
	<u>LATIONAH</u>			men who were at low
	<u>A.106.62141</u>			risk for no lifestyle
	7Circulation.			factors. Sixty-two
	2006;114:16			percent (95% CI: 49%, 74%) of
	0–167			, ,
				coronary events in this
				prevented with better
				adherence to these 5
				healthy lifestyle
				practices.
				Among men taking medication for

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hypertension or hypercholesterolemia, 57% (95% CI: 32%, 79%) of all coronary events may have been prevented with a lowrisk lifestyle. Compared with men who did not make lifestyle changes during follow-up, those who adopted>2 additional low-risk lifestyle factors had a 27% (95% CI: 7%, 43%) lower risk of CHD.

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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7	Ali Khan	1000 patients	Cross-sectional,	• 30.3% study
	Khuwaja,Sai	with type 2	multi- center study	participants had CVD.
	ma Lalani, et	• •		Majority of the
	al,		Interview method	patients were
	(2011)Cardi			physically inactive
	ovascular			and had adverse
	Disease-			psychosocial factors.
	Related			
	Lifestyle			• 40% of the study
	Factors			participants were
	among			exposed to passive
	People with			smoking while 12.7%
	Type 2			were current smokers.
	Diabetes in			• Only 8.8% of study
	Pakistan:			subjects had none of
	A			the studied lifestyle
	Multicentre			factor, 27.5% had one,
	Study for the			while 63.7% had two
	Prevalence,			or three factors.
	Clustering,			
	and			
	Associated			
	Sociodemogr			
	aphic			
	Determinant			
	s,			
	Cardiology			
	Research			
	and Practice			
	Volume			
	2011, Article			

Vol. 7 Issue 1, January 2018,

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ID 656835, 8		
pages		

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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8	Abdonas	9,209 men	Population surveys	• Subjects with 5–6
	Tamosiunas,	and women		healthy factors had
	Dalia	aged 45–64		hazard ratio (HR) of
	Luksiene, Et			CVD mortality 0.35
	al,			(95% confidence
	(2014)Health			interval (CI) 0.15–
	Factors and			0.83) compared to
	Risk of All-			average risk in the
	Cause,			whole population.
	Cardiovascul			
	ar, and			• The hazard ratio for
	Coronary			CVD mortality risk
	Heart			was significant in men
	Disease			(HR 0.34, 95% CI
	Mortality:			0.12–0.97) but not in
	Findings			women (HR 0.38,
	from the			95% CI 0.09–1.67).
	MONICA			
	and HAPIEE			
	Studies in			
	Lithuania,			
	DOI:10.1371			
	/journal.pone			
	.0114283			

Vol. 7 Issue 1, January 2018,

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9	T Sekhri,R	10642 men	Quantitative study	• The study revealed
9	S Kanwar,		Qualititative study	that 4.6% of the study
	ŕ			·
	et al, (2014),			population had a
	Prevalence	20–60 years		family history of
	of risk			premature CAD.
	factors for			• The overall prevalence
	coronary			of diabetes was 16%
	artery			(5.6% diagnosed
	disease in			during the study and
	an urban			the remaining 10.4%
	Indian			already on
	population,			medication).
	BMJ Open			medication).
	2014;4:e005			• Hypertension was
	346.			present in 21% of
				subjects.
				• The prevalence of
				dyslipidemia was
				significantly high,
				with 45.6% of study
				subjects having a high
				total cholesterol/high
				density lipoprotein
				ratio. Overall, 78.6%
				subjects had two or
				more risk factors for
				CAD.

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10	Monir	The study	Cross sectional study	• Totally, 108
	Nobahar,	population	was conducted	subjects who filled in
	Mohammad	comprised 19	• Semi structured	their questionnaires
	Reza	physicians, 56	questionnaire	were included in the
	Razavi(2015	nurses and 33		study. The study
)Lifestyle	faculty		population, including
	and most	members.		68.5% females, had a
	important			mean age of 36.30 ±
	risk factors			8.878 years.
	of			• Smokers
	cardiovascul			comprised 1.8% of the
	ar disease in			subjects
	physicians,			• Exercise more than
	nurses and			twice a week was
	faculty			reported by 19.4%.
	members.			• Moderate life-
	Middle East			related and work-
	J Rehabil			related stress was
	Health. 2015			reported by 61.1% and
	April; 2(2):			63.9% of the subjects.
	e28882.			•The mean body
				mass index was 24.67
				±3.77, and 39.8% of
				the participants were
				overweight or fat.

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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11	Elvin	3229 patients	Prospective,	• In this cohort diabetes
	Zengin,	with known	multicenter, clinical	mellitus was the risk
	Christoph	coronary	cohort study	factor with the
	Bicke, et al,	artery disease		strongest influence
	(2015), Risk	(CAD)		regarding occurrence
	Factors of			of secondary events
	Coronary			(hazard ratio;
	Artery			HR:1.70, confi- dence
	Disease in			interval; CI 95%:
	Secondary			1.36-2.11; P<0.0001),
	Prevention—			followed by
	Results from			LDL/HDL ratio and
	the			smoking.
	AtheroGene			
	—Study,			
	doi:10.1371/			
	journal.			
	pone.013143			
	4			

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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12	T.	5,331 study	Prospective cohort	• Among men, the
	Kobayashi,	participants	study	prevalence of
	M.			hypertension in the
	Watanabe, et			counterclock- wise,
	al, (2015),			normal, or clockwise
	CLINICAL			rotation group was 28,
	IMPACT OF			34, and 40%,
	TRANSITIO			respectively (p<0.01).
	NAL ZONE			
	IN 12-LEAD			• Among women, the
	ELECTROC			prevalence of
	ARDIOGRA			hypertension in the
	M ON THE			counterclock- wise,
	RISK OF			normal, or clockwise
	CARDIOVA			rotation group was 23,
	SCULAR			29, and 35%,
	DISEASES			respectively (p <
	IN A			0.01).
	POPULATI			
	ON-BASED			
	COHORT			
	STUDY,			
	Journal of			
	Hypertensio			
	n Volume			
	33, e-			
	Supplement			
	1, 2015			

Vol. 7 Issue 1, January 2018,

ISSN: 2249-2496 Impact Factor: 7.081

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13	C. James, S.	643 patients	EUROASPIRE IV	•	it was seen that in
	Tisheva, et		cohort study		Keralites-irrespective
	al, (2015), A				of gender, diabetes or
	STUDY OF				impaired glucose
	RISK				tolerance (79%) and
	FACTORS				dyslipidemia (71%)
	FOR				are the major risk
	CORONAR				factor for Coronary
	Y ARTERY				artery disease.
	DISEASE				
	AMONG				
	PATIENTS				
	WITH				
	ISCHEMIC				
	HEART				
	DISEASE				
	IN THE				
	STATE OF				
	KERALA				
	IN SOUTH				
	INDIA,				
	Journal of				
	Hypertensio				
	n Volume				
	33, e-				
	Supplement				
	1, 2015				

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14	Amit V.	• 7814	Prospective cohorts	Across four studies
	Khera, M.D.,	participants	study	involving 55,685
	Connor A.	in the		participants, genetic and
	Et al, (2016)	Atheroscler		lifestyle factors were
	Genetic	osis Risk in		independently associated
	Risk,	Communiti		with susceptibility to
	Adherence	es (ARIC)		coronary artery disease.
	to a Healthy	study,		
	to a Healthy Lifestyle, and Coronary Disease, <i>The</i> new England journal of medicine	study, • 21,222 in the Women's Genome Health Study (WGHS) • 22,389 in the Malmö Diet and Cancer Study (MDCS) — and in 4260		
		participants		
		in the cross-		
		sectional		
		BioImage		
		Study		

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3.2. Study Characteristics

The studies (n = 14), included 141096participants. The average age ranged from 20 - 64

years. One study presented results only for women [1] while two studies presented results

only for men [5,6]. In two studies participants were having type1 and 2 diabetes [4,7]. Two

studies were conducted in India [9,13] while rest of the studies conducted in other

countries. Among the included articles, 1 article [1] pre-menopause women, 2 [4,7]

diabetes patients and in remaining articles participants like health care workers, middle

aged, patients with coronary artery diseases etc. were included to identify risk factors for

CHD respectively. The included studies giving emphasise on the combination of activities

like healthy diet, physical activity or exercise, weight control, smoking cessation, stress

management, blood pressure and diabetes control, need of hormonal therapy after

menopause and adherence to medical treatment.

4. Discussion

Making changes in lifestyle is a proven method for reducing risk of developing heart

disease. While there are no guarantees that a heart-healthy lifestyle will keep heart disease

away, these changes will certainly improve health in other ways, such as improving

physical and emotional well-being.

Overall, the review reported there are several risk factors for heart disease; some are

controllable, others are not. Uncontrollable risk factors for heart disease include being

male, older age, family history of heart disease, being postmenopausal, race, etc. Still,

there are many heart disease risk factors that can be controlled include smoking, high LDL,

or "bad" cholesterol, and low HDL, or "good"cholesterol, uncontrolled high blood

pressure, physical inactivity, obesity (having a BMI greater than 25), uncontrolled

diabetes, uncontrolledstress, depression, and anger, poor diet, etc.

This review included studies from different countries. Most of these studies were

conducted in developing countries, which limits the interpretation of results.

5. CONCLUSION

This systematic review results highlights very high prevalence and clustering of CVD-

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related lifestyle factors, particularly healthy diet, physical activity or exercise, weight control, smoking cessation, stress management, blood pressure and diabetes control, need of hormonal therapy after menopause and adherence to medical treatment. These interventions should be based on a comprehensive and integrated approach covering all of these lifestyle factors rather than any single factor to anticipate their cumulative effects. We recommend that health care providers should provide awareness and education regarding CVD risk factors and their prevention to patients and their families/caregivers.

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