Which lifestyle interventions effectively lower LDL cholesterol?

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Evidence-based answer

Counseling, weight loss, exercise, and drinking alcohol all effectively lower low-density lipoprotein cholesterol (LDL-C). Specifically, one to 2 daily drinks of alcohol lowers LDL-C, if consumed regularly for more than 4 weeks (strength of recommendation [SOR]: **A**, based on consistent results of multiple randomized controlled trials [RCTs]).

Counseling by physicians, dieticians, or pharmacists is effective at increasing patient compliance with medications, thereby lowering LDL-C (SOR: **C**, good evidence that intervention lowers LDL-C, insufficient to prove that it reduces mortality/morbidity).

Weight loss has been associated with reductions in LDL-C. However, other factors—including degree of caloric restriction, drug intervention, and diet composition—may play a more significant role than weight loss alone (SOR: **A**, based on a meta-analysis and consistent results of RCTs).

Exercise significantly lowers LDL-C (SOR: **A**, based on meta-analyses and consistent results of RCTs). Smoking cessation may have a beneficial effect (SOR: **B**, based on inconsistent results from RCTs that it lowers LDL-C). Exercise-based alternative practices (yoga and tai chi) lower LDL, and meditation may have a beneficial effect (SOR: **C**, moderate evidence that intervention lowers LDL, insufficient evidence to prove that it reduces mortality/morbidity).

Clinical commentary

Consider patient preference when discussing lifestyle modification

Therapeutic lifestyle changes are the initial treatment of choice for reduction of cardiac risk factors, but both patients and physicians often see these modifications as confusing and difficult to achieve. A recent year-long study on different diets concluded that dietary adherence is more important than a specific type of diet for weight loss and reduction of cardiac risk factors.[1] Another recent study reports no difference in weight loss among diets, based on different exercise duration and intensities over 1 year in a group of sedentary and overweight women.[2] Therefore, family physicians should consider culture, patient preference, and practical issues such as cost and availability, when discussing therapeutic lifestyle modification with patients.

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FAST TRACK

Weight loss lowers LDL-C, although some studies suggest it may be short-term

CONTINUED

FAST TRACK

2 clinical trials found that LDL decreased significantly with 1 to 2 alcohol drinks per day

TABLE

A- and B-level evidence points to effectiveness of lifestyle interventions

LIFESTYLE INTERVENTION	MAGNITUDE OF EFFECT ON LDL-C	% REDUCTION LDL-C	DATA SOURCES	SOR
Alcohol	4–10 mg/dL	4%–8%	4 RCTs	A
Counseling	0–58 mg/dL	0%–33%	15 RCTs, 8 CTs	A
Exercise	3–16 mg/dL	2.5%–4%	5 meta-analysis	A
Meditation	0–28 mg/dL	0%–19%	3 RCTs	B
Smoking	0–5 mg/dL	0%–4%	2 RCTs	B
Weight loss: – diet, exercise, supplements – drug therapy	 0–42 mg/dL 10–31 mg/dL	 0%–22% 11%–32%	 28 RCTs, 14 CTs, 1 meta-analysis 4 RCTs, 2 CTs	A
Yoga/tai chi	20–26 mg/dL	15%–20%	2 RCTs, 1 CT	A

LDL-C, low-density lipoprotein cholesterol; SOR, strength of recommendation; RCT, randomized controlled trial; CT, clinical trials.

SOR: A, good evidence that intervention lowers LDL. SOR: B, moderate evidence.

Evidence summary

Elevated LDL-C is an independent risk factor for coronary heart disease (CHD),[3] the leading cause of death in the US.[4] Lowering LDL-C by 60 mg/dL reduces CHD events by 50% after 2 years.[5] Although medications successfully lower LDL-C and decrease CHD risk, therapeutic lifestyle changes remain the initial therapy for most adult patients.[3,6]

Our search located evidence about alcohol consumption, counseling, exercise, weight loss, alternative lifestyle measures, and smoking cessation. The **TABLE** summarizes the evidence for each.

1 to 2 drinks daily reduced LDL-C

One 5-year-long cohort study (N=933) showed that alcohol was associated with LDL-C reduction in a dose-dependent manner.[7] Two crossover trials (4–6 weeks in duration) conducted among heavy drinkers showed that LDL-C increased when alcohol intake decreased. Two randomized crossover trials (8–12 weeks in duration) found a statistically significant decrease in LDL-C with consumption of 1 to 2 drinks daily.

Counseling improves medication adherence

An RCT (N=167) with 8 years of follow-up found that patient education and counseling effectively improved medication adherence.[8] Another RCT (N=1162) lasting 1 year, however, found that nutrition counseling by primary care physicians resulted in no significant change in LDL-C compared with usual care.[9]

Studies focused on enhancing dietary compliance did not find consistent post-intervention improvement. Greater medication adherence or improved dietary compliance did result in consistent significant improvements in LDL-C.

Exercise lowers LDL; weight loss a factor

Aerobic exercise effectively lowers LDL-C. This reduction is enhanced by weight loss and diet and mitigated by weight gain.[10] An analysis of 4 RCTs showed that LDL-C also decreased with resistance training.

A higher body-mass index is associated with higher LDL-C. However, the effect of weight loss *per se* on LDL-C remains unclear. Multiple short-term studies have found that a modest amount of

weight loss (5%–10%) is associated with a significant reduction in LDL-C.[11] A meta-analysis found a 0.8 mg/dL LDL-C decrease for every kg of weight lost. Long-term follow-up, however, showed that LDL-C returned to baseline even when weight loss was maintained. Eight clinical trials failed to demonstrate a reduction in LDL-C postintervention with up to 10 kg of weight loss. Studies using weight-loss drugs (Sibutramine, Orlistat) found more significant weight loss during treatment, along with greater decrease in LDL-C, when compared with studies using only lifestyle modifications.

Other measures have mixed results

High-quality RCTs (N=267) with yoga or tai chi as the exercise intervention showed a statistically significant decrease in LDL-C over 12 to 14 weeks.[12] Two RCTs investigated the effect of meditation on LDL-C with mixed results. One (N=16) showed a significant decrease in LDL-C over 8 weeks, while a second (N=60) showed no difference in LDL-C. A high-quality RCT (N=91) with a combined intervention (counseling, exercise, and meditation over 1 year) showed a significant decrease in LDL-C.

In cross-sectional surveys, LDL-C does not appear to differ between smokers and nonsmokers. One meta-analysis found a dose-dependent relationship between smoking and LDL-C, with overall LDL-C 1.7% higher for smokers compared with nonsmokers.[13] Two RCTs investigated the effect of smoking cessation on LDL-C with mixed results. One (N=935) showed a decrease in nonfasting LDL-C while a second (N=140) showed no difference in LDL-C.

Recommendations from others

According to ATP III guidelines,[3] all adults with LDL-C above goal should be treated with therapeutic lifestyle changes for primary and secondary prevention of CHD. These include a diet intervention, increased physical activity, and weight loss. Physicians are encouraged to refer patients to a nutritionist. If LDL-C is not at goal after 6 weeks, changes are intensified; physicians should consider pharmacologic therapy if a patient is still unable to attain his or her goal. ACP III guidelines recommend an office visit every 4 to 6 months to monitor adherence.

American Heart Association guidelines recommend that physicians counsel smokers at every office visit to stop smoking. The American College of Cardiology recommends abstinence from alcohol for patients with suspected alcoholic cardiomyopathy. For patients with heart failure from any other cause, alcohol consumption is usually limited to 1 drink per day. ■

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