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A systematic review of lifestyle counseling for diverse patients in primary care

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Abstract

Prior research and systematic reviews have examined strategies related to weight management, less is known about lifestyle and behavioral counseling interventions optimally suited for implementation in primary care practices generally, and among racial and ethnic patient populations. Primary care practitioners may find it difficult to access and use available research findings on effective behavioral and lifestyle counseling strategies and to assess their effects on health behaviors among their patients. This systematic review compiled existing evidence from randomized trials to inform primary care providers about which lifestyle and behavioral change interventions are shown to be effective for changing patients' diet, physical activity and weight outcomes.

Searches identified 444 abstracts from all sources (01/01/2004–05/15/2014). Duplicate abstracts were removed, selection criteria applied and dual abstractions conducted for 106 full text articles. As of June 12, 2015, 29 articles were retained for inclusion in the body of evidence.

Randomized trials tested heterogeneous multi-component behavioral interventions for an equally wide array of outcomes in three population groups: diverse patient populations (23 studies),

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Appendix A. Supplementary data

Supplementary data to this article can be found online at <http://dx.doi.org/10.1016/j.ypmed.2017.03.020>.

African American patients only (4 studies), and Hispanic/Mexican American/Latino patients only (2 studies).

Significant and consistent findings among diverse populations showed that weight and physical activity related outcomes were more amenable to change via lifestyle and behavioral counseling interventions than those associated with diet modification. Evidence to support specific interventions for racial and ethnic minorities was promising, but insufficient based on the small number of studies.

Keywords

Lifestyle counseling; Lifestyle interventions; Behavioral counseling; Behavioral interventions; Racial populations; Ethnic populations; Primary care practices; Implementation; Primary care providers; Diet or weight outcomes; Physical activity outcomes

1. Context

Increasing rates of overweight and obesity, along with low levels of physical activity and poor diets, contribute to the high prevalence of chronic diseases (de Waure et al., 2013) and to poorer outcomes among individuals with those conditions (de Waure et al., 2013). Patients with chronic disease are most frequently seen in primary care settings and considerable interest exists in integrating lifestyle counseling and health behavior change strategies into primary care (AMA, 2013; Dysinger, 2013; Clarke and Hauser, 2016; Wolfenden et al., 2016). Primary care practitioners face numerous challenges in offering lifestyle and behavioral change counseling for patients with chronic conditions. Many studies and systematic reviews have examined strategies designed to change diet (Orozco et al., 2008; Angermayr et al., 2010), increase physical activity (Richards et al., 2013a; Richards et al., 2013b), and manage weight (Tsai and Wadden, 2009), but little is known about lifestyle and behavioral counseling approaches optimally suited for implementation in primary care practices generally, and among racial and ethnic patient populations in particular (Angermayr et al., 2010; Pal et al., 2013; Glynn et al., 2010; Duke et al., 2009; Lager et al., 2014). Primary care practitioners may find it difficult to access and use available research on effective strategies, to assess effects of specific behavioral and lifestyle counseling strategies on changes in health behaviors overall and specific population groups in their practice, and to define their role in providing lifestyle and behavioral change counseling (Hebert et al., 2012; Tulloch et al., 2006).

This review aimed to compile existing evidence from randomized trials about lifestyle and behavioral change strategies shown to be effective for changing patient outcomes related to diet, physical activity, and weight loss and/or body mass index (BMI) for samples of diverse patient populations (e.g., any study population of any composition without regard to race or ethnicity) and patients in racial and ethnic minority groups in primary care settings (e.g., any study population that was comprised solely of one racial and/or ethnic group). Key questions (KQ) are:

- a. KQ1: What lifestyle counseling and behavioral change strategies are shown to be effective in changing patient outcomes (diet, physical activity and weight loss and/or BMI) for all patients in primary care practice settings?
- b. KQ2: What lifestyle counseling and behavioral change strategies are shown to be effective in changing primary patient outcomes (diet, physical activity, and weight management) for patients in racial and ethnic minorities in primary care settings?

2. Evidence acquisition

Agency for Healthcare Research and Quality Evidence-based Practice Center (EPC) review methods and PRISMA guidelines were used to establish eligibility criteria (Table 1), conduct the review, and report findings based on study design, PICOS (e.g., participants, interventions, comparisons, outcomes and settings) and report characteristics (Table 1). Databases included MEDLINE®, the Cochrane Library, Cochrane Central Trials Registry, PsychInfo, and online repositories of evidence-based interventions. Table 2 describes full electronic search strategies for Scopus, PubMed and CINAHL including the search strategies used to identify studies with a study population comprised only of members of a specific racial or ethnic group(s) for KQ2. Search results were limited to studies published from January 1, 2004 to May 15, 2014.

3. Evidence synthesis

Searches identified 444 abstracts and on 06/12/2015, 29 articles were retained for inclusion in the body of evidence; 23 for KQ1 and 6 for KQ2 (Fig. 1). For KQ1, studies were included if the study populations were composed of diverse patients (e.g., any study population of any composition without regard to race/ethnicity). For KQ2, studies were included only if study populations were composed on one race/ethnicity group. Even though search criteria were designed to find studies for any racial/ethnic study populations for KQ2, eligible studies were found only for African American (n = 4) and Hispanic/Mexican American/Latino (n = 2) populations. Abstracts were reviewed by two individual reviewers using stated inclusion and exclusion criteria (Table 1). Differences between reviewers were adjudicated by the lead author. Of the 444 abstracts, 331 were excluded based on dual review and 7 were excluded as duplicates, leaving 106 articles for full text abstraction. Table 3 lists the full range of data collected for each article. The lead author provided training for the full abstract review for all reviewers (4 doctoral student reviewers, two program coordinators, one research specialist, and two faculty members). Each article was abstracted independently by two reviewers. Abstractors also noted design limitations (e.g., small sample size of <50 participants, lack of randomization, selective reporting of measures and large losses to follow-up of one-half or more of the specified sample size) for each article. Risk of bias for each study (Appendix Tables A.1 & A.2) and for all studies by key question was assessed by the lead and senior author using design limitations rated as low (no design limitations), moderate (1 or 2 limitations) or high (3 or more limitations). For all studies, the overall risk of bias rating as well as the number of articles in the sample for each question and/or outcome was also used to determine overall strength of evidence. The purpose, study design,

setting and sample, statistical analysis used, and study outcomes including effect estimates and confidence intervals for individual studies are reported, as available in each article in Appendix Tables B.1 & B.2. Full abstraction tables are available for all included and excluded articles from the lead author.

The heterogeneity of all PICOS criteria across studies precluded meta-analysis. Data were assessed qualitatively along with strength of evidence for each KQ and by each outcome as high, moderate, low, or very low.

3.1. KQ1

3.1.1. Participants and settings—Twenty-three included studies ranged in size from 26 to 5145 participants, with an overall total sample of 14,163 (Whittemore et al., 2004; Quinn et al., 2008; Cohen et al., 2011; Block et al., 2004; Volger et al., 2013; Edelman et al., 2006; Whitehead et al., 2007; Katz et al., 2008; Reed et al., 2008; Christian et al., 2008; Poston et al., 2006; Ely et al., 2008; Wadden et al., 2005; Appel et al., 2011; Digenio et al., 2009; Bennett et al., 2010; Kumanyika et al., 2011; Bennett et al., 2012; Greiner et al., 2008; Fries et al., 2005; Svetkey et al., 2009; Pi-Sunyer et al., 2007; Rothert et al., 2006). Studies included diverse populations defined as any study population of any composition without regard to race and/or ethnicity. Eight studies involved overweight or obese men and women (Volger et al., 2013; Poston et al., 2006; Ely et al., 2008; Wadden et al., 2005; Appel et al., 2011; Digenio et al., 2009; Greiner et al., 2008; Rothert et al., 2006), five studied men and women with type 2 diabetes (Whittemore et al., 2004; Quinn et al., 2008; Cohen et al., 2011; Christian et al., 2008; Pi-Sunyer et al., 2007), four studied a racially and ethnically diverse sample of low-income men and women participants (Block et al., 2004; Whitehead et al., 2007; Reed et al., 2008; Fries et al., 2005), two involved men and women diagnosed with hypertension and obesity (Bennett et al., 2010; Bennett et al., 2012), one involved hypertensive men and women (Svetkey et al., 2009), and one involved a general population of female primary care patients (Kumanyika et al., 2011). Three studies included interventions for both primary care patients and their providers.

Studies were conducted in a variety of primary care settings: six in community health clinics (Quinn et al., 2008; Block et al., 2004; Volger et al., 2013; Christian et al., 2008; Bennett et al., 2012; Svetkey et al., 2009), six in university internal medicine and family medicine clinics (Edelman et al., 2006; Whitehead et al., 2007; Katz et al., 2008; Bennett et al., 2010; Kumanyika et al., 2011; Pi-Sunyer et al., 2007), two in an obesity clinic and diabetes educational center (Whittemore et al., 2004; Digenio et al., 2009), one in a Veterans Affairs health center (Cohen et al., 2011), one in a federally funded community health center (Reed et al., 2008), one in the Kaiser Permanente Health Care Delivery System (Rothert et al., 2006), and three in rural settings (Ely et al., 2008; Greiner et al., 2008; Fries et al., 2005).

3.1.2. Dietary outcomes—Six studies evaluated the effects of multi-component interventions to change patients' dietary outcomes: fruit and vegetable (F&V) intake (Block et al., 2004; Volger et al., 2013; Svetkey et al., 2009), fat (Volger et al., 2013) and fiber-related behavior (Fries et al., 2005) outcomes, eating behaviors relating to dietary restraint (Volger et al., 2013), and diet self-management/self-care (Whittemore et al., 2004; Quinn et

al., 2008). Study participants numbered 2278 with 481 low-income women (Block et al., 2004), 754 low-income men and women (Fries et al., 2005), and 79 men and women with pre-existing type 2 diabetes (Whittemore et al., 2004; Quinn et al., 2008), or hypertension (N = 574) (Svetkey et al., 2009) or obesity (N = 390) (Volger et al., 2013). Comparators were usual care or least intensive intervention arm or an alternate intervention strategy unrelated to diet. Follow-up assessments occurred with varying frequency ranging from 1 to 3 times, over time periods ranging from 1 week to 24 months, and with different time intervals of 1.5, 6, and 12 months.

Consistent with prior review findings on dietary change (Orozco et al., 2008; Duke et al., 2009; Osei-Assibey et al., 2010; Hartley et al., 2013), results for changes in F&V intake were mixed. Two studies showed no significant differences in treatment groups in F&V intake at any time although F&V intake increased modestly by 0.5 to 0.7 servings across all groups followed by smaller increases or declines at 24 months in one study (Volger et al., 2013) after delivery of a brief lifestyle counseling intervention (e.g. monthly 10–15 minute meetings, enhanced brief lifestyle counseling that added meal replacements and medication to the monthly counseling sessions). Significant increases in F&V intake at 6 and 18 months were found when both physicians and patients were involved in interventions (Svetkey et al., 2009).

Decreases in dietary fat, as measured by questionnaire (Shannon et al., 1997), were significantly greater among patients in a tailored feedback low-intensity intervention group compared to usual care (Fries et al., 2005). Significant reductions in both total and saturated fat intake were observed at 6 months and sustained to 18-month follow-up as an outcome of a combined physician and patient intervention (Svetkey et al., 2009).

Significant differences in self-reported dietary fiber behaviors were observed at 1 and 6 months but not at 12 months following participation (Fries et al., 2005).

A significant between-group difference in dietary restraint was achieved at 6 and 24 months although the intervention effect diminished over time (Volger et al., 2013) after delivery of a brief lifestyle counseling intervention that included monthly 10–15 minute meetings, enhanced brief lifestyle counseling, and meal replacements and medication.

Two studies examined diet self-management. A cell phone-based diabetes management software system used in conjunction with web-based data analytics and therapy optimization tools, resulted in statistically significant improvement in diet changes related to diabetes self-care over a one-month period (Quinn et al., 2008). Women with type 2 diabetes who participated in a standard diabetes care treatment regimen augmented by 6 nurse-coaching sessions and two brief phone calls demonstrated significantly better diet self-management at 3 and 6 month follow-up (Whittemore et al., 2004).

3.1.3. Physical activity outcomes—Nine studies including 7386 participants addressed physical activity outcomes measured as active kcals and minutes of activity per week (Volger et al., 2013), physical activity minutes per month (Whittemore et al., 2004) and minutes per week (Svetkey et al., 2009), days of exercise per week (Edelman et al., 2006),

MET moderate and vigorous physical activity levels (Reed et al., 2008; Christian et al., 2008), total fitness levels (Pi-Sunyer et al., 2007), and total mean physical activity levels (Whitehead et al., 2007), and physical activity index scores including vigorous and leisure physical activity, moving, sitting, and standing (Katz et al., 2008). Study populations included low-income men and women primary care patients (N = 444) (Whitehead et al., 2007; Reed et al., 2008), men and women with type 2 diabetes (N = 2626 and 2882, respectively) (Whittemore et al., 2004; Christian et al., 2008; Pi-Sunyer et al., 2007), men and women with hypertension (N = 574) (Svetkey et al., 2009), men and women with one or more known cardiovascular risks (N = 154) (Edelman et al., 2006), internal medicine and primary care physicians (N = 65 and 32, respectively) (Katz et al., 2008; Svetkey et al., 2009), and obese men and women (N = 309) (Volger et al., 2013). Follow-up assessments were made with varying frequency ranging from 1 to 2 times, over different time periods and with different time intervals ranging from 3 to 24 months.

Seven studies evaluated patient-focused interventions (Lager et al., 2014; Whittemore et al., 2004; Quinn et al., 2008; Block et al., 2004; Volger et al., 2013; Edelman et al., 2006; Greiner et al., 2008) and two combined patient and provider-focused interventions (Hebert et al., 2012; Cohen et al., 2011). Among the patient-focused interventions, five studies showed improvements in physical activity (PA) outcomes (Whittemore et al., 2004; Block et al., 2004; Volger et al., 2013; Edelman et al., 2006; Greiner et al., 2008) while two studies showed no significant differences between groups at any point in time (Whittemore et al., 2004; Whitehead et al., 2007).

Among patient-focused studies, three evaluated group and individual counseling sessions. Counseling and coaching studies achieved significant increases in PA outcomes with interventions that offered more versus less frequent counseling (Volger et al., 2013), group and individual counseling sessions that incorporated a tapered frequency approach (Greiner et al., 2008), and individualized, tailored counseling (Edelman et al., 2006).

Two patient-focused studies compared usual care to two different lifestyle-counseling strategies with mixed results. The combination of counseling and an education map (Reed et al., 2008) achieved improved but non-significant PA and the other showed a significant improvement at 6 but not at 24 months for an enhanced brief lifestyle counseling session (Volger et al., 2013).

Two studies of interventions with both physicians and patients showed no significant differences between groups but showed that the greatest increases in physical activity levels were seen in conditions where both the physician and patients had participated in an intervention to increase lifestyle counseling and adherence to recommendations (Katz et al., 2008; Svetkey et al., 2009).

3.1.4. Weight management outcomes—Seventeen studies addressed weight and weight management (Whittemore et al., 2004; Cohen et al., 2011; Volger et al., 2013; Edelman et al., 2006; Christian et al., 2008; Poston et al., 2006; Ely et al., 2008; Wadden et al., 2005; Appel et al., 2011; Digenio et al., 2009; Kumanyika et al., 2011; Bennett et al., 2012; Greiner et al., 2008; Svetkey et al., 2009; Pi-Sunyer et al., 2007; Rothert et al., 2006).

Five studies were conducted in community-based primary care practice clinics (Volger et al., 2013; Christian et al., 2008; Wadden et al., 2005; Bennett et al., 2012; Svetkey et al., 2009), two in internal medicine/family medicine practices (Bennett et al., 2010; Kumanyika et al., 2011), one in an obesity clinic (Digenio et al., 2009), two in university clinical research clinics (Edelman et al., 2006; Pi-Sunyer et al., 2007), one in a Kaiser- Permanente Health Care Delivery System (Rothert et al., 2006), one in a Diabetes Educational Center (Whittemore et al., 2004), one in a Veterans Affairs Health Center (Cohen et al., 2011), and five in outpatient primary care practices (Poston et al., 2006; Appel et al., 2011; Bennett et al., 2012) with two in rural settings (Ely et al., 2008; Greiner et al., 2008).

The majority of studies included overweight and obese men and women (N = 4596) (Volger et al., 2013; Poston et al., 2006; Ely et al., 2008; Wadden et al., 2005; Appel et al., 2011; Digenio et al., 2009; Greiner et al., 2008; Rothert et al., 2006). Three studies included patients with type 2 diabetes (N = 5508) (Whittemore et al., 2004; Pi-Sunyer et al., 2007) with one conducted among Veterans (Cohen et al., 2011). One study included patients with hypertension (N = 574) (Svetkey et al., 2009), two patients with hypertension and obesity (N = 466) (Bennett et al., 2010; Bennett et al., 2012), and one general primary care female patients (N = 261) (Kumanyika et al., 2011). Participants included in all studies numbered 12,142.

Five studies compared usual or standard medical care to an in-person lifestyle counseling intervention (Whittemore et al., 2004; Cohen et al., 2011; Edelman et al., 2006; Ely et al., 2008; Bennett et al., 2012), and one study compared enhanced usual care to an intensive lifestyle counseling intervention (Pi-Sunyer et al., 2007). Two studies compared usual care to two multi-component lifestyle counseling intervention conditions (Volger et al., 2013; Appel et al., 2011). One study compared a web-based intervention to usual care (Bennett et al., 2010), and two studies examined a computer-based assessment versus enhanced usual care (Christian et al., 2008; Rothert et al., 2006). Another compared a low intensity counseling intervention to a moderate intensity counseling intervention (Kumanyika et al., 2011). Three studies compared medications to counseling, or in combination with counseling interventions (Poston et al., 2006; Wadden et al., 2005; Digenio et al., 2009). Two studies conducted interventions with both patients and providers to enhance weight loss (Svetkey et al., 2009) and to discuss and motivate confidence for weight loss (Greiner et al., 2008).

Primary weight management outcomes included weight loss (Volger et al., 2013; Poston et al., 2006; Digenio et al., 2009; Pi-Sunyer et al., 2007; Rothert et al., 2006), waist circumference (Digenio et al., 2009), mean weight changes (Cohen et al., 2011; Christian et al., 2008; Ely et al., 2008; Wadden et al., 2005; Appel et al., 2011; Bennett et al., 2010; Kumanyika et al., 2011; Bennett et al., 2012; Svetkey et al., 2009), and BMI (Whittemore et al., 2004; Edelman et al., 2006). Follow-up assessments occurred with varying frequency ranging from 1 to 3 times, over time periods from 3 to 24 months, and with time intervals of 3, 4.5, 6, 12, 18, and 24 months.

Interventions involving web-based or computer-based assessments enabling patients to have a self-manageable and tailored weight loss plan proved to have significant weight loss

benefits over either usual care (Bennett et al., 2010) or enhanced usual care that only added educational information (Christian et al., 2008; Rothert et al., 2006; Bennett et al., 2010).

In studies comparing usual care to interventions that only utilized behavioral counseling techniques (i.e. lifestyle coach, primary care practice (PCP) counseling, auxiliary healthcare provider, enhance lifestyle counseling), participants in two behavioral counseling interventions had significantly better weight loss outcomes than those in usual care (Kumanyika et al., 2011; Pi-Sunyer et al., 2007) while those in another study demonstrated a trend toward improvement in BMI that was not significant and that decreased at month 3 (Whittemore et al., 2004). For patients in a moderate intensity arm (provider counseling with added coaching), the percent of patients losing > 5% of baseline was significant (Kumanyika et al., 2011). An intensive lifestyle intervention of individual and group sessions with an intervention tea, portion controlled diets, PA and a toolbox algorithm produced significantly greater weight loss at 12 months and greater reductions in waist size (Pi-Sunyer et al., 2007). Compared to usual care, the most intensive behavioral intervention strategy (enhanced lifestyle counseling) yielded the greatest weight loss outcomes compared to a less intensive intervention (brief lifestyle counseling) with results lasting up to 24 months (Whittemore et al., 2004).

A combination of group and individualized coaching sessions incorporating a tapered off frequency approach led to insignificant reductions in weight and BMI (Greiner et al., 2008).

Remote approaches to counseling (e.g., telephone, either alone or augmented by coaching and web-based support (Whittemore et al., 2004; Poston et al., 2006)) showed that clinically and statistically significant weight loss was achieved and in some cases over the long rather than short term (Ely et al., 2008).

Studies examining medication in addition to or in comparison to lifestyle counseling found that the combination of medication coupled with the highest frequency of lifestyle counseling interventions yielded significantly greater weight loss results at both 6 month (Poston et al., 2006; Digenio et al., 2009) and 12 months post baseline (Wadden et al., 2005). Patients receiving combined therapy of sibutramine plus life-style modification counseling and receipt of educational materials experienced significant weight loss at 12 months but sibutramine is no longer available in the United States.

Two studies involved both patients and providers as participants. Mean weight changes were significant at 6 months compared to the control group but not sustained at 18-months (Svetkey et al., 2009). Patients who agreed with their physicians on whether weight and related behaviors were discussed during routine visits reported higher motivation and confidence to lose weight compared to those reporting that they didn't have discussions with their physician (Greiner et al., 2008).

3.1.5. Summary—While outcome improvements were observed in head-to-head comparisons of interventions for weight and physical activity, changes in dietary behavior were often small (e.g., less than one serving in fruit and vegetable consumption), not significant across intervention groups, and only occasionally sustained over the long term.

For physical activity, intervention effects were significant both clinically and statistically with differences in PA as measured by several different metrics ranging from 16% to 36%. Duration of effect was not measured sufficiently within studies to allow a conclusion. Intervention effects for changes in weight though variously defined, were both statistically and clinically significant, ranging from -2 to -9.9 lb and in some cases weight loss of > 5% of baseline body weight was sustained for as long as 24 months. Overall, the SOE was rated as moderate for KQ1 based on our assessment of study limitations, the heterogeneity of outcomes and associated metrics and of intervention designs, and differences in duration of follow-up. Evidence was rated high for findings related to PA, moderate for weight management and low for diet outcomes.

3.2. KQ2 summary findings

For KQ2, studies were included only if study populations were composed of one race/ethnicity group. Even though search criteria were designed to find studies for any racial/ethnic study populations for KQ2, eligible studies were found only for African American (n = 4) and Hispanic/Mexican American/Latino (n = 2) populations. As a result, our findings apply only to these two groups and not to racial/ethnic minorities more generally. Among studies conducted among African American participants only, two were in community health centers (Befort et al., 2008; Parra-Medina et al., 2011), one in a family practice department of a large university health system (Kumanyika et al., 2005), and one in primary care clinics (Hartley et al., 2013). Two studies explored interventions for Hispanic/Mexican American/Latino populations only (Staten et al., 2004; Vincent, 2009). One study was conducted in two primary care clinics that participated in the National Breast and Cervical Cancer Early Detection Program (NBCCEDP) (Staten et al., 2004), the other in a community health clinic (Vincent, 2009).

3.3. KQ2 summary findings for African American populations

3.3.1. Dietary outcomes—Two studies examined interventions to improve dietary outcomes: energy intake and percent calories from fat, and increased F&V consumption (Befort et al., 2008) and reductions in Dietary Risk Assessment scores (Parra-Medina et al., 2011). Study participants (N = 310) populations were obese African American women (N = 44) (Befort et al., 2008), and African American women aged 35 years and older who were patients of South Carolina (SC) community health care centers and at high risk for cardiovascular disease (N = 266) (Parra-Medina et al., 2011).

Each study compared multi-component interventions to change patients' dietary outcomes with mixed results. Participants in the 16-week Behavior Weight Loss Program (BWLP) combined with 4 motivational interviewing sessions reduced their energy intake and percent calories from fat and increased their consumption of F&Vs but there were no differences between groups at 16-week follow-up (Befort et al., 2008). In the second study, mean reductions in participant Dietary Risk Assessment scores were observed in both groups, with comprehensive intervention participants having significantly higher mean reductions than standard care participants at 6 and 12-months (Parra-Medina et al., 2011).

3.3.2. Physical activity outcomes—Two studies described in the Dietary Outcomes section also tested interventions designed to improve physical activity outcome measures of active kcals and minutes of activity (Befort et al., 2008) and total physical activity and leisure-time activity (Parra-Medina et al., 2011). Results were mixed with no significant change across time for either activity minutes or kcals (Befort et al., 2008) and significant increases in leisure-time physical activity at 6 months but not in total physical activity at 6 months (Parra-Medina et al., 2011).

3.3.3. Weight management outcomes—Three studies evaluated interventions to change patients' weight management outcomes: weight loss (Befort et al., 2008; Martin et al., 2008) and mean weight changes (Kumanyika et al., 2005).

Studies included comparison of a 16-week BWLP combined with 4 motivational interviewing sessions with the BWLP combined with health education control sessions (Befort et al., 2008); and a standard care intervention with a tailored intervention consisting of five 15-minute physician counseled office visits on a monthly basis plus one 15 minute maintenance session at month 6 and oral physician recommendations and handouts summarizing the focus of each visit and culturally specific menus and recipe books (Martin et al., 2008). Results were insignificant across groups in one study (Befort et al., 2008) and significant in the short, but not long term in the other two studies (Martin et al., 2008; Kumanyika et al., 2005).

3.3.4. Summary—Overall, the strength of evidence is low based on the number of studies. Significant findings were found for dietary and PA outcomes in only one study while 3 studies found significant short but not long term findings for weight loss.

3.4. KQ2 summary findings for Hispanic/Mexican American/Latino patients

3.4.1. Dietary outcomes—Two studies addressed daily F&V consumption and PA outcomes among Hispanic women over the age of 50 years (Staten et al., 2004) and among 17 Mexican American participants with type 2 diabetes (Vincent, 2009).

The Arizona WISEWOMEN project included three interventions: provider counseling only, provider counseling plus health education and counseling and public health education combined with community health worker (CHW) support (Staten et al., 2004). Over a 12-month study period, significantly more participants receiving the more comprehensive intervention of provider counseling, health education, and CHW support progressed to eating five fruits and vegetables per day with baseline consumption improving by 3.5%. Participants receiving only provider counseling or provider counseling plus health education did not improve over baseline. No significant changes between groups related to diet were observed in the second study (Vincent, 2009).

3.4.2. Physical activity outcomes—The same two studies addressed PA outcomes (e.g., number of minutes of moderate-to-vigorous PA in one study (Staten et al., 2004) and number of minutes of overall PA in the other) (Vincent, 2009) using the same interventions. There were no significant changes between groups related to overall PA in either study.

3.4.3. Weight management dietary outcomes—One study found a significant decrease in mean weight loss of nearly 5 lb and mean BMI whereas the control group had a slight increase in weight and BMI (Vincent, 2009).

3.4.4. Summary—One study evaluated dietary outcomes only and found no significant effect. One study evaluated dietary, PA, and weight outcomes, finding a significant difference in mean weight loss and mean BMI at 4 weeks post intervention. Evidence is low for Hispanic/Latino/Mexican American patients based on the number of studies.

4. Discussion

4.1. Summary of evidence

Our review identified a wide array of multi-component interventions tested in randomized trials as options for providing education, counseling and support for lifestyle and behavioral change in primary care settings and among diverse and racial and ethnic minority population groups. We found that weight and physical activity related outcomes were more amenable to change than those associated with diet with significant findings across intervention arms and over time in multiple studies. While outcome improvements were observed in head-to-head comparisons of interventions for weight and physical activity, changes in dietary behavior were often small, not significant across intervention groups, and only occasionally sustained long term. Overall, the SOE was rated as moderate for KQ1 and as low for KQ2 based on our assessment of study limitations, the heterogeneity of outcomes, associated metrics, intervention designs, and duration of follow-up. For KQ1 alone, we rate the evidence as high for findings related to PA, moderate for weight management, and low for diet outcomes. Findings by outcome for two racial and minority populations (KQ2) were inconsistent and the number of studies small. Evidence for effectiveness for these populations is low.

5. Limitations

Our review found great variability across all PICOS characteristics. The most frequently identified limitations were small sample size and large losses to follow-up. We acknowledge the possibility that our findings are affected by selection and publication bias and the potential for reviewer misclassification of study characteristics. Interventions varied widely, were based on different behavioral constructs, and often complex. Assessments of intervention completion and fidelity of intervention content and process were not presented in any of the included studies.

6. Conclusions

Increasingly, primary care providers are called upon to address obesity and excess weight among patients following recommendations such as those by the USPSTF (Anon., 2015) which call for screening all adults for obesity and offering or referring patients with a BMI of 30 kg/m² or higher to intensive, multicomponent behavioral interventions. The USPSTF notes a high certainty that the net benefit of these actions is moderate or that there is moderate certainty that the net benefit is moderate to substantial (Anon., 2015). The USPSTF found that intensive, multicomponent behavioral interventions for obese adults

should include behavioral management activities, such as setting weight-loss goals; efforts to improve diet or nutrition and increase physical activity; ways to address barriers to change; self-monitoring; and strategizing how to maintain lifestyle changes (Anon., 2015; LeBlanc et al., 2011). The USPSTF recommendations did not specifically explore interventions delivered and tested in primary care settings exclusively for racial and ethnic minorities. Our review findings are consistent with those of the USPSTF and others (Orozco et al., 2008; Angermayr et al., 2010; Richards et al., 2013a; Richards et al., 2013b; Tsai and Wadden, 2009; Pal et al., 2013; Glynn et al., 2010; Duke et al., 2009; Lager et al., 2014; Hebert et al., 2012; Tulloch et al., 2006) in finding that many different approaches are used to deliver education, counseling, and support for lifestyle modification and health behavior change in primary care through multicomponent interventions, that weight associated metrics are important, and that significant weight changes are more likely with intensive, multi-component interventions.

Interventions in our review focused on changing multiple health behaviors as part of weight loss or management interventions. Nine of fifteen studies examined diet or physical activity and had primary weight loss outcomes. For primary care providers, these metrics may be more practical to measure than health behaviors as weight-related metrics are already collected for a patient's history and physical examinations and don't depend on patient self-report. Adding a reliable and valid measure of diet and PA may not be easy to integrate into the clinical workflow. Ten of the seventeen included weight loss studies yielded significant long-term effects of up to 12 months. Variability was observed in the clinical significance of the amount of weight loss among patients. Examining the percent of patients in primary care who lost weight may be a useful metric for intervention effects along with individual weight loss outcomes.

It is important to consider why interventions targeting weight loss through health behavior change had significant effects on weight outcomes, but did not substantially change diet and physical activity in all cases. Fruit and vegetable intake were among the metrics used to evaluate the effects of weight loss interventions on dietary behaviors. Many patients in these studies had limited socioeconomic resources that likely reduced their capacity to make dietary changes. Recently, we demonstrated that a greater proportion of African American community residents who received education about shared risk factors for cancer and cardiovascular disease met the recommended guidelines for physical activity compared to those who received disease specific education about risk factors for cardiovascular disease (Halbert et al., 2014). Patients and community residents may be more capable of making physical activity changes because this behavior can be modified through strategies (e.g., starting a walking program) not requiring additional financial resources. Recent efforts focus on using practical approaches to identify the health behavior and lifestyle changes that patients are capable of making within the context of their social and economic resources (Bukman et al., 2014). Determining patient's capability of health behavior change may be an important process to assess and frame future research aiming to explore options for implementing research tested weight loss interventions in primary care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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PRISMA Flow Diagram

Fig. 1.
PRISMA 2009 flow diagram.

Table 1

General inclusion/exclusion criteria for key questions.

Category	Inclusion criteria	Exclusion criteria
Study design	All trials including randomized clinical trials, comparative effectiveness studies, etc. (should have a comparator such as another intervention or usual care control group). Observational Cross-sectional Qualitative	Editorial Newspaper article Press release Commentary Conference talk Case studies Systematic reviews
Setting	Primary care Ambulatory care University internal medicine Health clinic (FQHC or public health clinic)	Hospital/inpatient Community Academic
Date published	2004–2014	Prior to 2004
Language	English-speaking	Not English-speaking
Country	Only United States	Not United States
Population	Adults ages 18–75 years	Aged < 18 or > 75 years
Intervention	Lifestyle counseling related to diet, physical activity or obesity. Interventions with a nutrition and/or weight management component. Intervention components that pertain to counseling, printed materials, coaching, etc. Outcomes related to diet/nutrition, physical activity, weight loss, body mass index, and obesity.	Doesn't have components aforementioned in inclusion criteria (e.g. primary intervention is pharmacological strategy only. No lifestyle counseling or diet/physical activity activities are integrated into the intervention.)

Table 2

Initial literature search terms for key questions.

SCOPUS	((TITLE-ABS-KEY(counsel* OR advise* OR teach OR guide) AND TITLE-ABS-KEY(ethnic OR race OR culture OR blacks OR asians OR minorities) AND TITLE-ABS-KEY("life style" OR health behavior* OR lifestyle)) AND NOT DBCOLL(medl*)) AND (primary care OR family practice OR family physicians)
PUBMED	Search ({ "Counseling"[Mesh] OR "Directive Counseling"[Mesh]}) AND(((("Life Style"(Mesh) OR "Health Behavior"[Mesh])) AND "Ethnic Groups"[Mesh]) AND ("Primary Health Care"(Mesh) OR "Physicians, Primary Care"[Mesh] OR "Primary Care Nursing"(Mesh)) Search "Counseling"(Mesh) OR "Directive Counseling"[Mesh] Search (((("Life Style"(Mesh) OR "Health Behavior"[Mesh])) AND "Ethnic Groups"[Mesh]) AND ("Primary Health Care"[Mesh] OR "Physicians, Primary Care" [Mesh] OR "Primary Care Nursing"(Mesh)) Search ("Life Style"(Mesh) OR "Health Behavior"[Mesh]) Search "Ethnic Groups"[Mesh] Search "Primary Health Care"(Mesh) OR "Physicians,Primary Care"[Mesh] OR "Primary Care Nursing"[Mesh]
CINAHL	(MH "Life Style Changes") OR (MH "LifeStyle+") OR (MH "LifeStyle, Sedentary") OR "lifestyle" (MH "Ethnic Groups+") (MH "Counseling+") OR (MH " Couples Counseling") OR (MH "Nutritional Counseling") OR (MH "Peer Counseling") (MH "Primary Health Care") OR (MH "Physicians, Family")

Table 3

Study data items by category.

Data categories	Data items
Study design	Research objective
	Study groups
	Funding source
	Geographic location
	Setting type
	Setting description
	Study design
	Primary outcomes
	Measurement intervals
Patient characteristics	Sampling strategy
	Unit of randomization
	Process of randomization
	Inclusion/exclusion criteria
	Number eligible
	Number randomized
	Number completers
	Number analyzed
	Mean age (or age range)
	Number female (%)
	Number race (%)
	Number ethnicity (%)
	Median income (%)
	Number insured (%)
	Number education (%)
	Number health literacy (%)
	Other baseline characteristics
Interventions	Comparator(s) description
	Intervention format
	Intervention delivery agent
	Intensity of the intervention
	Theory-based intervention
Intermediate outcomes	Intermediate outcome(s) description
	Exact measure(s) used
	Timing of measurement
	Data source
	Number analyzed for outcome(s)
	Results by group
	Differences by group
	Controlled covariates

Data categories	Data items
Ultimate outcomes	Statistical methods used
	Analysis adjusted for multiple comparisons
	Analysis adjusted for clustering effect
	Intention to treat analysis
	Stated outcome(s)
	Exact measure used to measure outcome(s)
	Timing of measurement
	Data source
	Number analyzed for outcome(s)
	Results by group
	Differences by group
	Controlled covariates
	Statistical methods used