Bazian

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Individual-Level Behaviour Change

External evidence review 3: Appendices

Evidence review for Public Health Guidance

Developed by Bazian for NICE

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Appendix A: Included studies

1. Qualitative studies

Ainsworth et al. (2006) [+] conducted a web-based survey of chiropractors in Canada self-reported views on maximising compliance to prescribed home exercise and quantifying the most frequently used strategies. 104 Ontario chiropractors (65% male, 33% over 35 years and a mean of 13 years in practice) completed the questionnaire from a staged recruitment process sending 3,356 personalised email invitations. The most frequently used compliance strategies, used over 60% of the time, were keeping instructions simple, motivating patients by explaining exercises in a positive and enthusiastic way, giving patients encouragement, prescribing exercises that require low-cost equipment, helping patients by providing material that helped demonstrate the exercises and educating patients by discussing the importance of and benefits to exercise. This study provides a description of what was done but little evidence of what made a difference or what the views of the providers actually was. The study only provides weak evidence for a motivational approach.

Broyles at al. (2012) [++] ran a focus-group study in a Veterans Affairs medical centre (US) looking at the anticipated barriers and facilitators to implementing nurse-delivered screening, brief intervention (BI) and referral to treatment (RT) for reducing alcohol intake, described 6 barriers and 3 facilitators reported by 33 medical-surgical nurses (97% female). Barriers were: lack of alcohol-related knowledge and skills; limited interdisciplinary collaboration and communication around alcohol-related care; inadequate alcohol assessment protocols and poor integration with the electronic medical record; concerns about negative patient reaction and limited patient motivation to address alcohol use; questionable compatibility of screening, BI and RT with the acute care paradigm and nursing role; and logistical issues (e.g., lack of time/privacy). The facilitators of nurse-delivered screening, BI, and RT focused on provider- and system-level factors related to: improved

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provider knowledge, skills, communication, and collaboration; expanded processes of care and nursing roles; and enhanced electronic medical record features. Inadequate alcohol assessment protocols and poor integration with the electronic medical record and questions about the compatibility of screening, BI and RT with the acute care paradigm and nursing role were raised along with other barriers already described. Efficient record-keeping systems were seen as an important facilitator to improve the uptake of assessment and screening for alcohol disorders and the authors suggest a hybrid model of implementation featuring active roles for interdisciplinary generalists and specialists.

Casey et al. (2009) [++] ran three focus group discussions in Canada aiming to assess the barriers and facilitators to participation in a supervised exercise programme. Sixteen participants with type 2 diabetes (seven women, nine men with ages ranging from 39 to 65 years) were recruited to the study. The participants had previously taken part in a trial comparing dietary counselling alone to dietary counselling plus with exercise and had been diagnosed with diabetes for between 1 month and 13 years. The study found that participants appreciated the monitoring, encouragement and accountability provided by programme staff. This, they said, provided motivation. Participants also requested better transition from the programme with support and supervision to self-directed activities. They said that co-morbid conditions were barriers to a regular exercise routine and that having even greater scheduling flexibility and having exercise facilities closer to them were of benefit.

Coghill et al. (2009) [++] conducted a semi-structured interview to investigate the perceived motivators, demotivators for adherence to regular physical activity. In the UK study of 38 men with hypercholesterolemia (mean age 54.8 years) who had been randomised to the active arm of a 12 week home-based walking intervention were asked six questions over 15 minutes. 'Health or fitness' were the main motivational themes for adherence to walking. For those who were less physically active, lack of time was cited as a de-motivator with external support identified as a motivator for increased activity in those who were more active. The authors conclude that the ability to

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emphasise the health benefit of physical activity and provide continued support may be important in future programmes.

Dillman et al. (2010) [++] conducted a cross-sectional survey of 119 diabetes educators (mean age 44 years, 97% female, 90% white) recruited from 3 provinces in Canada. The majority of educators saw fewer than 10 patients per day (57%), with another 30% seeing 10 to 15 patients per day in sessions that were typically between 20 and 40 minutes in length. Personal efficacy in counselling and referral and other aspects of competence such as: attitudes, perceived difficulty, barriers and training practices related to physical activity and exercise were recorded. Diabetes educators lacked confidence in their own ability; they also lacked confidence in the ability of their patients to perform physical activity and exercise. They had positive attitudes to physical activity and exercise themselves but perceived their typical patient's attitude to be much less positive. Incorporating in-depth physical activity and exercise counselling in their practice was perceived as "somewhat difficult" and lack of time for counselling, lack of interest by the patient, a lack of resources, educator lack of ability/knowledge, patient co morbidities or limitations and a lack of access to facilities were all cited as barriers. In terms of training 40% of diabetes educators reported having received no formal training in physical activity and exercise counselling, and an additional 40% had received only 1 form of training (e.g., workshops, as a part of degree, conference presentations or certifications). The remaining 20% of participants reported having received more than 2 forms of training specific to physical activity and exercise counselling. Skills for the educators were in promoting self-confidence in patients ability to succeed, in time management and in making appropriate exercise related referrals were listed and requested in any future training programmes for diabetes educators.

Escolar-Reina (2010) [+] investigated problems encountered complying with exercise programmes and included lack of clinical knowledge about the disease or goals of exercise. Effects of prescribed exercises were both positive and negative with 'proper' supervision suggested as a potential method to reduce patients' insecurity and fear of exercising at home. Bonding

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to prescribed exercises was enhanced when their care giver provider presented knowledge about the disease, promoted feedback and motivation during exercise instruction, gave reminders to exercise or monitored results and adherence.

Jansink et al. (2010) [++] conducted 12 in depth interviews with practice nurses in a Dutch general practice and asked about the specific barriers they experienced in counselling patients with type 2 diabetes. A premise of this study was that promoting lifestyle behaviour change requires a shift from simple advice giving to a counselling-based approach. The topics discussed included lifestyle changes in diet, physical activity and smoking cessation and nurses were invited to reflect on barriers at the patient and practice levels, but mainly on their own roles as counsellors. All interviews were audio-recorded and transcribed and analysed against a predetermined framework. Nurses felt most barriers were located at the level of the patient, i.e. that patients had limited knowledge of a healthy lifestyle and limited insight into their own behaviour. Nurses also claimed patients lacked the motivation to modify their lifestyle or the discipline to maintain an improved lifestyle. When asked about their own barriers, nurses reported lack of counselling skills and insufficient time as barriers to effective lifestyle counselling. Training in motivational interviewing was proposed to help overcome the tendency to 'jump ahead of the patient' and other skills, notably ‘structuring the consultation’ to prioritise behaviour change were suggested.

Mahoney et al. (2012) [++] aimed to explore the attitudes, actions and beliefs of Australian mental health occupational therapists in providing diet-related interventions. In semi-structured interviews lasting 30 to 40 minutes six occupational therapists (5 women and 1 man) were confident in provided general education for healthy eating, however, they were not comfortable providing specific dietary advice. Training needs in providing specific healthy eating education and the ability to refer to dietitians in mental health settings were highlighted.

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Murphy et al. (2011) [++] designed a qualitative study using grounded theory methods of 40 patients with type 1 diabetes in Ireland. Interviews of 30 to 60 minutes were conducted over 24 months using purposive sampling of participants who had completed a multicentre, cluster randomised trial named the dose adjustment for normal eating (DAFNE) trial. Participants were 60% female, aged 20-70 years and had been diagnosed with type 1 diabetes for between 2 and 31 or more years. This study showed positive outcomes (decreased HbA1c, reduced hospital admissions and improved quality of life) for the structured education programme. The researchers were interested in patient perspectives on self- management and the determinants of the capacity to successfully self-manage their disease. The sense of 'being in control' was found to be central to other factors reported by the patients as important in influencing their ability to self-manage. These other factors were gaining knowledge, support, motivation, a relationship shift towards collaboration and empowerment. The researchers suggest that these factors are all interdependent and that the role of professionals in clinical practice is to understand and develop their skills in promoting these factors in their consultations so that they can give more focused and empowering care to people with diabetes.

O'Sullivan et al. (2010) [+] conducted three semi structured interviews with 15 patients as a qualitative component of a successful physical activity counselling trial based on self-determination theory. The trial was conducted in Canada and showed improvements in promoting measures of autonomy and self-efficacy. The interviews were transcribed verbatim and were summarised in nine themes, patients were extremely satisfied with the intervention and particularly valued the intensive counselling and a tailored approach. Support for autonomy enhanced the motivation of participants and encouragement (verbal persuasion) offered by the counsellor to increase activity levels was universally valued by all 15 patients. A good relationship with the counsellor was found to improve satisfaction with the intervention. Longer-term support from a physical activity counsellor was requested by patients.

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Patwardhan et al. (2009) [++] in the US explored key facilitators and barriers to the adoption of a brief tobacco-cessation protocol reported by ten pharmacists at interview. Five out of the 10 pharmacists (age range 36 to 50 years) interviewed worked in a large community pharmacy chain setting, three were employed at independent stores, one pharmacist worked at a supermarket pharmacy, and one at a mass-merchandiser pharmacy. Results showed that fear of negative patient reaction was the most prominent barrier to initiating tobacco cessation discussions with patients. The authors suggested improved training for pharmacists in initiating cessation discussions and providing environmental cues in pharmacies and changes to work flows to promote brief interventions or make them easier to deliver.

Robinson et al. (2010) evaluated the experiences of both the receivers and deliverers of a peer mentoring healthy lifestyle programme in deprived areas of Liverpool, UK. The programme trained 13 local men (mentors) to deliver advice, encourage men to be health aware and to access leisure services. Contact was made with 245 men (age over 35 years). In the evaluation, interviews were conducted with 6 mentors, and 14 men receiving the intervention and 5 community and health professionals (evaluators) who also attended the training. The evaluators identified settings and social networks as key influences on participation in this healthy lifestyle programme that consisted of dietary and physical activity advice. The men said that the mentors' skill in non-directive communication and ability to let them take control of decisions themselves was appreciated. The mentors said that they would appreciate training in supporting peers to sustain behaviour change.

Thomsen et al. (2009) [++] conducted one-time face to face, semi-structured interviews to assess the experience of 15 women in Denmark who were newly diagnosed with breast cancer and offered a pre-operative smoking cessation intervention. The interview was arranged 3 to 8 weeks after surgery and lasted 35 to 100 minutes. The women with a median age of 50 years (range 40 to 72 years) had a median 30 pack year smoking history, over 35 years (bebut age 15 years) and all received a 45-90 minute smoking cessation intervention 3-7 days prior to surgery for breast cancer. Peri-operative NRT

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was also offered. The themes emerging included reflection on smoking and health, escaping the social stigma of being a smoker, heightened awareness of being addicted to smoking and enacting a duty of responsibility to themselves and those around them. Participants experienced a sense of personal achievement and improved well-being as well as endorsement from family and friends. 6 of 11 women had relapsed by the interview and said they did so as an ingrown response to emotional distress. The authors report diagnosis of cancer as a 'teachable moment' for behaviour change, defined as naturally occurring transitions or health events thought to motivate individuals to spontaneously adopt risk-reducing health behaviours. The women in the study were adamant that they would not have considered cessation had they not been offered the intervention, suggesting that although diagnosis may be a teachable moment it does not necessarily spontaneously prompt smoking cessation.

"when you have been diagnosed with a life threatening disease, I mean then you might as well [stop smoking], if you can't find a better reason to stop smoking, then really you probably never will"

Walters et al. (2012) [+] conducted semi-structured interviews in Australia to investigate the health behaviour changes adopted by 44 participants with moderate or severe COPD enrolled in a smoking cessation trial of telephone health-mentoring by nurses. The health-mentors used a 'patient centred' approach on the phone calls to deliver individual self-management support. A median of 13 mentor contacts over 12 months (range 5 to 20 contacts) were provided. In the 45 minute interviews participants (mean age 65 years, 55% male, 43% current smokers, 75% moderate COPD) reported that being 'listened to' by caring health professionals was very valuable. The telephone mode of delivery for this support was rated as highly acceptable and was described as enabling good rapport. The intervention increased awareness of COPD effects in participants and helped them develop and personalise behaviour change strategies even by those not actively making change according to the results. The intervention was theory based and training for

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mentors was provided in a two-day training programme that included: motivational interviewing skills; goal setting; action planning and problem solving; self-management support theory and practice; and a COPD-specific clinical management module. Particular skills appreciated by participants were the encouragement and fostering of problem solving offered by mentors to overcome difficulties and maintain change. Some simple strategies gave participants the knowledge they needed to make changes.

"She said 'Well, why don't you leave them at home?' I said 'Well I never thought of that!'" (male, age 71, smoker, moderate COPD).

Sometimes participants believed that they had been able to make changes to their smoking because of the strategies their mentor had provided to cut down or give up.

2. Intervention studies

French et al. (2012) [+] designed a physical activity intervention in the UK and applied it to 35 randomised volunteers recruited from an inner-city London workplace. The impact of the intervention (steps measured by pedometer) was compared when motivational components and volitional components were delivered on a single occasion or on separate occasions (motivation first or volitional component first) in a three-arm trial. The motivational techniques used were: enhancing self-efficacy and encouraging the planning of exercise and a pedometer and the volitional techniques were: goal setting, action planning and coping planning. The intervention was based on an extended theory of planned behaviour. Self-efficacy, attitude, action planning and coping planning were assessed using validated scores and scales. Results showed that the combination of motivational and volitional components in the physical activity intervention were significantly associated with increased walking and self-efficacy. The two arms where motivational and volitional components were offered separately were not associated with significant improvement. This is one of the few studies to show a larger effect size when motivational and volitional components of an intervention are

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delivered together. It implies that skill or ability in delivering these six techniques are important competencies when delivered together.

Gaume et al. (2008) [+] recorded by audiotape a sample of 166 consecutive alcohol brief interventions (a single 15 minute session) carried out in an emergency department in the US as part of a randomised trial of patients screened positive for hazardous alcohol consumption (n=1,366). From these 97 sessions were independently coded by two masters-level psychologists who were. blinded to assessment and follow-up data; both were trained in MI and in using Motivational Interviewing Skill Code (MISC version 2.0, a score measuring motivational interviewing skill). Regression models were used to assess the associations between MISC and the drinking outcomes (baseline to 12 months difference in weekly drinking quantity and difference in heavy drinking episodes per month).

In the bivariate models, counsellors demonstrating better motivational interviewing skills were associated with better outcomes overall across all levels of patient 'ability to change', whereas counsellors with poorer MI skills were effective mostly only at high levels of patient 'ability to change'. In the fully adjusted multivariate models only patient communication characteristics (ability to change) predicted outcomes and counsellor skills were not associated with better outcomes.

Martino et al. (2008) [++] assessed the motivational skills of 35 therapists from five outpatient community programs in the US who delivered motivational enhancement therapy to 461 clients over 3 sessions to resolve ambivalence about drug (including alcohol) use. Competence was assessed using the Independent Tape Rater Scale adapted from the Yale Adherence Competence Scale and change in client motivation was assessed on the first and last 5 minutes of the sessions. Some significant associations between therapist fidelity and client process and outcome variables were shown. When divided into fundamental and advanced MI competence, inter class correlation coefficients in the models were positively related to in-session change in client motivation for the total sample (r ranged from .13 to .22, $p < .01$). The most

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consistent findings were that therapists who used fundamental and advanced MI skills more often and with higher levels of competence were significantly more likely to have clients who verbally expressed in session increases in their motivation. The study provides weak evidence as it did not identify whether behaviour change followed. Items characterising fundamental skills in this study were 'reflections; open-ended questions, and MI style'. Items characterising advanced strategies were 'drawing out pros, cons, and ambivalence; heightening discrepancies and using strategies for evoking motivation for change'

McCarthy et al. (2010) [++] assessed counselling skill using data from an RCT of adult smokers in the US. The trial randomised 403 adults to 8x10 minute sessions or no additional clinical contact and also randomised them to bupropion or placebo in a 2x2 design. The counselling focussed on bolstering social support, motivation, problem solving and coping skills. In the main trial counselling did not significantly increases abstinence rates at any time points (longest 56 days) and the investigators carried out further analyses. Meta-regression results showed that there were some predictors of abstinence. For example counselling that successfully prompted the avoidance of access to cigarettes, improved quitting self-efficacy, reduced perceived difficulty in quitting and protected against guilt and demoralisation following relapse was significantly more effective than counselling that did not. The authors conducted a mediation analysis, an analysis that assessed the significance of two associations on the conceptual path to success; first between counselling and a mediator and second between the mediator and abstinence. Only two mediator variables met the criteria as providing a significant explanation for the associations. These were cessation 'self-efficacy' and declines in 'perceived difficulty quitting'. This implies that skills or competence in fostering these two attributes may be important targets of training.

McEwen et al. (2005) [++] measured the frequency and quality of GP advice to stop smoking in a qualitative study using data from a cluster-randomised trial of 107 GP's in 30 practices in the West of England. The intervention was a GP desktop resource, a card 'envelope' on which GPs are offered guidance

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on helping patients stop smoking, plus a tear off advice and information sheet for handing to smoking patients. In this survey, a postal questionnaire was sent to all 107 GPs four weeks after the distribution of the resource. Responses rate was 70% (37 GPs from each arm of the study). The resource was an independent predictor of the number of patients advised to stop smoking (β0.345, $p<0.001$). Concern about the doctor-patient relationship was the only attitude variable that independently predicted (negatively) advice giving (β−0.465, $p<0.001$). Overcoming these concerns was suggested by the authors as a target for future training.

Moyers et al. (2005) [++] designed a study to assess the skills of therapists in motivational interviewing after a 2 day training workshop, with the aim of understanding better how motivational interviewing works. All 103 therapists (75% of the original sample) were English speaking US licensed health professionals in counselling, psychology, medicine, nursing or social work and were treating 5 or more clients per week with substance abuse disorders (including alcohol) in individual counselling sessions. They submitted sample audiotapes of actual client counselling sessions at 4, 8 and 12 months after their training. The first 20 minutes of the tape recordings were coded (using a validated score the Motivational Interviewing Skills Code) for 6 global clinical characteristics of the therapist: empathy, acceptance, egalitarianism, warmth, genuineness and overall MI 'spirit'. Four global client measures were also coded: affect, co-operation, engagement and seeking of information. The correlation between the clinician's interpersonal skills and the global client measures of involvement was assessed. Surprising findings, for the authors, were that in the main model, techniques inconsistent with motivational interviewing such as confronting, directing, offering advice without permission and warning patients were associated with improved client involvement. The link was strengthened when clinical interpersonal skills were added to the model and led the authors to conclude that behaviours inconsistent with MI enhanced the impact of therapist interpersonal skills upon client involvement and that clinician adherence to the spirit of the MI method, rather than the

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specific techniques for implementing it, is an important competency to emphasise in training.

3. Systematic reviews

Fourteen systematic reviews were identified and retrieved for full text analysis if they reported the mediating effect of a competence, knowledge, skill or training in terms of its effect on the impact of behaviour change interventions (Battersby 2010, Breckon 2008, Carr 2011, Dombrowski 2010, Greaves 2011, Hutchison 2009, Huttenen-Lenz 2010, Lai 2010, Michie 2009, Michie 2011, Murray 2012, Rice 2008, van Achterberg 2010, Williams 2011).

Battersby et al. (2010) [+] conducted a qualitative review of reviews and meta-analyses. The authors developed thematic content and derived a set of principles. Principles were selected to inform implementation of self-management in primary care for alcohol and smoking related lifestyle changes if they were supported by one or more reviews. 83 reviews and meta-analyses were included from 123 identified by the project team. 12 principles were identified. The authors report that none of the twelve behaviour change principles identified demonstrated clear effects in convincing majorities of the studies in which they were evaluated. The principles derived approximate behaviour change techniques or competencies. Evidence was organised within the framework of the Chronic Care Model:

1. Brief targeted assessment
2. Evidence-based information to guide shared decision-making
3. Use of a nonjudgmental approach
4. Collaborative priority and goal setting
5. Collaborative problem solving
6. Self-management support by diverse providers
7. Self-management interventions delivered by diverse formats
8. Patient self-efficacy
9. Active follow-up
10. Guideline-based case management for selected patients
11. Linkages to evidence-based community programs, and
12. Multifaceted interventions

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The authors provide a framework for implementing these principles in three phases of the primary care visit: enhanced pre-visit assessment, a focused clinical encounter, and expanded post-visit options. The framework proposed has also helped in organising the competencies as concepts for this review.

Breckon et al. (2008) [+] conducted a qualitative systematic review of physical activity interventions aiming to examine elements of the theory on which the intervention is based and the level of treatment fidelity applied. Twenty-six papers, mostly describing RCTs but some with quasi-experimental designs, were identified and included from an initial search that elicited 924 de-duplicated hits. One study was published before 2000 and 15 of the 26 studies (58%) were published after 2003. Behavioural and physiological outcome measures were recorded in most studies however process evaluation was generally poorly reported. Amongst these 26 studies, 15 (58%) identified that providers received training, but only 7 of these included any information concerning the frequency, duration, and content of training. Following the review (and author feedback), 5 studies administered and reported the training and competence of the interventionist. Assessment of competence involved checklists, reviewing audiotapes or providing certification of competence and most interventions were underpinned by the trans-theoretical model. The authors identify a fidelity framework but were not able to list competencies for physical activity interventions. They call for more thorough reporting of the design, training for delivery and receipt of physical activity counselling.

Carr et al. (2011) [++] conducted an evidence synthesis for the UK HTA programme of qualitative and quantitative research. The focus was on lifestyle advisors and the content, provider role, format, setting, intensity, duration and fidelity of the intervention techniques they used. The effectiveness, cost-effectiveness, equity and acceptability of the lifestyle advisors role in improving health and wellbeing were reviewed. The 26 trials (25,484 participants) included a range of study designs (RCT, non-RCTs, cohort studies, case–study control, interrupted time series, ethnographic studies) and looked at interventions across chronic care, mental health, breastfeeding,

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smoking, diet and physical activity and sexual health behaviour change topics. Overall, the authors found that the evidence was variable and only gave limited support to lifestyle advisors having a positive impact on health knowledge, behaviours and outcomes despite high levels of participant acceptability. Three abilities were suggested as benefits for this role: the ability to act as translational agents, explaining and communicating the health gains for example, the ability to remove barriers to prescribed behaviour, for example overcoming access issues like travel difficulties and helping to create facilitative social environments, for example encouraging support from family.

Dombrowski et al. (2010) [++] undertook a systematic review of randomised controlled trials of complex behaviour interventions for obese adults with obesity related co-morbidities or risk factors for co-morbidities. The authors were interested in identifying the active ingredients and so focussed on the behaviour change techniques described in the studies using a 26-item taxonomy to code programme components (Abraham 2008). From 7,658 potential references identified through database searching and searching of three obesity journals, 44 studies were identified for the review. Studies were published between 1985 and 2008 and 27 were conducted in the US. The average age of participants across all included studies was 55 years and mean BMI was 33. The meta-regression suggested that increasing numbers of identified BCTs are not necessarily associated with better outcomes. The provision of instructions ($\beta -2.69$, $p=0.02$), self-monitoring ($\beta -3.37$, $p<0.001$), relapse prevention ($\beta -2.63$, $p=0.02$) and prompting practice ($\beta -3.63$, $p<0.001$) could be linked to more successful interventions. Studies including more behaviour change techniques aimed at dietary change that were congruent with Control Theory were associated with greater weight loss.

Greaves et al. (2011) [++] conducted a review of reviews that themselves could have included RCTs, observational studies, case-controlled or other quasi-experimental designs. The interventions in these reviews or meta-analyses targeted diet and/or physical activity in adults at risk of developing type 2 diabetes. MEDLINE, EMBASE, CINAHL, PsycInfo, and the Cochrane Library were searched from 1998 to 2008. Reviews were selected where the

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primary outcome measure was weight, weight loss (kg or BMI) proportions of people achieving a target weight loss, changes in physical activity or dietary behaviour. Behaviours could be measured objectively (e.g. with accelerometers) or by self-report (e.g. dietary intake questionnaires). Of 3,856 identified articles, 30 met the inclusion criteria and 129 analyses related intervention components to effectiveness. A 26-item version of behaviour change taxonomy was used (Abraham 2008). Results indicate that overall, interventions produced clinically meaningful weight loss (3-5 kg at 12 months; 2-3 kg at 36 months) and increased physical activity (30-60 mins/week of moderate activity at 12-18 months). No statistical analyses or meta-analyses were conducted by the authors but the existing analyses reported in the articles reviewed were extracted and reported in a systematic format. Based on these causal analyses, intervention effectiveness was increased by engaging social support, targeting both diet and physical activity, and using well defined or established behaviour change techniques. Increased effectiveness was also associated with increased contact frequency and using a specific cluster of “self-regulatory” behaviour change techniques (e.g. goal-setting, self-monitoring). No clear relationships were found between effectiveness and intervention setting, delivery mode, study population or delivery provider.

Hutchison et al. (2009) [+] conducted a systematic review of physical activity behaviour change interventions based on the trans-theoretical model (TTM) with the aim of seeing how well the interventions accurately represent the model. The review included 34 articles reporting 24 different physical activity behaviour change interventions (21 RCTs and 3 non randomised trials) . Only seven of the 24 interventions used all four dimensions of the model (stages of change, processes of change, decisional balance and self-efficacy). The dominant techniques used were the distribution of TTM based written information on physical activity and physical activity counselling based on the TTM model. As the majority of studies failed to accurately represent all dimensions of the model, it is not possible to determine the causal effect of this theory base.

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Huttunen-Lenz et al. (2010) [++] conducted a systematic review of 14 RCTs (3,558 participants) of non-pharmacological interventions for smoking cessation in adults with coronary heart disease. Databases were searched from 1970 onwards. The review included international trials with 6 to 66 month follow-up. Despite superficial differences, interventions appeared to deploy similar behaviour change techniques targeted mainly at motivation and goals, beliefs about capacity, knowledge and skills. These competencies were proposed as future targets for training.

Lai et al. (2010) [++] explored pharmacological and behaviour interventions based primarily upon motivational interviewing (MI) for smoking cessation in a systematic review. Fourteen randomised trials (over 100,000 smokers) published between 1997 and 2008 were. MI was generally compared with brief advice or usual care and was effective when delivered by primary care physicians (RR 3.49; 95% CI 1.53 to 7.94) and by counsellors (RR1.27; 95% CI 1.12 to 1.43), and when it was conducted in longer sessions (more than 20 minutes per session) (RR 1.31; 95% CI 1.16 to 1.49). Multiple session treatments may be slightly more effective than single sessions however there was variation across the trials in treatment fidelity. Critical details in how MI was modified for study populations, training of therapists and content of counselling were lacking from trial reports and this confirms the view that designing and training people to deliver interventions in the future would benefit from more precise recording of the detailed content of interventions aimed at motivating people to change.

Michie et al. (2009) [++] conducted a systematic review and meta-regression of effective behaviour change techniques in healthy eating and physical activity interventions. The searched looked for peer reviewed articles (RCTs or controlled trials or interrupted time series designs) published between 1990 and 2008 that claimed to use behaviour change and/or cognitive techniques. The review included 122 evaluations (44,747 participants). Of these evaluations, fifty-one targeted physical activity only, thirty-five targeted healthy eating only and eighteen targeted both. The authors used a 26item BCT taxonomy to code the techniques described in these papers (Abraham 2008).

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The interventions that combined self-monitoring with at least one other technique derived from control theory were significantly more effective than the other interventions. Pooling the data using a random-effects model produced an overall effect size of 0.31 (95% CI 0.26 to 0.36), indicating that participants receiving behaviour change interventions reported significantly better outcomes than those in control conditions. There were moderate levels of heterogeneity (I^2=69%, p<0.001). Meta-regression was used to explore the reasons for heterogeneity across studies by examining ten intervention characteristics and 26 BCTs. Most variables explained little variation. The greatest amount of among-study heterogeneity (13%) was explained by self-monitoring. Additional effective techniques included prompting intention formation, prompting specific goal setting, providing feedback on performance and prompting review of behavioural goals. Three further techniques were associated with lower physical activity, these were setting graded tasks, use of follow-up prompts and relapse prevention. Interventions that combined self-monitoring with at least one other technique derived from control theory were significantly more effective than the other interventions (effect size 0.42 vs. 0.26).

Michie et al. (2011) [+] undertook a study to identify the competencies needed to deliver behavioural support for smoking cessation. Ten guidance documents identified by an expert panel could be used to generate a list of competencies for individual behaviour support and a further three documents for generating the competencies for group behavioural support. Overall, 94 competencies were identified (71 individual and 23 additional group competencies) and 59 were cited in at least two guidance documents (51 individual and 8 group). Fourteen of the individual competencies were supported by RCT evidence. These were ability to: (1) provide information on the consequences of smoking and smoking cessation, (2) provide information on withdrawal symptoms, (3) facilitate barrier identification and problem solving, (4) facilitate relapse prevention and coping, (5) facilitate action planning/develop treatment plan, (6) facilitate goal setting, (7) measure CO, (8) advise on stop smoking medication, (9) assess current and past smoking

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behaviour, (10) assess current readiness and ability to quit, (11) assess past history of quit attempts, (12) offer appropriate written materials, (13) prompt commitment from the client there and (14) give options for additional and later support. Three of the group competencies were supported by RCT evidence. These were (1) encourage group discussions, (2) encourage group tasks that promote interaction and/or bonding and (3) encourage mutual support.

For individual competencies, nine were associated with higher success rates in the English Stop Smoking Services. These were (1) strengthen ex-smoker identity, (2) elicit client views, (3) measure CO, (4) give options for additional and later support, (5) provide rewards contingent on stopping smoking, (6) advise on changing routine, (7) facilitate relapse prevention and coping, (8) ask about experience of stop smoking medication being used and (9) advise on stop smoking medication. Four of these were also supported by RCT evidence: (1) measure CO, (2) facilitate relapse prevention and coping, (3) give options for additional and later support and (4) advise on stop smoking medication.

The authors then classified competencies in terms of skill, knowledge and grouped them into one of seven functions (BM, BS, A, RD, RI , RC or P). These functional classification of competencies were coded thus:

- B: behaviour change techniques that specifically focus on the target behaviour
  - M: Addressing motivation (e.g. ability to provide information on consequences of smoking and smoking cessation)
  - S: Maximising self-regulatory capacity and skills (e.g. ability to facilitate barrier identification and problem solving)
- A: Adjuvant activities (e.g. ability to advise on stop-smoking medication, ability to advise on/facilitate use of social support)
- R: General aspects of the interaction
  - D: Delivery of the intervention (e.g. ability to tailor interactions appropriately)

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  - I: Information gathering (e.g. ability to assess current readiness and ability to quit)
  - C: General communication (e.g. ability to elicit and answer questions)
- P: Professionalism (e.g. knowledge of health and well-being and its different aspects)

In summary, competencies from RCT and clinical service evidence identified for the delivery of individual behavioural support were skills specifically related to the delivery of fourteen behaviour change techniques. For delivery of group-based behaviour support the skills related to group discussion, cohesion and mutual support were identified from RCTs and clinical service evidence.

Murray et al. (2012) [++] undertook a content synthesis by systematic review of the qualitative literature reporting patient-level influences on lifestyle change for reducing vascular risk. Thirty-three studies were included. The aim was to identify the main barriers and facilitators to lifestyle behaviour change in individuals at high risk of cardiovascular events. Using a clustering technique and organising factors into categories, the authors linked a total of 348 factors extracted from these 33 international studies to themes. The factors were further organised into 20 categories and from these categories five key themes were identified: emotions, beliefs, information and communication, friends and family support, and cost/transport. Categories and key themes could contain a mix of barriers and facilitators and the authors discuss the fact that overcoming some barriers (eg. transport, cost and education) could be met by a straightforward response, whereas tackling negative beliefs and emotions require skilled staff and organisational commitment. Over half the themes in the categories of ‘friends and family support’ and ‘social support’ were perceived as facilitators suggesting that involving significant others when attempting lifestyle change is important. In considering the likely responses of patients it is suggested that clinicians develop skills to address beliefs about the need to change, knowledge about

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lifestyle and options, support from family and friends, emotional state (anxiety or depression) and practical problems with finance and travel.

Rice et al. (2008) [++] in a systematic review of nursing interventions identified 42 randomised trials (more than 15,000 participants) and explored whether support and intervention from nurses helps people stop smoking. Thirty-one studies comparing a nursing intervention to a control or to usual care found the intervention to significantly increase the likelihood of quitting (RR 1.28, 95% CI 1.18 to 1.38). Five studies of nurse counselling on smoking cessation during a screening health check, or as part of multifactorial secondary prevention in general practice (not included in the main meta-analysis) found nursing intervention to have less effect under these conditions and the authors suggest this means that the evidence of an effect is weaker when interventions are brief and are provided by nurses whose main role is not health promotion or smoking cessation. This review provided evidence that higher intensity interventions did not have a larger treatment effect although there was weak evidence that additional telephone support increased smoking cessation. A significant benefit for additional face to face sessions was reported in one trial.

Van Achterberg et al. (2010) [++] conducted an overview of systematic reviews reporting evidence for behaviour change technique effectiveness for the promotion of healthy behaviours. The review included 23 systematic reviews: 14 on smoking cessation, 6 on physical exercise, and 2 on healthy diets and 1 on both exercise and diets. Techniques targeting knowledge (210 studies) and facilitation of behaviour (172 studies) were evaluated most frequently and self-monitoring, risk communication and use of social support were most often identified as effective. Relapse prevention techniques and re-evaluation of outcomes were ineffective. Only a few combinations of techniques were very frequently found, with the highest success rates for combinations of knowledge, awareness and facilitation techniques, suggesting that these competencies are important. As one of the largest overviews of systematic reviews the conclusions reached suffer from being general rather than specific to behaviour targets or intervention types.

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Williams et al (2011) [+] conducted a systematic review of techniques for changing physical activity and behaviour by searching for randomised, non-randomised, quasi-experimental or pre- and post-intervention studies published up to 2007. Amongst 2,958 potentially relevant papers the authors identified 36 interventions in 27 unique studies. A meta-analysis was undertaken and moderator analysis to explore the heterogeneity in results. Six behaviour change techniques were significantly associated with higher physical activity behaviour effect sizes. These were provision of information on consequences of behaviour in general, action planning, reinforcement of effort or progress towards behaviour goal, provision of instructions, facilitation of social comparison and time management. For enhanced self-efficacy the techniques associated with significantly higher self-efficacy were action planning, reinforcement of effort or progress and provision of instructions. Techniques associated with lower self-efficacy and lower physical activity effect were relapse prevention, plan social support/social change, set graded tasks, prompt practice and use of follow-up prompts. This review supports the view that some techniques targeting physical activity improve self-efficacy and could be usefully included in training programmes, while other commonly used techniques are not.

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Appendix B: Quality grading

Quality assessment of included studies

Table 1 Quality assessment of qualitative research

Study	Internal Validity Score
Broyles 2012	++
Casey 2010	++
Coghill 2009	++
Dillman 2010	++
Escolar-Reina 2010	+
Jansink 2010	++
Mahony 2012	+
Murphy 2011	++
O'Sullivan 2010	+
Patwardhan 2009	++
Robinson 2010	++
Thomsen 2009	++
Walters 2012	++

Table 2 Quality assessment of intervention studies

Study	Internal Validity Score
Ainsworth 2006	+
French 2012	+
Gaume 2008	+
Martino 2008	++

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Study	Internal Validity Score
McCarthy 2010	++
McEwen 2005	++
Moyers 2005	+
Petrella 2003	+

Systematic Reviews

Study	Internal Validity Score
Batersby 2010	+
Breckon 2008	++
Carr 2011	++
Dombrowski 2010	++
Greaves 2011	+
Hutchison 2009	++
Huttunen-Lenz 2010	++
Lai 2010	++
Michie 2009	++
Michie 2011	+
Murray 2012	++
Rice 2008	++
Van Achterberg 2010	+
Williams French 2009	+

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Appendix C: Excluded manuals and studies

Table 3 Excluded manuals

Manual	Reason
Tobacco Cessation Intervention Techniques for the Dental Office Team How to Help Our Nicotine Dependent Patients Become Tobacco Free	No specific competencies
A step-by-step implementation guide for trauma centers Screening and Brief Interventions (SBI) for unhealthy alcohol use	This is about the process rather than specific competencies
Top tips for commissioners and providers of behaviour change training programmes ChaMPs Public Health Network	This is a best practice checklist rather than specific competencies
Training in tobacco cessation counselling for medical, nursing, dentistry and pharmacy students: Environmental scan and recommendations	No specific competencies

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Appendix D: Record of searches strategies

Medline

1 FOOD HABITS/ (18281)

2 FOOD PREFERENCES/ (8722)

3 Nutrition therapy/ (745)

4 diet*.ti. (120856)

5 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition)).ab,ti. (58496)

6 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).ab,ti. (7882)

7 or/1-6 (186241)

8 SMOKING/ (110120)

9 SMOKING CESSATION/ (17777)

10 "Tobacco Use Cessation"/ (609)

11 "Tobacco Use Disorder"/ (7142)

12 (smok* or tobacco or cigar* or nicotine).ti. (92985)

13 or/8-12 (150877)

14 exp ALCOHOL-RELATED DISORDERS/pc (5924)

15 ALCOHOL DRINKING/ (46965)

16 ((Alcohol or Drunk* or Drink*) and (consum* or misuse or abuse or intoxication or harmful or excess* or binge or hazardous or heavy or temperance or abstinence)).ti. (13204)

17 or/14-16 (56463)

18 exp EXERCISE/ (97463)

19 EXERCISE MOVEMENT TECHNIQUES/ (294)

20 exp SPORTS/ (100035)

21 exp exercise therapy/ (26137)

22 ((physical* or keep* or cardio* or aerobic or fitness) adj3 (fit* or activit* or train*)).ti. (29775)

23 (sedentary or exercis*).ti. (77450)

24 or/18-23 (225628)

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25 Safe Sex/ (1889)

26 (contracep* or condom*).ti. (29054)

27 exp Sexually Transmitted Diseases/pc (43853)

28 ((sex* or intercourse) adj3 (risk* or protected or unprotected or safe* or unsafe or behavi*)).ti. (9647)

29 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*").ti. (8130)

30 pregnancy in adolescence/ (6307)

31 or/25-30 (89043)

32 7 or 13 or 17 or 24 or 31 (674861)

33 BEHAVIOR THERAPY/ (22501)

34 Cognitive Therapy/ (13395)

35 psychotherapy.sh. (39292)

36 INTERVIEW, PSYCHOLOGICAL/ (11579)

37 DIRECTIVE COUNSELING/ (928)

38 COUNSELING/ (26016)

39 MOTIVATION/ (45504)

40 Health Behavior/ (28761)

41 ((behavio?r* or lifestyle* or "life style*" or brief) and (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention*)).ti. (21756)

42 ((behavio?r* or lifestyle* or "life style*" or brief) adj2 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention* or counsel*)).ab. (53078)

43 (counsel* or motiva*).ti. (24099)

44 or/33-43 (229379)

45 32 and 44 (41187)

46 ((behavio?r* or lifestyle* or "life style*") adj3 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention*)).ti,ab. (68232)

47 (smok* or tobacco or nicotine or alcohol or diet* or exercis* or physical or fitness or sex* or condom* or contracept*).ti,ab. (1567691)

48 45 or (46 and 47) (53140)

49 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab. (914547)

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50 Qualitative Research/ (13931)

51 Focus groups/ (13939)

52 *Attitude of Health Personnel/ (41748)

53 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab. (40568)

54 49 or 50 or 51 or 52 or 53 (971097)

55 exp *Health Personnel/ed [Education] (23306)

56 exp *Counseling/ed [Education] (664)

57 exp *inservice training/mt [Methods] (2308)

58 *Patient Education as Topic/mt [Methods] (8013)

59 exp *Professional Competence/ (35723)

60 exp *education, professional/ (160928)

61 exp *Education, Continuing/ (28773)

62 *Vocational Education/ (1003)

63 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (67951)

64 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (368)

65 63 or 64 (68123)

66 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 65 (253574)

67 48 and 54 and 66 (698)

68 limit 67 to (english language and yr="2003 -Current") (440)

EMBASE

1 food preference/ (6229)

2 diet therapy/ (26869)

3 diet*.ti. (72990)

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4 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition)).ab,ti. (56425)

5 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).ab,ti. (8658)

6 or/1-5 (146004)

7 SMOKING/ (100349)

8 SMOKING CESSATION/ (28623)

9 (smok* or tobacco or cigar* or nicotine).ti. (67896)

10 or/7-9 (148708)

11 exp Drinking behavior/ (22789)

12 (Alcohol* adj3 (consum* or misuse or abuse or intoxication or harmful or excess* or binge or hazardous or heavy or temperance or abstinence)).ti. (8205)

13 or/11-12 (28420)

14 exp EXERCISE/ (120315)

15 exp kinesiotherapy/ (29377)

16 exp SPORT/ (56508)

17 ((physical* or keep* or cardio* or aerobic or fitness) adj3 (fit* or activit* or train*)).ti. (26033)

18 (sedentary or exercis*).ti. (53277)

19 or/14-18 (206009)

20 Safe Sex/ (2670)

21 (contracep* or condom*).ti. (15744)

22 exp Sexually Transmitted Diseases/pc (6994)

23 ((sex* or intercourse) adj3 (risk* or protected or unprotected or safe* or unsafe or behavi*)).ti. (7141)

24 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*").ti. (6957)

25 pregnancy in adolescence/ (4389)

26 (pregnan* adj5 (teen* or adolescen* or pupil* or underage or youth or young or student or college* or school* or universit* or unwanted or unintended or unplanned)).ti. (2472)

27 or/20-26 (38739)

28 6 or 10 or 13 or 19 or 27 (536690)

29 COUNSELING/ (22162)

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30 MOTIVATION/ (41756)

31 Health Behavior/ (32558)

32 attitude to health/ (56551)

33 ((behavio?r* or lifestyle or "life style" or brief) and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*)).ti. (18300)

34 ((behavio?r* or lifestyle or "life style" or brief) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or counsel*)).ab. (58089)

35 (counsel* or motiva*).ti. (16710)

36 or/29-35 (206926)

37 28 and 36 (44229)

38 ((behavio?r* or lifestyle* or "life style*") adj3 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention*)).ti,ab. (67942)

39 (smok* or tobacco or nicotine or alcohol or diet* or exercis* or physical or fitness or sex* or condom* or contracept*).ti,ab. (1288111)

40 37 or (38 and 39) (56400)

41 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab. (820029)

42 qualitative research/ (16848)

43 exp *health personnel attitude/ (41559)

44 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab. (38323)

45 41 or 42 or 43 or 44 (875898)

46 exp *inservice training/ (3100)

47 exp *education, professional/ (1365)

48 exp *continuing education/ (6055)

49 exp *vocational education/ (1365)

50 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (59338)

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51 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (306)

52 50 or 51 (59477)

53 46 or 47 or 48 or 49 or 52 (68645)

54 40 and 45 and 53 (512)

55 limit 54 to (english language and yr="2003 -Current") (386)

56 limit 55 to exclude medline journals (27)

57 food preference/ (6229)

58 diet therapy/ (26869)

59 diet*.ti. (72990)

60 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition)).ab,ti. (56425)

61 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).ab,ti. (8658)

62 or/57-61 (146004)

63 SMOKING/ (100349)

64 SMOKING CESSATION/ (28623)

65 (smok* or tobacco or cigar* or nicotine).ti. (67896)

66 or/63-65 (148708)

67 exp Drinking behavior/ (22789)

68 (Alcohol* adj3 (consum* or misuse or abuse or intoxication or harmful or excess* or binge or hazardous or heavy or temperance or abstinence)).ti. (8205)

69 or/67-68 (28420)

70 exp EXERCISE/ (120315)

71 exp kinesiotherapy/ (29377)

72 exp SPORT/ (56508)

73 ((physical* or keep* or cardio* or aerobic or fitness) adj3 (fit* or activit* or train*)).ti. (26033)

74 (sedentary or exercis*).ti. (53277)

75 or/70-74 (206009)

76 Safe Sex/ (2670)

77 (contracep* or condom*).ti. (15744)

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78 exp Sexually Transmitted Diseases/pc (6994)

79 ((sex* or intercourse) adj3 (risk* or protected or unprotected or safe* or unsafe or behavi*)).ti. (7141)

80 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*").ti. (6957)

81 pregnancy in adolescence/ (4389)

82 (pregnan* adj5 (teen* or adolescen* or pupil* or underage or youth or young or student or college* or school* or universit* or unwanted or unintended or unplanned)).ti. (2472)

83 or/76-82 (38739)

84 62 or 66 or 69 or 75 or 83 (536690)

85 COUNSELING/ (22162)

86 MOTIVATION/ (41756)

87 Health Behavior/ (32558)

88 attitude to health/ (56551)

89 ((behavio?r* or lifestyle or "life style" or brief) and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*)).ti. (18300)

90 ((behavio?r* or lifestyle or "life style" or brief) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or counsel*)).ab. (58089)

91 (counsel* or motiva*).ti. (16710)

92 or/85-91 (206926)

93 84 and 92 (44229)

94 ((behavio?r* or lifestyle* or "life style*") adj3 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention*)).ti,ab. (67942)

95 (smok* or tobacco or nicotine or alcohol or diet* or exercis* or physical or fitness or sex* or condom* or contracept*).ti,ab. (1288111)

96 93 or (94 and 95) (56400)

97 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab. (820029)

98 qualitative research/ (16848)

99 exp *health personnel attitude/ (41559)

100 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*)

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adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab. (38323)

101 97 or 98 or 99 or 100 (875898)

102 exp *professional competence/ (5573)

103 exp *inservice training/ (3100)

104 exp *education, professional/ (1365)

105 exp *continuing education/ (6055)

106 exp *vocational education/ (1365)

107 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (59338)

108 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (306)

109 107 or 108 (59477)

110 102 or 103 or 104 or 105 or 106 or 109 (73192)

111 96 and 101 and 110 (517)

112 limit 111 to (english language and yr="2003 -Current") (388)

PsycINFO

1 food preferences/ (1292)

2 Eating Behavior/ (4915)

3 *Diets/ (3243)

4 ((health* or unhealthy or poor* or chang* or behav* or advic* or recommend*) adj3 (eat* or diet* or food* or nutrition)).ab,ti. (10590)

5 ((fruit* or vegetable*) adj2 (intake* or consum* or eat* or ate)).ab,ti. (1266)

6 or/1-5 (16167)

7 *Obesity/ (7452)

8 exp *Prevention/ (16307)

9 7 and 8 (362)

10 6 or 9 (16400)

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11 tobacco smoking/ (12300)

12 smoking cessation/ (5471)

13 (smok* or tobacco or cigar* or nicotine).ti. (14221)

14 or/11-13 (16059)

15 drinking behavior/ (632)

16 *ALCOHOL DRINKING PATTERNS/ (6303)

17 (Alcohol* adj3 (consum* or misuse or abuse or intoxication or harmful or excess* or binge or hazardous or heavy or temperance or abstinence)).ti. (2892)

18 or/15-17 (8411)

19 exp *PHYSICAL ACTIVITY/ (11446)

20 exp sports/ (9100)

21 ((physical* or keep* or cardio* or aerobic or fitness) adj3 (fit* or activit* or train*)).ti. (5825)

22 (sedentary or exercis*).ti. (5160)

23 or/19-22 (22089)

24 Safe Sex/ (832)

25 *SEXUAL RISK TAKING/ (2970)

26 (contracep* or condom*).ti. (1755)

27 sexually transmitted diseases/ (2162)

28 ((sex* or intercourse) adj3 (risk* or protected or unprotected or safe* or unsafe or behavi*)).ti. (4013)

29 (STD* or STI or "sexually transmitted disease*" or "sexually transmitted infection*").ti. (1054)

30 (pregnan* adj5 (teen* or adolescen* or pupil* or underage or youth or young or student or college* or school* or universit* or unwanted or unintended or unplanned)).ti. (655)

31 or/24-30 (9266)

32 10 or 14 or 18 or 23 or 31 (69438)

33 BEHAVIOR CHANGE/ (4207)

34 CHANGE STRATEGIES/ (31)

35 LIFESTYLE CHANGES/ (523)

36 *HEALTH BEHAVIOR/ (6380)

37 counseling/ (7321)

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38 Motivation/ (15433)

39 ((behavio?r* or lifestyle or "life style" or brief) and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*)).ti. (11836)

40 ((behavio?r* or lifestyle or "life style" or brief) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or counsel*)).ab. (30791)

41 (counsel* or motiva*).ti. (19837)

42 or/33-41 (71197)

43 32 and 42 (9234)

44 ((behavio?r* or lifestyle* or "life style*") adj3 (change* or changing or modification or modify or modifying or therapy or therapies or program* or intervention*)).ti,ab. (34970)

45 (smok* or tobacco or nicotine or alcohol or diet* or exercis* or physical or fitness or sex* or condom* or contracept*).ti,ab. (226870)

46 43 and (44 or 45) (8349)

47 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab. (346865)

48 Qualitative Research/ (3022)

49 group discussion/ (878)

50 exp health personnel attitudes/ (8319)

51 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab. (11824)

52 47 or 48 or 49 or 50 or 51 (356587)

53 professional competence/ (3209)

54 exp inservice training/ (398)

55 professional development/ (7058)

56 exp Continuing Education/ (1037)

57 vocational education/ (550)

58 exp Client Education/ (1120)

59 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (30751)

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60 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (170)

61 59 or 60 (30826)

62 53 or 54 or 55 or 56 or 57 or 58 or 61 (39421)

63 46 and 52 and 62 (81)

64 limit 63 to (english language and yr="2003 -Current") (69)

Cochrane CENTRAL, + Cochrane Database Syst Rev + DARE (via Cochrane library)

#1 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*) AND (behaviour* or behavior* or lifestyle or "life style" or brief):ti 10998

#2 (counsel* or motiva*):ti 2782

#3 MeSH descriptor Counseling, this term only 2404

#4 MeSH descriptor Motivation, this term only 2537

#5 MeSH descriptor Health Behavior, this term only 1837

#6 MeSH descriptor Health Knowledge, Attitudes, Practice, this term only 2915

#7 (#1 OR #2 OR #3 OR #4 OR #5 OR #6) 19470

#8 ("healthy eating" or fruit* or vegetable* or diet* or nutrition or smok* or tobacco or nicotine or alcohol* or drinking or "physical activity" or exercis* or fitness or sedentary or condom* or contracept* or sex*):ti,ab,kw 111172

#9 (#7 AND #8) 7384

#10 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes):ti,ab 5063

#11 MeSH descriptor Qualitative Research, this term only 230

#12 MeSH descriptor Focus Groups, this term only 232

#13 MeSH descriptor Attitude of Health Personnel, this term only 1198

#14 (Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counselor* or counsellor or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*):ti,ab 37553

#15 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*):ti,ab 32723

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#16 (#14 AND #15) 6477

#17 (#10 OR #11 OR #12 OR #13 OR #16) 12024

#18 (#17 AND #9), from 2003 to 2012 374

HMIC (Health Management Information Consortium)

1 exp behavioural control/ (773)

2 health behaviour/ (867)

3 lifestyle/ (333)

4 ((behavio?r* or lifestyle or "life style" or brief) and (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*)).ti. (730)

5 ((behavio?r* or lifestyle or "life style" or brief) adj2 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention* or counsel*)).ab. (2227)

6 (counsel* or motiva*).ti. (1083)

7 or/1-6 (4819)

8 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab. (42906)

9 qualitative research/ (899)

10 focus groups/ (363)

11 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab. (4171)

12 8 or 9 or 10 or 11 (45458)

13 professional competence/ (496)

14 exp professional education/ (8997)

15 exp professional development/ (2108)

16 patient education/ (474)

17 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (8169)

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18 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab. (36)

19 17 or 18 (8181)

20 13 or 14 or 15 or 16 or 19 (16514)

21 7 and 12 and 20 (132)

22 limit 21 to yr="2003 -Current" (53)

ERIC

As per review 2

Social Policy & Practice

1 (change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*).mp. and (behaviour* or behavior* or lifestyle or "life style" or brief).ti,de. [mp=abstract, title, publication type, heading word, accession number] (7615)

2 (counsel* or motiva*).ti,de. (5013)

3 ("healthy eating" or fruit* or vegetable* or diet* or nutrition or smok* or tobacco or nicotine or alcohol* or drinking or "physical activity" or exercis* or fitness or sedentary or condom* or contracept* or sex*).ti,ab,de. (37387)

4 (1 or 2) and 3 (2101)

5 (qualitative or focus group$ or case stud$ or field stud$ or interview$ or ethnograph$ or grounded theory or action research or participant observation or narrative$ or experience$ or thematic or themes).ti,ab,de. (76406)

6 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*)).ti,ab,de. (2603)

7 ((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab,de. (7931)

8 ((lay or peer or allied or link) adj3 (worker* or advocate* or helper* or professional* or personnel or trainer*) adj3 (teach* or train* or manual* or competen* or skill* or educat*)).ti,ab,de. (25)

9 4 and (5 or 6) and (7 or 8) (41)

Applied Social Sciences Index and Abstracts (ASSIA)

S9 S4 and (S5 or S6) and (S7 or S8)

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S8 ALL((lay or peer or allied or link) and (worker* or advocate* or helper* or professional* or personnel or trainer*) and (teach* or train* or manual* or competen* or skill* or educat*))

S7 ALL((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) and (teach* or train* or manual* or competen* or skill* or educat*))

S6 ALL((Practitioner* or therapist* or profession* or doctor* or nurse* or psychologist* or psychiatrist* or care provider* or healthcare provider* or counsel?or* or GP or physician* or service provider* or health* worker* or care worker* or clinician* or dentist* or pharmacist*) and (attitude* or opinion* or belief* or perceive* or perception* or aware* or personal view* or motivate* or incentive* or reason*))

S5 ALL(qualitative or focus group* or case stud* or field stud* or interview* or ethnograph* or grounded theory or action research or participant observation or narrative* or experience* or thematic or themes)

S4 (S1 or S2) and S3

S3 ALL(("healthy eating" or fruit* or vegetable* or diet* or nutrition or smok* or tobacco or nicotine or alcohol* or drinking or "physical activity" or exercis* or fitness or sedentary or condom* or contracept* or sex*))

S2 SU(Eating behaviour OR Health behaviour OR Health compromising behaviour OR Planned behaviour OR Sexual behaviour)

S1 TI(((change* or changing or modification* or modify or modifying or therapy or therapies or program* or intervention*) and (behaviour* or behavior* or lifestyle or "life style" or brief)) or (counsel* or motiva*))

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Appendix E: Evidence tables

Table 4: Qualitative Studies

Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Casey 2010 **Country:** Canada **Design:** Focus group **Quality:** (++) **Aim:** to assess barriers and facilitators to participation in a supervised exercise programme	**Participants:** 16 participants (7 women/ 9 men) mean age 52.5 yrs (range 39-65 yrs) Duration of diabetes approx. 3.5 yrs (0.17-13 yrs) **Population:** All had engaged in a supervised exercise programme through the authors' previous trial (8 participants – dietary counselling plus supervised exercise and 8 to dietary counselling)	**Context:** a Previous trial compared effect of dietary counselling alone with dietary counselling plus exercise on weight or cardiovascular risk factors	**Methods:** 3 focus group discussions addressing factors facilitating attendance, current engagement in exercise, reasons for continuing or discontinuing regular exercise and ways to integrate exercise into daily life **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Barriers and facilitators of participation in supervised exercise programmes Adherence to exercise following programme completion **Participants reported the following facilitators:** Motivation monitoring, and encouragement and accountability provided by programme staff. **And barriers:** Better transition exit from programme. Co-morbid conditions. Lack of scheduling flexibility. Geographical remoteness.	One of the authors facilitated group sessions Two authors coded and cross-verified transcripts	50% participation rate Focus groups recorded and transcribed verbatim. Manual coding and cross-verification by coders not involved in original trial. Analyses data driven and emergent themes Theoretical approach: not reported	Individual motivation was the most critical factor in exercising both during and following the programme. Participants appreciated the monitoring, encouragement and accountability provided by programme staff. They voiced a need for better transition to post-programme realities of less support and supervision. Co-morbid conditions were apt to derail them from a regular exercise routine. Participants viewed the optimal programme as having even greater scheduling flexibility and being closer to them geographically. Post-programme, walking emerged as the most frequent form of physical activity

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Coghill 2009 **Country:** UK (Bristol) **Design:** Interview study **Quality:** (++) **Aim:** to investigate motivators, demotivators and adherence to regular physical activity.	38 sedentary hypercholesterolemic men participating in a 12 week RCT of home-based walking Mean age 54.8 (SD 5.0 yrs) All participants were non-smokers	**Context:** All participants had been randomised to the active arm of an intervention RCT testing home based walking with professional support for an effect on cholesterol Trial consisted of 300 kcal expended exercise at least 5 days a week for 12 weeks.	**Methods:** One 10-15 minute Semi structured interview 6 months after the trial. Consisting of 6 questions about their experience Interviews summarised by interviewer and summary verified with each respondent prior to recording it on the response form **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Motivators and demotivators and adherence to regular physical activity during and at six months after participation in trial	Not clear	Content analysis conducted by 2 independent researchers Theoretical approach: reductivist and interpretative	Health or fitness were main motivational themes for adherence Six months post RCT, 27 participants maintained some walking 18 were more physically activity than before the RCT In those still physically active, health benefits were motivators for adherence In those less physically active, lack of time was a de-motivator with external support identified as a motivator for becoming more active Amongst those doing less exercise: • 50% said that "Professional support" • 40% "family support" • 10% "an accelerometer" would motivate them to start exercising again

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Dillman 2010 **Country:** Canada **Design:** Cross-sectional, observational study **Quality:** (++) **Aim:** to examine diabetes educators' perceptions of their own and their patients abilities and attitudes to lifestyle change	**Participants:** 119 diabetes educators (from 3 provinces in Canada) Mean age 44 yrs, 97% female, 90% caucasian	Diabetes educators' perceptions of (a) their abilities, attitudes and difficulties/challenges related to physical activity and exercise counselling; and (b) their patients' abilities and attitudes related to performing physical activity and exercise in managing their diabetes	**Methods:** Cross-sectional, observational design Validated and non-validated questionnaires **Reliability:** Study aims: clear. Data collection: appropriate Methods: reliable	survey measures of counselling, referral and other efficacies; attitudes; perceived difficulty; barriers; and training practices related to physical activity and exercise	Not reported	Descriptive and frequency analyses Robust recruitment Theoretical approach: Not reported	Diabetes educators had positive attitudes about physical activity and exercise. They perceived their typical patient's attitudes to be much less positive. Barriers to physical activity and exercise counselling: • lack of time to counsel • lack of interest by patient • lack of resources • lack of ability/knowledge • patient comorbidities/ limitations • lack of access to facilities. They indicated that they experienced a lack of confidence in their own ability to counsel patients about, prescribe and make referrals for physical activity and exercise

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Jansink 2010 **Country:** Netherlands **Design:** Semi-structured interviews **Quality:** (++) **Aim:** to understand specific barriers of lifestyle counselling by nurses in general practice	**Participants:** 12 practice nurses in Dutch general practice involved in diabetes care First 12 practices of the 70 in the 'Nurse-led motivational interviewing to change the lifestyle of patients with type 2 diabetes' MILD trial were invited Mean age of the nurses was 44 years (range 27 – 51 years), and all were women. with mean of 3.0 years (range 0.5 - 4.5 years) of experience with diabetes consultation.	Specific barriers to counselling patients with type 2 diabetes about diet, physical activity and smoking cessation Nurse level: awareness, knowledge, attitudes, motivation to change, and behavioural routines Patient level: knowledge, attitudes, skills, and compliance Practice level: organisation of care processes, staff, capacities, resources and structures	**Methods:** Semi-structured in-depth telephone interviews **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Patient barriers Practice level barriers Own role as counsellor	Researchers independently reviewed transcripts and classified comments according to predetermined framework	Saturation reportedly achieved Theoretical approach: framework approach	Nurses felt most barriers on the level of the patient: patients had limited knowledge of a healthy lifestyle and limited insight into their own behaviour, they lacked the motivation to modify their lifestyles or the discipline to maintain an improved lifestyle. Nurses reported lack of counselling skills and insufficient time as barriers in effective lifestyle counselling

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Mahony 2012 **Country:** Australia **Design:** Semi-structured interviews **Quality:** (++) **Aim:** to explore the attitudes, actions and beliefs of mental health occupational therapists about providing diet-related interventions	**Participants:** 6 (from a potential 45) occupational therapists working in mental health 5 female and 1 male 5 had worked in mental health for up to 6 years, one had 32 years of experience 4 community psychiatric rehab; one in acute inpatient unit; one in acute inpatient unit and community mental health unit	Occupational therapists provided interventions for clients who have issues performing occupations related to managing their diet	**Methods:** Purposive sampling Interviews audiotaped and transcribed verbatim Participants provided with transcripts to make corrections or add/remove data **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Clarification of present practices used by occupational therapists working in mental health	First author conducted interviews (30-40 mins duration)	Purposive sampling Member checking Audit trail and student supervision Log of all analytical and methodological decisions Theoretical approach: constructivist grounded theory	Mental health occupational therapists felt confident providing clients with interventions to promote diet-related skill development and providing general healthy eating education to support this development Participants were not comfortable providing clients with specific dietary advice. Participants identified a need for further training and support to enhance their effectiveness in providing healthy eating education and highlighted the need for more dietitians in mental health settings

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Murphy 2011 **Country:** Ireland **Design:** Interviews **Quality:** (++) **Aim:** to understand the experience of participants and identify factors that influence self-management.	**Participants:** 40 participants who had completed DAFNE programme 62.5% female, aged 20-70 yrs All participants had type 1 diabetes (duration 2-31+ years)	DAFNE (dose adjustment for normal eating) is a 5 day structured education programme for adults with type 1 diabetes. Delivered at 5 diabetes centre sites across Ireland Interviews conducted by 2 researchers over 24 months	**Methods:** Qualitative interviews lasting 45-60 minutes **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Factors influencing diabetes self-management	Two researchers conducted interviews Two researchers analysed the transcripts Selection of transcripts were read by full research team and categories and concepts agreed	Four criteria used to ensure rigour: credibility; resonance; confirrmability and usefulness Participants were sent copy of their transcript and asked to confirm contents were accurate Comments invited from experts in the field Theoretical approach: grounded theory	Five factors that influenced participants' self-management of their diabetes following dose adjustment for normal eating were identified. These were knowledge, support, motivation, relationship shift and empowerment, and these were all related to the core category, 'Being in Control'.

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
O'Sullivan 2010 **Country:** Canada **Design:** interview study **Quality:** (+) **Aim:** To explore the experience, thoughts and feelings of patients receiving a brief and intensive counselling intervention to try and explain why 'autonomous motivation' and 'self efficacy' were increased	**Participants:** 15 participants purposively recruited from the Physical Activity Counselling (PAC) trial intervention arm 11 caucasian women and 4 caucasian men Aged 32-65 years (mean 49.4 years) All participants had high school equivalency education (mean years of education 14.2 years)	**Context:** Qualitative component of wider randomised controlled trial 15 out of 61 participants in the experimental (intensive counselling)group of the PAC trial were invited to participate The trial consisted of brief physical activity counselling (2-4 minutes) compared with brief counselling plus 3 months of intensive counselling from a physical activity counsellor (total 6 sessions)	**Methods:** Three Interviews conducted by 2 experienced qualitative researchers Midway through the intervention, one week and 3 months after the intervention. the individual semi-structured interviews were conducted Interviews ranged from 15-60 minutes duration Interviews held in study centre in participants' language of choice (French or English) **Reliability:** Data collection: appropriate Methods: reliable	Participant experiences of 3 month combined provider physical activity counselling intervention. Summarised in nine themes: Patients: were extremely satisfied Valued the intensive component Valued the tailored approach Motivation was enhanced by supporting autonomy Appreciated encouragement (verbal persuasion) Appreciated information Requested long term support		4 researchers coded transcribed interviews NVivo7 software used Grounded theory analytical approach Theoretical approach: not reported	All 15 participants completed all 3 interviews Main themes: patients were extremely satisfied with the PAC intervention; patients particularly valued the intensive counselling intervention provided by the PA counsellor; patients valued and appreciated the tailored approach; autonomy support enhanced motivation; encouragement and activity levels influenced feelings of competence; information and strategies provided were invaluable; relatedness towards the PA counsellor was an important factor influencing satisfaction with the intervention; longer-term support is needed; everyone should have access to a PA counsellor

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Patwardhan 2009 **Country:** USA **Design:** Interview study **Quality:** (++) **Aim:** to identify key facilitators and barriers for pharmacists' adoption of a brief tobacco-cessation protocol	**Population:** Ten community pharmacists were interviewed in ten US towns Five out of the 10 pharmacists interviewed worked at a large community chain setting, three were employed at independent stores, one pharmacist worked at a supermarket pharmacy, and one at a mass-merchandiser pharmacy. Age range 36 to 50 years Six men / four women male.	**Context:** Pharmacists' providing a tobacco-cessation brief intervention, Ask-Advise-Refer (AAR). Preliminary qualitative study.	**Methods:** Purposive and Semi-structured, face-to-face Interviews with open-ended questions Thematic analysis Saturation sampling techniques applied to identify participants and determine sample size respectively. Interviews were audio-recorded and transcribed. **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Identify key barriers and facilitators impacting on implementation of AAR. Fear of negative patient reaction was the most prominent barrier to initiating tobacco cessation discussions	Two reviewers independently coded all transcripts to identify prominent themes	Experts reviewed interview scripts (audio transcribed) 2 pilot interviews Cognitive interviews held with pilot participants to ensure validity of interview questions Interviewer performance assessment after first 2 interviews Data sampling stopped when saturation met. Theoretical approach: 5A model (Ask-Advise-Assess-Assist-Arrange follow-up)	All facilitators and barriers identified were grouped into nine distinct themes. Pharmacists' fear of negative patient reaction was the most prominent barrier to initiating tobacco cessation discussions with patients. Suggested changes included (1) train pharmacists to initiate cessation discussions; (2) initially target discussions with patients who have a disease or medication adversely affected by tobacco use; (3) encourage patient enquiry about pharmacy cessation services through visual cues; (4) help pharmacists set up a workflow system compatible with the AAR protocol.

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Robinson 2010 **Country:** UK (Sefton, Liverpool) **Design:** interview study **Quality:** (+) **Aim:** to evaluate an intervention aimed at enhancing the health of men in deprived areas by providing a peer mentoring Healthy lifestyle programme.	**Participants:** 6 men enrolled in the lifestyle and peer mentoring programme (at 5 months) 14 telephone interviews at project end 5 interviews with community staff and health professionals **Population:** the population targeted were men aged 35 or more in low paid manual occupations, unemployed or on incapacity benefit, or carers in the most deprived areas of Sefton. 13 local men were trained to provide advice to 245 men in workplaces, community venues, job centres a library, health living centres and children centres.	"Working our way to health" encouraged men to be health aware and to access health and leisure services in order to improve diet, physical activity or stop smoking. The peer mentoring programme included a training programme delivered to community agency volunteers and public sector health staff	**Methods:** In-depth semi-structured face-to-face and telephone interviews with men taking part in the mentoring programme 5 months into the programme and at project end. Community agency volunteers and health staff also received training to improve communication with men and were interviewed **Reliability:** Thematic analysis (no detail provided) and characteristics of the peer group and the men receiving the intervention are not clear.	Men's health knowledge, behaviour modification and access to health improvement services. Behaviours included diet, physical activity and smoking cessation	Not clear	Not clear Theoretical approach: not reported	Key themes included issues relating to influences on participation (including settings and social networks), experiences of participation (including, for men, issues around control and physical activity) and for staff, the opportunity for reflection. Outcomes for men included: changed bio-medical body condition; increased functional capacity; and improved emotional and experiential well-being. Staff appreciated the framework for knowledge and up-to date statistics on inequalities, the way people grow and scenario based tasks as training. Future training on techniques to sustain change was suggested

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Thomsen 2009 **Country:** Denmark **Design:** Interview study **Quality**: (++) **Aim:** to describe how women smokers with newly diagnosed breast cancer experienced brief preoperative smoking cessation intervention in relation to breast cancer surgery.	**Participants:** 11 Danish women aged 40-72 yrs (median 50 yrs) All had newly diagnosed breast cancer and had had breast cancer surgery in past 3 months All had received smoking cessation counselling prior to breast cancer surgery	Smoking cessation intervention took place 3-7 days prior to surgery It consisted of one counselling session lasting 45-90 minutes Smoking cessation was recommended from 2 days prior to up to 10 days after surgery Smoking cessation validated by measurements of carbon-monoxide in expiratory air on day of surgery and 10 days post-operatively Follow-up telephone calls at 1,3, 6 and 12 months were conducted to assess smoking status	**Methods:** Nurse trained in smoking cessation counselling delivered intervention to 10 of 11 participants The face to face interview was arranged 3-8 weeks after surgery and lasted 35 to 100 minutes **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Smoking cessation	Nurse conducted interviews and transcribed the tapes Three member of research team analysed the transcribed interviews	Interviews were audiotaped and transcribed verbatim All patient interviews were included, quitters and non-quitters Theoretical approach: Ricour's theory of interpretation	Emerging themes: reflecting upon smoking and health; escaping the social stigma of being a smoker; heightened awareness of being addicted to smoking; enacting a duty of responsibility The context of breast cancer diagnosis influenced how the women perceived the pre-operative smoking intervention as well as their attempts to stop smoking Diagnosis described as 'teachable moments' Participants expressed a need for prolonged smoking cessation support Participants experienced a sense of personal achievement, improved well-being and endorsement from family and friends. Participants who relapsed did so as an ingrown response to emotional distress

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Study	Population and Participant Characteristics	Context, Provider	Methods and Reliability	Important Outcomes	Researcher Role	Analytical Rigour	Results
Walters 2012 **Country:** Australia **Design:** Semi-structured interviews **Quality:** (+) **Aim:** To investigate health behaviour changes adopted by participants with moderate or severe COPD	44 participants from 'SNAPPS' (Smoking, Nutrition, Alcohol, Physical activity, Psychosocial wellbeing and Symptom management) mentoring trial 55% male, 43% current smokers, 75% moderate COPD	Community nurses trained as health-mentors using a patient centred approach with COPD patients Regular phone calls over 12 months Median 13 mentor contacts over 12 months (range 5-20)	**Methods:** Semi-structured interviews (approx. 45 mins) in a purposive sample sought feedback on mentoring and behaviour changes adopted **Reliability:** Study aims: clear Data collection: appropriate Methods: reliable	Smoking, nutrition, alcohol, physical activity, psychosocial wellbeing and symptom management	Two researchers independently coded transcripts Emergent themes discussed with all authors	90 original participants, 65 invited to interview Recruitment ceased after it appeared saturation reached Sample selection sought to reflect a range of locations and number of health-mentor contacts, study participants' distribution by gender, smoking status, employment and educational level Theoretical approach: behavioural psychological theory	Telephone delivery was highly acceptable and enabled good rapport. Participants rated 'being listened to by a caring professional' as very valuable. Three participant groups were identified 14 (32%) actively making changes; 18 (41%) open to and making some changes and 12 (27%) more resistant to change. Mentoring increased awareness of COPD effects, helping develop and personalise behaviour change strategies, even by those not actively making changes. Physical activity was targeted by 43 (98%) participants and smoking by 14 (74%) current smokers with 21% reporting quitting. Motivation to maintain changes was increased by mentor support.

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Table 5 Intervention studies (RCTs and observational studies)

Study	Study Design	Outcomes and Analysis	Results
Ainsworth 2006 **Country:** Canada **Focus:** maximising patient compliance to prescribed home exercise **Funding:** Ontario Chiropractic Association **Overall quality**: (+)	**Study design:** cross-sectional self-report web-based survey **Participants:** 104 Ontario chiropractors (65% male) **Interventions:** prescribed home exercise **Method of allocation:** N/A	Compliance strategies used most frequently Reliable measures: robust questionnaire development, no validated questionnaires used Measurement complete: Some Outcome measures relevant: Some	Compliance strategies most frequently used: Keeping instructions simple (82%, 95% CI = 75–90%); Motivating patients by explaining exercises in a positive and enthusiastic manner (81%, 95% CI = 74–89%); Giving patients encouragement, support and praise (80%,95% CI = 72–88%); Prescribing exercises that require low-cost equipment (70%, 95% CI = 61–78%); and Supplying patients with material that helps demonstrate the exercises (62%, 95% CI = 53–71%) and Educating patients by discussing the importance of and benefits to exercise (62%, 95% CI = 53–71%)
French 2012 **Country:** UK	**Study design:** randomised controlled trial **Participants:** 35 volunteers (aged 18-65 yrs) from staff of large inner-city London borough council and London University.	Number of steps; intention; self-efficacy; attitude; action planning; and coping planning Steps counted using pedometer, sealed to prevent participant reactivity of measurement.	The "combined" intervention, contained motivational and volitional components in session at T1 and a filler task at T2. The "motivation first" intervention, presented the motivational components at T1 and the volitional components at T2. The "volition

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Study	Study Design	Outcomes and Analysis	Results
Focus: physical activity **Funding:** Not reported **Overall quality**: (+)	**Interventions:** walking intervention with 3 experimental conditions: (a) combined intervention containing motivational and volitional components; (b) motivation first intervention; (c) volition first intervention. **Method of allocation:** random allocation to one of 3 conditions	Demographics and questionnaire measures; process measures based on theory of planned behaviour. Reliable measures: Yes Measurement complete: Some Outcome measures relevant: Yes	first" intervention, presented the volitional components at T1 followed by motivational components at T2. At T2, there was a significant main effect of time, such that there was an increase in walking, but this did not differ between groups. At T3, the "combined" intervention group showed a large (d = 1.06) and significant (p = 0.036) increase in walking behaviour, in contrast to both other interventions (time × groups interaction, p = 0.003). The "combined" intervention also produced a significant increase in self-efficacy, relative to the two other interventions.

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Study	Study Design	Outcomes and Analysis	Results
Gaume 2008 **Country**: USA **Focus:** Counsellor skills influence on alcohol use **Funding:** Swiss National Science Foundation **Overall quality**: (+)	**Participants:** Patients screened positive for hazardous alcohol consumption (n=1,366). 1,055 successfully followed up at 12 months (367 in the brief alcohol intervention (BAI) group and 688 in control groups). **Interventions:** Brief motivational interviewing – one 15 minute session **Method of allocation:** Randomised controlled trial conducted in the Emergency Department	Between June 2003 and June 2004 all consecutive BAI sessions tape-recorded (n-166) of which 97 were eligible for coding and analysis. Tape recordings of the 97 brief alcohol intervention sessions with hazardous drinkers were analysed using the Motivational Interviewing Skill Code (MISC). Outcome measures: baseline to 12 months difference in weekly drinking quantity and difference in heavy drinking episodes per month. Socio-demographic characteristics, baseline and follow-up alcohol consumption data (assessed by AUDIT >12 score) collected. Bivariate analyses and multiple linear regression modelling. Patient level of readiness to change was not measured before the intervention. Potential self selecting bias. Not clear why 69 tape recorded interview ineligible for analysis. Reliable measures: Yes Measurement complete: Yes Outcome measures relevant: Yes	Baseline alcohol measures and socio-demographics of patients did not differ across counsellors however MISC scores and outcome at 12 months did. Bivariate models showed that counsellors with better motivational interviewing (MI) skills achieved better outcomes overall and maintained efficacy across all levels of an important predictor (patient ability to change), whereas counsellors with poorer MI skills were effective mostly at high levels of ability to change. However, in the fully adjusted multivariate models only patient communication characteristics (ability to change) predicted outcomes and counsellor skills were not associated with better outcomes

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Study	Study Design	Outcomes and Analysis	Results
Martino 2008 **Country: USA** **Focus:** therapist adherence and competence in motivational enhancement therapy **Funding:** Not reported **Overall quality**: (++)	**Participants:** 35 therapists from five outpatient community programs who delivered therapy to 461clients within a National Institute on Drug Abuse Clinical Trial Network multi-site effectiveness protocol. Therapists were predominantly female (60%) and Caucasian (77%). On average, they were 38.9 years old and employed at their agencies for a mean of 3.2 years **Interventions:** a three-session adaptation of motivational enhancement therapy (MET) or an equivalent number of drug counselling-as-usual sessions **Method of allocation:** random assignment to treatment condition	15 independent raters evaluated session audiotapes Therapist adherence and competence were evaluated using the Independent Tape Rater Scale adapted from the Yale Adherence Competence Scale Change in client motivation was measured using independent 7-point global ratings of the first and last 5 minutes of the sessions. Appropriate statistical analyses Reliable measures: Yes Measurement complete: Yes Outcome measures relevant: Yes	Independent rating of sessions demonstrated that the adherence and competence items were reliable (mean interclass correlation coefficients for adherence = .89 and competence = .81) and converged to form two *a priori* defined skill factors conceptually related to motivational interviewing. Moreover, the factors discriminated between MET therapists and those who delivered drug counselling-as-usual sessions in predicted ways, and were significantly related to in-session change in client motivation and some client treatment outcomes (per cent negative drug urine screens). The combination of expert-led workshops followed by program-based clinical supervision may be an effective method for disseminating motivational interviewing in community treatment programs

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Study	Study Design	Outcomes and Analysis	Results
McCarthy 2010 **Country:** USA **Focus:** smoking cessation **Funding:** Transdisciplinary Tobacco Use Research Center grant from the National Cancer Institute and from the National Institute of Drug Abuse **Overall quality:** (++)	**Study design:** randomised controlled trial **Participants:** 403 adult smokers; smoking at least 10 cigarettes a day; mean age 40.38 (SD: 11.73) no counselling group and 37.56 (SD: 12.16) counselling group; 43% married; 50% female **Interventions:** individual counselling in 8 x 10 minute sessions 265 (65.8%) attended all visits Attrition rates did not differ by treatment condition at the quit date (no counselling: 11.8%; counselling: 14.1%; $\chi 2(df=1, N=463)=.55$, $p=.46$) or at the conclusion of treatment (no counselling: 28.2%; counselling: 29.4%; $\chi 2(df=1, N=403)=.06$, $p=.80$). Counselling conditions did not differ in terms of treatment visits attended (no counselling: $M=7.19$, *Median*=8, *SD*=1.59; counselling: $M=7.33$, *Median*=8, $SD=1.45$; $t(401)=-.96$, $p=.34$) or in ED adherence; participants completed random prompts on 75.5% of days prompted ($t(401)=.65$, $p=.52$) and 79.5% ($t(401)=.50$, $p=.62$) of evening reports prompted, on average. Method of allocation: random	Counselling focused on bolstering social support, motivation, problem-solving and coping skills Pre and post quit ecological momentary assessments of smoking behaviour, smoking triggers, active prevention and coping strategies, motivation to quit, difficulty quitting and reactions to initial lapses CES-D, FTND, CO_2 breath testing, electronic diaries Reliable measures: Yes Measurement complete: Some Outcome measures relevant: Yes	At the end of treatment, 56 days 29.4% of those who received counselling and 25.7% of those who did not receive counselling had confirmed 7-day point-prevalence abstinence. Counselling condition was not a significant predictor of abstinence in a logistic regression analysis $B=.181$, $SE=.223$, $Wald=.657$, $OR=1.199$, *95% CI*=.774–1.857 Counselling prompted avoidance of access to cigarettes, improved quitting self-efficacy, reduced perceived difficulty of quitting over time, and protected against guilt and demoralization following lapses. Results supported the importance of limiting cigarette access, receiving social support, strong motivation and confidence, and easing withdrawal distress during cessation efforts. Quitting self-efficacy and perceived difficulty quitting may partially mediate counselling effects on abstinence.

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Study	Study Design	Outcomes and Analysis	Results
McEwen 2005 **Country:** UK **Focus:** GP anti-smoking advice **Funding:** Self-funded **Overall quality:** (++)	**Study design:** randomised controlled trial **Participants:** GP's in 30 practices in West of England **Interventions:** GP desktop resource (GDR) **Method of allocation:** 107 GPs randomly assigned (by practice) either to receive the GDR or to act as controls 70% response rate	Frequency and quality of GP advice to stop smoking. Reliable measures: Yes Measurement complete: Yes Outcome measures relevant: Yes	78% respondents were male (higher than national GP average of 64%) The GDR was an independent predictor of the number of patients advised to stop smoking ($\beta = .345$, $p < .001$). Concern about the doctor–patient relationship was the only attitude variable that independently predicted advice giving, in this case negatively ($\beta = -.465$, $p < .001$). Possession of the GDR did not alter GPs' views on whether intervening with smokers harmed the doctor–patient relationship, but did weaken the relationship between this attitude item and the number of patients advised to stop smoking ($\beta = .595$, $p < .001$ for the interaction).

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Study	Study Design	Outcomes and Analysis	Results
Moyers 2005 **Country:** USA **Focus:** how motivational interviewing works **Funding:** National Institute on Drug Abuse **Overall quality:** (++)	**Study design:** Secondary analysis of observed relationship between therapist skills and behaviours and client involvement in audiotaped work samples from the Evaluating Methods for Motivational Enhancement Education (EMMEE) RCT. **Participants:** 103 (75% of original sample) English speaking US citizens or permanent residents; all licensed health professionals in counselling, psychology, medicine, nursing or social work and treating 5 or more clients with substance abuse disorders per week in individual counselling sessions. **Intervention:** 2 day training workshop on motivational interviewing Method of allocation: all participants agreed to submit sample audiotapes of actual client counselling sessions at 4, 8 and 12 months after completion of training. Tapes from the 4 month window were analysed because it had the lowest attrition of all post-training data collection	MISC behavioural coding system evaluating 20 min segment of audio or videotape session of MI. The first 20 minutes of each session were coded. 6 global clinical characteristics were measured: empathy, acceptance, egalitarianism, warmth, genuineness and overall MI spirit 4 global client measures: affect; co-operation; engagement and seeking of information Reliable measures: Yes Measurement complete: Yes Outcome measures relevant: Yes	Therapist interpersonal skills were positively associated with client involvement as defined by cooperation, disclosure and expression of affect. Behaviours inconsistent with MI enhanced the impact of therapist interpersonal skills upon client involvement Clinician adherence to the spirit of MI method rather than specific techniques for implementing it are emphasised

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Study	Study Design	Outcomes and Analysis	Results
Petrella 2003 **Country:** Canada **Focus**: exercise on prescription **Funding:** Medical Research Council of Canada / Pharmaceutical Manufacturers Association of Canada **Overall quality**:+	Study design: randomised controlled trial participants: 284 healthy community-dwelling patients (72 per clinic) aged >65 years of which 241 completed the trial interventions: Step Test Exercise Prescription (STEP) exercise guidelines, a paper describing benefits of exercise, guidelines for delivery and training in interpretation of the step test data to determine patient aerobic capacity (VO_{2max}) including prescription of an exercise training heart rate. Method of allocation: Physician randomised to intervention or control group	Aerobic fitness Predicted VO_{2max} from the STEP test Exercise self-efficacy Clinical anthropometric parameters Reliable measures: yes Measurement complete: Outcome measures relevant: yes Overall quality:+	241 subjects (131 intervention, 110 control) completed the trial. (VO_2max) was significantly increased in the STEP intervention group (11%; 21.3 to 24ml/kg/min) compared to the control group (4%; 22 to 23ml/kg/min) over 6 months (p <0.001), and 14% (21.3 to 24.9ml/kg/min) and 3% (22.1 to 22.8ml/kg/min), respectively, at 12 months (p <0.001). A similar significant increase in ESE (32%; 4.6 vs 6.8) was observed for the STEP group compared to the control group (22%; 4.2 vs 5.4) at 12 months (p < 0.001). Systolic blood pressure decreased 7.3% and body mass index decreased 7.4% in the STEP group, with no significant change in the control group (p <0.05). Exercise counselling time was significantly (p <0.02) longer in the STEP (11.7+/-3.0 min) compared to the control group (7.1+/-7.0 min), but more (p <0.05) subjects completed > or =80% of available exercise opportunities in the STEP group.

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Table 6 Systematic Reviews

Study	Methods	Results	Notes
Battersby et al 2010 **Country:** Australia **Focus:** provision of a set of principles underpinned by evidence from randomized controlled trials to inform implementation of SMS texting in primary care **Funding:** Health Research and Educational Trust of the American Hospital Association, and The Robert Wood Johnson Foundation, **OVERALL QUALITY: (+)**	INCLUSION CRITERIA study design: structured reviews and meta-analyses participants: people with chronic conditions interventions: Practices and processes that could improve self-management support in primary care METHODOLOGY Search strategy: English language medical literature published between January 1980 and October 2008 was searched using the MEDLINE database of the National Library of Medicine and the Nursing and Allied Health database (from 1982). The Medical subject headings (MeSH) searched were Asthma, Diabetes, Coronary Arterio -sclerosis, Heart Failure, Congestive, Depression, Pulmonary Disease, Chronic Obstructive, HIV/AIDS, Smoking Cessation, Alcohol-related Disorders, and Exercise, Self Care, and Primary Care. A text word search was used of both databases using the term *self-management*. study selection: Publication types were limited to meta-analyses and systematic reviews. All the systematic reviews of the Cochrane Effective Practice and Organization of Care (EPOC) group were hand searched for those having relevance to SMS by affecting practice patterns. The project team identified 123 reviews and meta-analyses of which 83 were included. Evidence-based principles were chosen if they were supported by one or more reviews. quality assessment: None reported	number of included trials: Not reported number of participants: Not reported INTERVENTIONS: (1) brief targeted assessment, (2) evidence-based information to guide shared decision-making, (3) use of a non-judgmental approach, (4) collaborative priority and goal setting, (5) collaborative problem solving, (6) self-management support by diverse providers, (7) self-management interventions delivered by diverse formats, (8) patient self-efficacy, (9) active follow-up, (10) guideline-based case management for selected patients, (11) linkages to evidence-based community programs, (12) multifaceted interventions. OUTCOMES: none of the behaviour change techniques demonstrated clear effects in convincing majorities of the studies in which they were evaluated. Self-monitoring of behaviour, risk communication, and use of social support were most often identified as effective. The frequently used knowledge and facilitation	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: No study flow shown: No study characteristics of individual studies described: No quality of individual studies given: No results of individual studies shown: No statistical analysis appropriate: N/A OVERALL QUALITY: + LIMITATIONS: Reviewer: Limited detail on process or analysis of included data Author: None reported

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Study	Methods	Results	Notes
	data extraction: Not reported meta-analysis: No data analysis: Not reported subgroups / sensitivity analyses: No	techniques were clearly less often effective. Relapse prevention techniques and re-evaluation of outcomes were hardly ever successful. Only a few combinations of techniques were very frequently found, with highest success rates for combinations of knowledge, awareness and facilitation techniques	
Breckon 2008 **Country:** Not reported **Focus:** Physical activity counselling **Funding:** Not reported **OVERALL QUALITY:** (+)	INCLUSION CRITERIA study design: Interventions reporting an element of physical activity counselling participants: Adults ≥ 16 years METHODOLOGY search strategy: electronic searches of computerized databases including SPORTdiscus, Psychinfo, Sciencedirect, Cinahl, Web of Science, PubMed and Scopus and citations in papers identified by the electronic search. study selection: interventions that included an element of PA counselling and that required personal interaction, patient centeredness, and sound communication data extraction: design, treatments, consultation (theoretical framework), consultant (interventionist), intensity (and follow-up), duration, training and competence assessed, outcome measures, and outcome results data analysis: main oputcomes, theoretical frameworks and treatment fidelity regimens for each study subgroups / sensitivity analyses: Yes	number of included trials: 26 papers number of participants: Not reported One study was published before 2000 and 15 of the 26 studies (58%) were published after 2003. TRIALS: design: Intervention trials duration: 9 weeks – 24 months quality: + origin: Not reported funding: Not reported INTERVENTIONS: physiological, behavioural and some cognitive components. OUTCOMES: Outcome measures were categorized into either physiological (eg, heart rate [HR], blood pressure [BP], body mass index [BMI]), behavioural (adherence), or cognitive (perceptions) outcomes. Most studies included outcome measures from more than one category. Most common outcome measures were behavioural (eg, PA questionnaires) and physiological (eg, HR, BMI). Only a very small	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: OVERALL QUALITY: + LIMITATIONS: Reviewer: exclusion of any non face-to-face intervention i.e. telehealth; no reporting of participant numbers Author: qualitative versus quantitative nature of review; limited inclusion criteria

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Study	Methods	Results	Notes
		proportion of the reviewed studies included cognitive outcome measures (ie, stages of change questionnaire, processes of change questionnaire, decisional balance measures, or self-efficacy measures). Six studies reported no significant change across their sample from PA counselling. Thirteen studies reported a behavioural change (increased PA) in at least 1 intervention group, although only 3 studies reported a cognitive shift All remaining studies reported a physiological or epidemiological change (such as reduced BMI and increased VO2max) in participants between at least 1 intervention group and a control. Only 5 studies reported having applied any form of treatment fidelity. Three reported significant results with the remaining 2 reporting no differences as a result of the intervention(s). Findings reflected the equivocal nature of the results across the range of reviewed studies. Process evaluation poorly reported in most studies	

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Study	Methods	Results	Notes
Carr 2011 **Country:** UK and developed countries **Focus:** component intervention techniques of lifestyle advisors (LAs) in the UK and similar contexts **Funding:** HTA **OVERALL QUALITY:** (++)	INCLUSION CRITERIA study design: quantitative, qualitative or economic evaluation of HRLA participants: Adults interventions: chronic care, mental health, breastfeeding, smoking, diet and physical activity, screening and human immunodeficiency virus (HIV) infection prevention METHODOLOGY search strategy: Applied Social Sciences Index and Abstracts (ASSIA), EMBASE, NHS Economic Evaluation Database (NHS EED), MEDLINE, PsycINFO, etc.], relevant journals and reference lists to Sept 2008 study selection: any evaluation of HRLA interventions quality assessment: Yes data extraction: bibliographic details, study characteristics, participant characteristics, intervention and setting, outcome and data results, time period, study design, methods of analysis, factors considered in the analysis, other contextual factors, role, costs and any other outcomes of interest. meta-analysis: No data analysis: narrative synthesis, realist synthesis and cost-effectiveness subgroups / sensitivity analyses: Yes	number of included trials: 26 number of participants: 25,484 TRIALS: design: RCT; Non-RCTs; Cohort studies; Case–study control; Interrupted time series; Ethnographic Phenomenological; In-depth qualitative evaluations, Combined designs duration: quality: + funding: not reported INTERVENTIONS: interventions with the explicit aim of health improvement, including community-based secondary prevention for chronic disease that involved paid or voluntary work with an individual or group of peers acting in an advisory role, offering support in person, over the telephone or online advice delivered by post, online or electronically training, support or counselling delivered to patients, communities or members of the public sessions on relaxation, diet, exercise, fatigue, breaking the 'symptom cycle', managing pain and medication, decision-making, communication, problem-solving and role-playing OUTCOMES: LA interventions in chronic care and smoking cessation are cost-effective; and for HIV interventions but not in a UK setting. Cost-effectiveness of LA interventions for breastfeeding and mental health are inconclusive	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: Yes study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors below Author: Lack of reporting of mechanism leading to positive change. Uncertainty pervading analysis; lack of studies in male populations, older people and homeless populations. No evidence on holistic interventions

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Study	Methods	Results	Notes
		due to lack of included studies LA interventions for diet and physical activity are not cost-effective The wide variety of LA models, delivery settings and target populations prevented the reviewers from establishing firm causal relationships between intervention mode and study outcomes. Evidence is variable and can only give limited support to LAs having a positive impact on health knowledge, behaviours and outcomes. Levels of acceptability appear to be high. LAs acted as translational agents, sometimes removing barriers to prescribed behaviour or helping to create facilitative social environments. Reporting of processes of accessing or capitalising on indigenous knowledge (IK) is limited. Ambiguity continues with respect to the role and impact of lay and peer characteristics of the interventions	

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Study	Methods	Results	Notes
Dombrowski 2010 **Country:** UK **Focus:** obesity related co-morbidities **Funding:** Not reported **OVERALL QUALITY:** (++)	INCLUSION CRITERIA study design: randomised controlled trials participants: Obese adults interventions: Behavioural interventions Main outcomes were behaviour and weight change Secondary descriptive outcomes include modes of intervention delivery and BCTs; reporting of behaviour change data for diet and PA including self-report and objective measures as measured at both baseline and follow-up METHODOLOGY search strategy: MEDLINE, EMBASE and PsycINFO, 3 relevant journals 'International journal of obesity; the international journal of behavioural medicine' and 'obesity research'. Reference lists of relevant review articles and of all included studies were searched. study selection: Behavioural interventions targeting dietary and/or physical activity change in obese adults (mean BMI≥30, mean age≥40 years) with risk factors and follow-up data≥12 weeks. 26 item BCT coding used quality assessment: Yes data extraction: behaviour and weight change; secondary descriptive outcomes including modes of intervention delivery and BCTs.. meta-analysis: Yes data analysis: quantitative meta-anlyses using RevMan subgroups / sensitivity analyses: Yes	number of included trials: 44 number of participants: TRIALS: design: randomised controlled trials duration: ≥12 weeks follow-up data after the point of randomisation quality: + funding: not reported INTERVENTIONS: Behavioural interventions aimed at changing diet and/or PA compared to usual care, waiting list control or less intensive intervention group. OUTCOMES: Meta-regression suggested that increasing numbers of identified BCTs is not necessarily associated with better outcomes. The BCTs provision of instructions (β =− 2.69, *p*=0.02), self-monitoring (β = − 3.37, *p*<0.001), relapse prevention (β = − 2.63, *p*=0.02) and prompting practice (β = − 3.63, *p*<0.001) could be linked to more successful interventions. Studies including more BCTs aimed at dietary change that are congruent with Control Theory were associated with greater weight loss (β = − 1.13, *p*=0.04).	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: Yes study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors. Few studies used fidelity checks and there was a lack of information on control groups in trials. Author: Limited available evidence in included studies

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Study	Methods	Results	Notes
Greaves 2011 **Country:** UK **Focus:** intervention components associated with increased effectiveness in dietary and physical activity interventions **Funding:** Not reported **OVERALL QUALITY:** (++)	INCLUSION CRITERIA study design: Systematic reviews and meta-analyses including RCTs, observational studies, case-controlled or other quasi-experimental studies participants: Adults (18 years and over) at risk of developing type 2 diabetes, selected because they were obese, overweight, sedentary, had hypertension, impaired fasting glucose, impaired glucose tolerance, hyperlipidaemia, metabolic syndrome, polycystic ovarian syndrome, gestational diabetes, a family history of type 2 diabetes or cardiovascular disease, or had been identified as having a high cardiovascular disease risk score (e.g. using a validated risk score such as Q-RISK or Framingham) interventions: Interventions promoting physical activity and/or dietary change at the individual-level (i.e. interventions delivered to individuals either singly or in group sessions, but not whole community or whole-population level interventions such as media campaigns or changes in the local environment) METHODOLOGY search strategy: MEDLINE, EMBASE, CINAHL, PsycInfo, and the Cochrane Library were searched for systematic reviews of interventions targeting diet and/or physical activity in adults at risk of developing type 2 diabetes from 1998 to 2008 study selection: reviews were selected where the primary outcome measure was weight, weight loss (kg or Body Mass Index (BMI), proportions of people achieving a target weight loss), changes in physical activity (e.g. frequency, met-hrs per week) or dietary behaviour. Behaviours could be measured objectively (e.g. with accelerometers) or by self-report (e.g. dietary intake questionnaires). Cardiorespiratory fitness was considered as a proxy for	number of included trials: 30 number of participants: TRIALS: design: Ten reviews examined physical activity interventions, three examined dietary interventions and seventeen examined both. Data included a range of populations and settings with a variety of descriptive, meta-analytic and meta-regression analyses duration: quality: + origin: Not reported funding: Not reported INTERVENTIONS: Techniques in Michie and Abraham behaviour change taxonomy were investigated OUTCOMES: Overall, interventions produced clinically meaningful weight loss (3-5 kg at 12 months; 2-3 kg at 36 months) and increased physical activity (30-60 mins/week of moderate activity at 12-18 months). Based on causal analyses, intervention effectiveness was increased by engaging social support, targeting both diet and physical activity, and using well-defined/established behaviour change techniques. Increased effectiveness was also associated with increased contact frequency and using a specific cluster of “self-regulatory” behaviour change	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: Yes study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors Author: Inadequate description of behavioural interventions; lack of intervention fidelity; measurement bias e.g. self-select, self-report, study quality; unable to determine whether the lack of an association between the use of a stated theory and effectiveness may reflect a lack of good theories or rather reflects poor implementation of theories

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Study	Methods	Results	Notes
	change in physical activity. quality assessment: QA was rated for sub-sample of potentially relevant articles (35 out of 107) data extraction: data on the effectiveness of interventions for: Theoretical basis; Behaviour change techniques used; Mode of delivery; Intervention provider; Intensity; Characteristics of the target population and Setting data analysis: Each analysis was graded using the adapted SIGN criteria Meta-analysis: No	techniques (e.g. goal-setting, self-monitoring). No clear relationships were found between effectiveness and intervention setting, delivery mode, study population or delivery provider. Evidence on long-term effectiveness suggested the need for greater consideration of behaviour maintenance strategies	

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Study	Methods	Results	Notes
Hutchison 2009 **Country:** UK **Focus:** physical activity behaviour change **Funding:** Not reported **OVERALL QUALITY:** (+)	INCLUSION CRITERIA study design: randomised controlled trials; non-randomised controlled trials participants: Unclear interventions: TTM based physical activity interventions METHODOLOGY search strategy: PsycINFO, Science Direct, Web of Science, Scopus, SPORT Discus. Hand searched journals: Journal of Sport and Exercise Psychology; Journal of Sport Behaviour; Health Education Journal; Medicine and Science in Sport and Exercise; Health Education Research and Research Quarterly in Sport and Exercise Quality assessment: None reported study selection: Transtheoretical model; stages of change; process of change; physicaly activity; exercise and behaviour change data extraction: In evaluations of PA interventions reporting multiple outcome measures, the most general or comprehensive measure was selected (e.g., exercise level, energy expenditure). For studies of healthy eating, measures of good and/or poor diet were extracted meta-analysis: Yes data analysis: Comprehensive meta-analysis software and Stata verison 9.2 subgroups / sensitivity analyses: Yes	Number of included trials: 34 reporting 24 different TTM based physical activity behaviour change interventions number of participants: unclear TRIALS: design: 21 RCTs; 3 non-randomised controlled trials duration: 0-12 months (8 of 24 had follow up longer than 6 months) INTERVENTIONS: Dominant techniques were distribution of TTM based written information on PA (66%) and PA counselling based on the TTM (71%). Additional techniques included computer-generated PA feedback (8.3%) and telephone advice (12.5%). Brief intensity interventions (29%) Medium intensity interventions (38%) Intensive interventions (29%) OUTCOMES: Of short term studies, 75% reported a significant effect for TTM based interventions over control conditions in terms of stage progression, activity levels or both Long term results – only 2 studies reported a significant effect for TTM-based interventions over control conditions. There are numerous inconsistencies regarding the development and implementation/application of TTM based interventions.	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: No study flow shown: Yes study characteristics of individual studies described: Yes quality of individual studies given: No results of individual studies shown: No statistical analysis appropriate: N/A OVERALL QUALITY: + LIMITATIONS: Reviewer: No reporting of quality or results of individual studies; no quality assessment Author: Incomplete information, only 9 study authors replied to email invitation to clarify how TTM was used to develop their interventions.

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Study	Methods	Results	Notes
Huttunen-Lenz 2010 **Country:** UK **Focus:** smoking cessation **Funding:** Not stated **OVERALL QUALITY:** ++	INCLUSION CRITERIA study design: randomised controlled studies of non-pharmacological interventions for smoking cessation participants: Adults interventions: psycho-educational interventions METHODOLOGY search strategy: Cochrane Controlled Trials Register, PsychINFO, MEDLINE, CINAHL and Dissertations and Abstracts International databases from 1970s onwards study selection: psycho-educational cardiac rehabilitation interventions; non-pharmacological interventions for smoking cessation among patients with CHD. quality assessment: Yes data extraction: Data extraction sheets for study design, intervention and patient characteristics, point prevalent, continuous smoking cessation, and mortality. meta-analysis: No data analysis: application of Michie et al behaviour change technique framework, behavioural determinants were estimated subgroups / sensitivity analyses: No	number of included trials: 14 number of participants: 1,792 intervention participants; 1,766 control participants (range 87 – 789 per study) TRIALS: design: RCT duration: 6-66 month follow-up quality: variable origin: worldwide funding: not reported INTERVENTIONS: Any non-pharmacological intervention OUTCOMES: Psycho-educational interventions statistically significantly increased point prevalent (RR 1.44, 95% CI, 1.20–1.73) and continuous (RR 1.51, 95% CI, 1.18–1.93) smoking cessation, and statistically non-significantly decreased total mortality (RR 0.73, 95% CI, 0.46–1.15). Included studies used a mixture of theories in intervention planning. Despite superficial differences, interventions appear to deploy similar behaviour change techniques, targeted mainly at motivation and goals, beliefs about capacity, knowledge, and skills.	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: No study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Data from low quality studies means that conclusions must be treated with caution; no search date given; rigour of validity assessment unclear. Author: Limited statistical analyses; challenge of collecting reliable long term follow up data; lack of process evaluation in studies

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Study	Methods	Results	Notes
Lai 2010 **Country:** UK, China **Focus:** Motivational interviewing for smoking cessation **Funding:** Not reported **OVERALL QUALITY:** ++	INCLUSION CRITERIA study design: RCTs, cluster randomised controlled trials participants: tobacco users of either gender recruited in any setting interventions: Pharmacological and behaviour interventions based primarily upon the motivational interviewing METHODOLOGY search strategy: Cochrane Tobacco Addiction Group Specialized Register for studies with terms (motivational OR motivation OR motivating OR motivate OR behavi* OR motivat*) and (interview* OR session* OR counsel* OR practi*) in the title or abstract, or study selection: Randomized controlled trials in which motivational interviewing or its variants were offered to smokers to assist smoking cessation quality assessment: Yes data extraction: main outcome measure was abstinence from smoking after at least six months follow up meta-analysis: Yes data analysis: The most rigorous definition of abstinence was used in each trial, and biochemically validated rates where available. Subjects lost to follow up were treated as continuing smokers subgroups / sensitivity analyses: Yes	number of included trials: 14 number of participants: >10,000 TRIALS: design: all MI intervention trials duration: 3-12 months (15-45 min sessions) quality: + origin: worldwide funding: Not reported INTERVENTIONS: most commonly used approach to motivational interviewing (MI) has been one in which the smoker is given feedback intended to develop discrepancy between smoking and personal goals in a non-threatening manner MI was delivered in face-to-face sessions in 11 studies. In 3 counselling was telephone-based. None of the included studies used MI in groups. Ten studies delivered the MI intervention in a single session; 3 studies each provided three sessions, and four sessions (by phone). The duration for each session ranged from 10 to 40 minutes. OUTCOMES: 14 studies published between 1997 and 2008, involving over 10,000 smokers. Trials were conducted in one to four sessions, with the duration of each session ranging from 15 to 45 minutes. All but two of the trials used supportive telephone contacts, and supplemented the counselling with	inclusion criteria described: details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors Author: Publication bias and/or selective reporting in favour of positive results may compromise strength of evidence and conclusions

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Study	Methods	Results	Notes
		self-help materials. MI was generally compared with brief advice or usual care in the trials. Interventions were delivered by primary care physicians, hospital clinicians, nurses or counsellors. Our meta-analysis of MI versus brief advice or usual care yielded a modest but significant increase in quitting (RR 1.27; 95% CI 1.14 to 1.42). Subgroup analyses suggested that MI was effective when delivered by primary care physicians (RR 3.49; 95% CI 1.53 to 7.94) and by counsellors (RR1.27; 95% CI 1.12 to 1.43), and when it was conducted in longer sessions (more than 20 minutes per session) (RR 1.31; 95% CI 1.16 to 1.49). Multiple session treatments may be slightly more effective than single sessions, but both regimens produced positive outcomes. Evidence is unclear at present on the optimal number of follow-up calls. There was variation across the trials in treatment fidelity. All trials used some variant of motivational interviewing. Critical details in how it was modified for the particular study population, the training of therapists and the content of the counselling were sometimeslacking from trial reports.	

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Study	Methods	Results	Notes
Michie 2009 **Country:** UK **Focus:** techniques in health eating and physical activity interventions **Funding:** not reported **OVERALL QUALITY:** ++	INCLUSION CRITERIA study design: Interventions, evaluated in experimental or quasi-experimental studies, using behavioural and/or cognitive techniques to increase physical activity and healthy eating participants: adults interventions: any METHODOLOGY search strategy: MEDLINE, EMBASE, PsycINFO, the Cochrane library (Cochrane Central Controlled Trials Register and the Health Technology Assessment database), AMED (Allied and Complementary Medicine Database), and HMIC (Health Management Information Consortium) databases between 1990 and 2008 study selection: interventions that recruited adults' (18 years or over) to increase their levels of physical activity or healthy eating, used experimental or quasi-experimental designs, and had outcome measures that were objective, standardized, or validated self-report measures. data extraction: In evaluations of PA interventions reporting multiple outcome measures, the most general or comprehensive measure was selected (e.g., exercise level, energy expenditure). For studies of healthy eating, measures of good and/or poor diet were extracted meta-analysis: Yes data analysis: Comprehensive meta-analysis software and Stata verison 9.2 subgroups / sensitivity analyses: Yes	number of included trials: 122 evaluations number of participants: 44,747 TRIALS: design: experimental or quasi-experimental duration: 1 session to 2.5 years quality: + INTERVENTIONS: 26 behaviour change techniques of which self-monitoring of behaviour, prompting intention formation, prompting specific goal setting, providing feedback on performance, prompting review of behavioural goals were most effective OUTCOMES: Fifty-one evaluations targeted physical activity only, 35 targeted healthy eating only and 18 targeted both. The 122 interventions produced an overall pooled effect size of 0.31 (95% confidence interval _ 0.26 to 0.36, *I*2 _ 69%). The technique, "self-monitoring," explained the greatest amount of among-study heterogeneity (13%). Interventions that combined self-monitoring with at least one other technique derived from control theory were significantly more effective than the other interventions (0.42 vs. 0.26).	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors Author: Limited number of intervention studies of sufficient rigour; potential publication bias resulting in over-estimation of magnitude of effects; potential unaccounted for variance in effect size heterogeneity

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Study	Methods	Results	Notes
Michie 2011 **Country:** UK **Focus:** evidence based competences required to deliver behavioural support for smoking cessation **Funding:** Cancer Research UK and the UK Department of Health **OVERALL QUALITY:** ++	INCLUSION CRITERIA study design: development and application of a system for identifying competencies required for the delivery of individual and group-based behavioural support for smoking cessation participants: N/A interventions: behaviour change competences METHODOLOGY search strategy: Sets of recommended competences for behavioural support were identified from a range of guidance documents study selection: Sets of recommended competences for behavioural support were identified from a range of guidance documents quality assessment: Yes data extraction: recommended competences were compared with ones based on behaviour change techniques identified within behavioural support programmes found to be effective in randomised controlled trials (RCTs) and, for individual behavioural support, ones associated with higher success rates in the English Stop Smoking Services. data analysis: list and classification of competences; determination of which competences have agreement of effectiveness; derive subsets of behaviour change techniques subgroups / sensitivity analyses: Yes	INTERVENTIONS: smoking cessation OUTCOMES: Ninety-four competences were identified (71 individual and 23 additional group competences) 59 were cited in at least two guidance documents (51 and 8, respectively). Fourteen of the individual competences and three of the group competences were supported by RCT evidence For individual competences, nine were supported by evidence from the services. Competences were classified in terms of skill, knowledge and function	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: N/A study flow shown: Yes study characteristics of individual studies described: Yes quality of individual studies given: N/A results of individual studies shown: N/A statistical analysis appropriate: N/A OVERALL QUALITY: ++ LIMITATIONS: Author: Incomplete descriptions of behaviour change techniques. Behaviour change techniques specified may not be reliably delivered; lack of information on fidelity of delivery is required.

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Study	Methods	Results	Notes
Murray 2012 **Country:** UK **Focus:** To identify the main barriers and facilitators to lifestyle behaviour change amongst individuals at high risk of cardiovascular events **Funding:** NIHR **Quality:** (++)	INCLUSION CRITRIA Systematic review of Qualitative studies involving patients at high risk of cardiovascular events were identified through electronic searching and screening against predefined selection criteria. METHODOLOGY A content synthesis of the qualitative literature reporting patient-level influences on lifestyle change. Factors (reported influences) were extracted and, using a clustering technique, organised into categories that were then linked to key themes through relationship mapping.	OUTCOMES A total of 348 factors were extracted from 33 studies. Factors were organised into 20 categories and from these categories five key themes were identified: emotions, beliefs, information and communication, friends and family support, and cost/transport. Skills to address the following barriers or facilitators were identified as important; beliefs about the need to change, knowledge about lifestyle and options, support from family and friends, emotional state (anxiety or depression) and practical problems with finance and travel. It is possible to organise the large number of self-reported individual influences on lifestyle behaviours into a small number of themes: emotions, beliefs, information and communication, friends and family support and cost/transport. Further research is needed to clarify which of these patient-level barriers and facilitators are the best predictors of uptake and participation in programmes aimed at helping people to change lifestyle.	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++

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Study	Methods	Results	Notes
Rice 2008 **Country:** UK **Focus:** whether support and intervention from nurses helps people stop smoking **Funding:** American Heart Association, USA. NHS Research & Development Programme, UK **OVERALL QUALITY:** ++ .	INCLUSION CRITERIA study design: studies had to have at least two treatment groups and allocation to treatment groups must have been stated to be 'random' participants: adult smokers aged 18 years or older interventions: Nursing intervention was defined as the provision of advice, counselling, and/or strategies to help patients quit smoking METHODOLOGY search strategy: Cochrane Tobacco Addiction Group specialized register searched study selection: Randomized trials of smoking cessation interventions delivered by nurses or health visitors with follow up of at least six months. data extraction: the most rigorous definition of abstinence for each trial, and biochemically validated rates if available meta-analysis: Yes data analysis: (i) author(s) and year; (ii) country of origin, study setting, and design; (iii) number and characteristics of participants and definition of 'smoker'; (iv) description of the intervention and designation of its intensity (high or low); and (v) outcomes and biochemical validation. subgroups / sensitivity analyses: Yes	number of included trials: 42 number of participants: >15,000 TRIALS: design: Randomized trials duration: At least 6 month follow up quality: + origin: Any funding: Not reported INTERVENTIONS: Thirty-one studies comparing a nursing intervention to a control or to usual care Nine studies compared different nurse delivered Interventions including five studies of nurse counselling on smoking cessation OUTCOMES: The main outcome measure was abstinence from smoking after at least six months of follow up. Advice and support from nursing staff could increase people's success in quitting smoking, especially in a hospital setting. No evidence that that the trials classified as using higher intensity interventions had larger treatment effects Weak evidence that additional telephone support increased cessation (3 trials) Significant benefit for additional face to face sessions (1 trial)	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: Yes study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Agree with authors Author: Lack of controlled studies; further studies with careful consideration of sample size, participant selection, erfusals, drop-outs, long-term follow up and biochemical verification are required; lack of replication studies

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Study	Methods	Results	Notes
Van Achterberg 2010 **Country:** Netherlands **focus:** promoting healthy behaviours in patients **funding:** Not reported **OVERALL QUALITY:** ++	INCLUSION CRITERIA study design: 23 systematic reviews: 14 on smoking cessation, 6 on physical exercise, and 2 on healthy diets and 1 on both exercise and diets METHODOLOGY search strategy: Pubmed, CINAHL, PsycInfo and the Cochrane Database of Systematic Reviews. Search strategies for each topic (smoking, diet, exercise) and each database included both relevant index terms and free text word study selection: reporting systematic review; published 1990 onwards; focus on adult patient populations; selection of RCTs within reviews, focus on smoking, exercise or diet; addressing healthcare workers attempts to promote healthy behaviour; disclosure of interventions and reporting on studies with behavioural outcome assessments quality assessment: Oxman QA tool 1994 data extraction: general content of the reviews was extracted using a pre-structured form on characteristics of the review such as target groups, setting, numbers and types of studies included, and health-care providers involved in interventions. Abraham and Michie taxonomy used to classify techniques meta-analysis: No data analysis: descriptive analysis to report the frequency of use of behaviour change techniques. subgroups / sensitivity analyses: No	number of included trials: 23 number of participants: not reported TRIALS: design: systematic reviews duration: 1 week-60 months follow-up quality: variable origin: worldwide funding: not reported INTERVENTIONS: Knowledge, awareness, social influence, attitude, self-efficacy, intention, action control, maintenance, facilitation of behaviour, common combinations thereof OUTCOMES: The content of interventions for the promotion of healthy behaviours is often insufficiently reported. None of the behaviour change techniques demonstrated clear effects in convincing majorities of the studies in which they were evaluated. Self-monitoring of behaviour, risk communication, and use of social support were most often identified as effective. The frequently used knowledge and facilitation techniques were clearly less often effective. Relapse prevention techniques and re-evaluation of outcomes were hardly ever successful. Only a few combinations of techniques were very frequently found, with highest success rates for combinations of knowledge, awareness and	inclusion criteria described: Yes details of literature search given: Yes study selection described: Yes data extraction described: Yes study quality assessment described: No study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: Yes results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: ++ LIMITATIONS: Reviewer: Unclear study quality assessment Author: Potential bias due to 'indirect sources'; time lapsed since original studies and reviews; lack of check for appropriateness of techniques in studies; insufficient detail in publications to determine appropriate delivery of tecniques

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Study	Methods	Results	Notes
		facilitation techniques. While success rates were low with all techniques, the overall results were dominated by large numbers of studies on smoking cessation. As poor success rates were especially found in smoking cessation studies, these drew heavily on overall findings.	
Williams French 2011 **Country:** UK **Focus:** Techniques for changing physical activity self-efficacy and behaviour **Funding:** Not reported **OVERALL QUALITY**: +	INCLUSION CRITERIA study design: Published randomized experimental, non-randomized experimental, quasi-experimental or pre- and post intervention studies. participants: Adults aged 18-60 years interventions: Lifestyle and recreational physical activity interventions that aimed to increase physical activity self-efficacy. METHODOLOGY search strategy: Web of Science (1966–2007), PsycInfo (1966–2007), SPORTDiscus (1966–2007) and the Cochrane Library were searched using a comprehensive search strategy including self-efficacy, physical activity and trial search terms. study selection: randomised experimental, non-randomised experimental, quasi-experimental or pre/post intervention studies for lifestyle and recreational physical activity interventions that aimed to increase physical activity self-efficacy quality assessment: Not reported data extraction: Effect size data were extracted for physical activity self-efficacy and physical activity	number of included trials: 36 interventions from 27 unique studies number of participants: mean 199 (22-874) TRIALS: design: ten randomized experiments, four pre- and post-intervention studies, one non-randomized experiment and one quasi-experimental study. duration: Not reported quality: - origin: Not reported funding: Not reported INTERVENTIONS: 24 intervention studies focused on lifestyle physical activity, e.g. walking and gardening, 3 studies targeted recreational physical activity, e.g. aerobics class, gym sessions. There were 19 individual interventions, 8 interventions were delivered in group setting. Modes of delivery included training sessions, discussion groups, telephone and mass media. Workplace, primary care, media and university	inclusion criteria described: Yes details of literature search given: No study selection described: Yes data extraction described: Yes study quality assessment described: No study flow shown: No study characteristics of individual studies described: Yes quality of individual studies given: No results of individual studies shown: Yes statistical analysis appropriate: Yes OVERALL QUALITY: + LIMITATIONS: Reviewer: No study quality assessment; no detail of literature search given Author: Lack of description in intervention studies with inadequate reporting of specific behaviour change techniques; lack of statistical control for

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Study	Methods	Results	Notes
	behaviour. meta-analysis: Yes data analysis: Cohen's *d*; *Q* co-efficient; one way Spearman's Rho; paired *Z* scores subgroups / sensitivity analyses: No	settings were most often utilized. Most commonly, a researcher or health professional was assigned the role of intervention deliverer. A theoretical rationale was explicitly mentioned in 24 of the included studies, although 3 studies mentioned no theoretical rationale in their study description. OUTCOMES: 6 techniques were significantly associated with higher physical activity behaviour effect sizes: 'provide information on consequences of the behaviour in general' (included d = 0.27; not included d = 0.08, P = P < 0.001), 'action planning' (included d = 0.38; not included d =0.16, P = 0.009), 'reinforcing effort or progress towards behaviour' (included d = 0.33; not included d = 0.16, P = 0.011), 'provide instruction'(included d = 0.26; not included d = 0.12, P = 0.004), 'facilitate social comparison' (included d = 0.46; not included d = 0.18, P = 0.022) and 'time management' (included d = 0.33; not included d = 0.17, P = 0.039). 3 intervention techniques were significantly associated with lower physical activity effect sizes; 'set graded tasks' (included d = _0.01,not included d = 0.21, P = 0.001), 'use of follow-up prompts' (included d = 0.02, not included d = 0.21, P = 0.021) and 'relapse prevention' (included d = 0.01, not included d = 0.26, P < 0.001). The remaining 11 techniques included in the moderator analysis were not associated with significant differences in physical activity effect size estimates between studies that included	potential confounders; lack of generalisability

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Study	Methods	Results	Notes
		those techniques and studies that did not. Three intervention techniques were significantly associated with higher self-efficacy effect sizes; 'action planning' (included d = 0.49; not included d = 0.11, P < 0.001), 'reinforcing effort or progress towards behaviour' (included d = 0.31; not included d = 0.11, P = 0.003) and 'provide instruction' (included d = 0.21; not included d = 0.11, P = 0.017). Five intervention techniques were significantly associated with lower self-efficacy effect sizes, 'set graded tasks' (included d = _0.52; not included d = 0.20, P = 0.01), 'prompt self-monitoring of behaviour' (included d = 0.06, not included d = 0.19, P = 0.004), 'prompt practice' (included d = 0.13, not included d = 0.22, P = 0.026), 'plan social support/social change' (included d = 0.06; not included d = 0.20, P = 0.010) and 'relapse prevention' (included d = 0.05; not included d = 0.22, P < 0.001).	

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