

The importance of nutrition and fitness professionals in weight loss, weight loss maintenance and body recomposition

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Abstract

Rates of obesity have risen globally over the last 30 years, obesity is a risk factor for many diseases such as metabolic disease (which includes diabetes, dyslipidaemia, hypertension, and heart disease), leading to a globally increasing burden of disease. Obesity not only impacts the individuals who suffer from it, but society as a whole; it is estimated that 7-20% of all healthcare costs are directed towards preventing or managing the effects of obesity. Effective long-term nutritional care may be an important factor in mitigating the effects of the obesity epidemic, as regaining weight after dieting is typical when attempting weight loss autonomously or with usual care (from non-nutrition specialists without focus on the weight maintenance period). Indeed, comprehensive, multidisciplinary care during the weight maintenance phase leads to higher rates of bodyweight maintenance post dieting. Many different nutrition and fitness professionals work with weight loss management clients by providing exercise, behavioural, or nutrition guidance. However, there are no reviews assessing the scope of the literature on the effectiveness of different nutrition and fitness professional's weight loss management guidance. Therefore, the purpose of this dissertation was to conduct a scoping review to evaluate the current literature on the role and effectiveness of various health and fitness professionals in providing weight loss and weight loss maintenance guidance. Following PRISMA guidelines for scoping reviews, databases (PubMed, CINAHL, Scopus, Medline and SPORTDiscus) were searched for relevant articles using terms related to weight loss and various health and fitness profession titles, with no date restrictions. The search yielded 7815 unique articles, with 25 studies meeting the inclusion criteria. In sum, 37 total practitioner types were identified across the 25 studies, these practitioners were separated into groups: Registered Dietitians (RD) (n = 19), Nutritionists (n = 1), Exercise physiologists and physical therapists (n = 4), personal trainers (PT) (n = 3), health coaches (n = 4) and other health professionals (n = 5) and the literature was qualitatively assessed. It was found that most people who seek weight loss and weight loss maintenance don't engage with RDs, who are often considered the most appropriate practitioner for this purpose. Rather, people may be more likely to engage with PTs, other fitness professionals, and the emerging profession of health coaches. There are no studies comparing the effectiveness of weight loss and weight maintenance guidance from different professionals. Therefore, more studies which evaluate health and fitness professionals' capabilities in these roles which make comparisons between professions are needed to best inform practice, scope of practice, and multidisciplinary collaboration.

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Attestation of authorship

“I hereby declare that this submission is my own work and that, to the best of my knowledge and belief, it contains no material previously published or written by another person (except where explicitly defined in the acknowledgements), nor material which to a substantial extent has been submitted for the award of any other degree or diploma of a university or other institution of higher learning.”

James Walsham

Co-authored works

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We, the undersigned, hereby agree to the percentages of participation to the chapters identified above.

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List of common abbreviations

BMI	Body mass index
WT	Body weight
PT	Personal trainer
RT	Resistance training
FM	Fat mass
WTR	Weight regain
CL	Class
RD	Registered dietitian
INT	Intervention
CON	control
PHT	Physical therapist

Chapter 1: Introduction to the dissertation

1.1 Background and Rationale

The obesity epidemic is of increasing concern to practitioners and policy makers, as rates of obesity have risen globally over the last 30 years [1]. Obesity is a risk factor for many diseases such as metabolic disease (which includes diabetes, dyslipidaemia, hypertension and heart disease) [2]; further, obesity is associated with decreased quality of life [3] and increased rates of depression [4]. Obesity not only impacts the individuals who suffer from it, but society as a whole; it is estimated that 7-20% of all healthcare costs are directed towards preventing or managing the effects of obesity [5]. Roux and Donaldson [6] suggest economic evaluation of obesity should be shifted from evaluating the current costs, towards evaluating how to utilise scarce healthcare funding effectively. Some observational data suggests ~70% of the public who previously sought weight loss may regain their weight, increasing body mass $\geq 5\%$ over 10 years [7]. Many authors note that weight stigma is a significant contributor towards the increasing rates of obesity, decreasing the likelihood of successful weight loss [8-11]. Weight stigma is just one of the many factors which lead to poor rates of long term weight loss maintenance [12], as well as adverse health consequences of obesity [13]. However, when comprehensive, multidisciplinary care during the weight maintenance phase occurs, ~50% of dieters can maintain a $\geq 5\%$ reduction in body mass seven years following weight loss, which is significantly more effective than usual care [14]. Thus, evaluating the effectiveness of different practitioners who already assist people who seek weight loss is essential.

Meaningful long term weight loss maintenance is generally defined as maintaining a $\geq 5\%$ or greater body mass loss for one year [15, 16]. As noted, weight loss and weight loss maintenance are influenced by a few key factors including support from health practitioners [17]. Soini and colleagues [17] found that it was more common for men to achieve sustainable weight loss without support from a healthcare practitioner, while women were more likely to seek out help from a healthcare practitioner. While men and women may seek healthcare practitioner support at different rates, both seem to seek familial support at a similar rate when pursuing long term weight loss [17]. Notably, Tapsell and colleagues [18] found that a multidisciplinary team consisting of a general practitioner, psychologist, RD, and exercise physiologist had greater effects on weight loss over a 3-month period compared to usual care (practice nurse). It is evident that the level of care and outcomes vary greatly depending on the type of practitioner utilised; however, there is lacking evidence to conclude whether practitioner experience and

qualifications play a key role. Furthermore, there is limited research investigating the effect of the type of practitioner on weight loss, body composition changes and weight maintenance outcomes.

Weight loss maintenance is a relevant topic for many populations. For example, athletes, who sometimes maintain a specific (often weight-reduced) body weight range to enhance power-to-weight ratio or to make a weight class [19], commonly seek advice from family, teammates, coaches, strength and conditioning specialists, and athletic trainers, rather than from RDs [20]. This situation may be similar in the wider population, with most people getting nutrition information from unqualified online sources [21, 22]. Although RDs are likely the most appropriate and effective practitioners for guiding weight loss [23], strength and conditioning specialists and athletic trainers (professions which require education in exercise physiology, health, and nutrition to some extent) may also have sufficient experience and nutrition knowledge to provide guidance [24]. Indeed, even among certified fitness professionals with university degrees, those who specifically attained further nutrition certifications possess significantly higher nutrition knowledge than those without further nutrition education [25]. More so, De Heer and colleagues [26] found that only one in ten patients told to lose weight will seek help from a health professional (including RDs), let alone strength and conditioning specialists or other sport professionals which only athletes have access to. Rather, many in the public with weight loss goals seek out PTs, and often expect them to provide nutrition guidance (sometimes beyond their scope of practice) (18). Therefore, it is essential to assess the nutrition competence of non-registered RD 'nutrition coaches' such as PTs and others who are likely to engage with the public for weight loss guidance.

As alluded to previously, many populations desire weight loss maintenance, but unfortunately do not seek out, have, or feel they have access to high quality nutrition information or guidance, and thus get information from poor sources [27, 28]. When individuals receive education and guidance from poor sources such as online information [21, 22, 27], it is likely there will be adverse consequences due to this, such as poor long term weight loss maintenance outcomes [29-31], body image concerns [32-34] and disordered eating (i.e. rigid restraint and binge eating) [13, 29, 35]. Sustained weight loss maintenance is difficult to achieve [36, 37]; in spite of that, if a health professional can support an individual attempting weight loss they are more likely to attempt weight loss [38] and succeed [17, 18]. Thus, it is important to elucidate which practitioners can provide safe and effective weight loss management, as currently this is unclear.

1.2 Purpose Statement

The primary purpose of this dissertation was to conduct a scoping review with the aim of providing an understanding of the current literature measuring the effectiveness of health and fitness professionals in providing weight loss and weight loss maintenance guidance. This study was conducted for the following reasons:

- The extent of the literature examining the effectiveness of different health professionals in providing weight loss and weight loss maintenance guidance has not been examined.
- Previous research indicates that dietitians may be safe and effective; however, it is unclear which other professionals may also be effective.
- Comparisons between the effectiveness of different practitioners has been minimally examined in the literature.

1.3 Research questions

1. What are the characteristics of nutrition and exercise professionals in the literature who provide advice for weight loss / weight maintenance / body composition change?
2. Which nutrition and fitness practitioners' effectiveness has been evaluated in the literature for weight loss / weight maintenance / body composition change?

1.4 Structure of the dissertation

This dissertation consists of three chapters. Chapter one is an introduction to the dissertation, describing the scope and cost of the obesity epidemic, the challenge of weight loss maintenance, the potential importance of professional care in weight loss maintenance, and the limitations of the research evaluating and comparing such care. Chapter two consists of a scoping review which specifically examined the aforementioned three research questions. As this dissertation was written in the pathway 2 format, Chapter 2 follows the authorship guidelines for *Sports Medicine*, a high impact and readership journal focused on reviews, where we plan to submit following examination. Thus, this chapter has its own introduction, methods, results, and discussion. Finally, Chapter three is a conclusion of the dissertation which outlines the main findings and ideas from chapter two and highlights the avenues for future research.

Chapter 2: The importance of nutrition and fitness professionals in weight loss, weight loss maintenance and body recomposition.

To be submitted to Sports Medicine following dissertation examination.

2.1 Introduction

Weight loss and weight loss maintenance are common goals among multiple populations, such as specific classes of athlete for whom it may improve performance [19], and members of the public seeking weight loss for health [3, 15, 39]. However, weight maintenance is difficult and often unsuccessful [17], with success rates affected by factors such as general psychological wellbeing, physical activity, and socioeconomic factors [7, 17]. Various health and fitness professionals provide valuable support to help people achieve these goals in a safe and effective manner, generally leading to more successful weight loss or weight loss maintenance [17]. However, it is currently unclear which health practitioner an individual should seek out when aiming to achieve weight loss, weight maintenance or body composition change. Considering the low rate at which individuals seek out health practitioners [26], it is important to evaluate the effectiveness of each practitioner who may interact with weight loss advice seekers, such as RDs, nutritionists, health coaches, PTs, strength and conditioning specialists, and sport coaches.

PTs may be the professionals who are most often sought out to help individuals seeking weight loss and they already orient their marketing and businesses towards weight loss [40, 41]. Furthermore, clients expect nutrition care from PTs [42]. It is well documented that PTs may step outside of their scope of practice when administering nutrition advice and protocols [41, 43, 44]. For instance, Barnes and Colleagues [41] investigated the self-perceived competence of PTs in their nutrition knowledge, skills, communication, and attitudes reporting that the majority of PTs felt confident in their knowledge of nutrition (mean score 76%; 'very confident') [41]. However, confidence is not the same thing as competence, although there are limited data that indicate PTs, if properly educated, have the potential to provide competent advice [25]. Thus, when PTs step outside of their scope of practice or do not have adequate nutrition training, it may present health risks to their clientele and legal risk to themselves [45]. Indeed, poor nutrition guidance may lead to detrimental outcomes in the long term, especially when nutrition approaches are inappropriately restrictive [46]. Furthermore, nutrition education standards for PTs differ widely internationally and do not necessarily align with the international confederation of registers for

exercise professionals' standards [47]. Currently, there is insufficient evidence regarding how common place it is for PTs to provide nutrition guidance, its quality, and ultimately, how effective it is in assisting their clients with weight loss and maintenance.

Williams and colleagues [23] conducted the only known meta-analysis investigating the effectiveness of RDs in weight management compared to 'usual' or 'minimal' care. Although the definitions of minimal or usual care varied, generally this referred to education, or short educational sessions with a physician or nurse. Williams and colleagues [23] concluded that RDs are significantly more effective for helping individuals achieve weight loss than minimal or usual care; however, the effect is relatively small (~1kg on average). The effectiveness of different treatment approaches has been analysed in the literature; however, these comparisons are done between RDs only, rather than with other types of practitioners [48].

Another group of practitioners to consider in this space is the growing profession of health coaching [49, 50], but their role in weight loss management is just beginning to be studied [51, 52]. Health coaching is of particular interest due to its integration with primary care [49, 50], as well as the role health coaches may play in promoting health within low socioeconomic populations [50, 53, 54]. Further, health coaches may reduce healthcare costs [55] while improving outcomes in patients with chronic diseases [56-59]; however, health coaching is a rapidly growing profession [60, 61] with varying standards of practice and accreditation [51, 61].

To conclude, different and emerging fitness and health professions engage with clients and patients seeking weight loss. As such professions emerge, and as multidisciplinary approaches become standard, more research on these professions is needed. Specifically, research comparing the effectiveness of different types of practitioners may help to better inform the public and potentially encourage collaborative, multidisciplinary approaches. Considering the personal and societal impact of lifestyle diseases, it is crucial to understand which practitioners are effective and for which aspects of weight loss and weight loss maintenance guidance and care. Thus, the purpose of this scoping review is to evaluate the depth and breadth of the literature on practitioners who provide weight loss and weight loss maintenance advice, to determine whether there is sufficient literature to compare the effectiveness of different practitioners in helping individuals achieve weight loss, weight maintenance, and body composition change.

2.2 Methods

Registry of the scoping review protocol

A scoping review of the literature was performed following the PRISMA 2020 guidelines [62] and the extension checklist for scoping reviews (PRISMA-ScR) [63]. The protocol was prospectively registered on the OpenScience Framework [64]. Registration occurred before any searches had been conducted.

Information sources

The following electronic bibliographic databases were searched: PubMed, Scopus, CINAHL, SPORTDiscus and Medline. The searches covered all dates of available literature. The search was carried out on September 17th, 2021. No limits were applied for language within each database to prevent excluding articles that were not assigned with a language. All included studies were peer-reviewed and published in an English-language journal. Conference abstracts and proceedings were excluded, as were theses and dissertations. Search alerts were created in all databases, and forward citation tracking was performed. Any articles identified by this search were assessed by two researchers (JW and RH) for eligibility. The secondary search was completed on the 5th of February 2022.

Eligibility criteria

All studies included in this review met the following criteria: (1) the study was published in English; (2) the study evaluated the magnitude of weight loss, body composition change, or weight maintenance; (3) participants were not taking medication for weight loss; (4) participants were apparently healthy adults without any clinical diagnoses but of any body mass index (BMI); (5) the study investigated interventions involving practitioners (RDs, PTs, strength and conditioning specialists, sport coaches, health coaches, or nutritionists) who focus on helping with weight loss, weight maintenance, or body composition change; and (6) the study compared an intervention involving practitioners to another type of practitioner intervention (e.g., PTs to RDs), or to minimal care (nutrition related print material or a once off general nutrition seminar), usual care (where individuals received usual care from general practitioner, nurse or health program), or no intervention.

Notes on the eligibility criteria

Studies that included participants with clinical diagnoses such as diabetes and hypertension were excluded, as treating clinical diagnoses is not permitted within the scope of practice of fitness

professionals and PTs [44, 47, 65]. Thus, only the literature on non-clinical populations was included. In some cases, where the authors of the original studies described their participants as “apparently healthy” or when they stated their participant criteria “excluded serious conditions”, two authors of the present review (JW and RH) used their own judgement of a “non-clinical” population to include or exclude these studies. For example, Von Berens and Colleagues [66] study was excluded due to the inclusion of elderly participants and because participants with clinical diagnoses were not explicitly excluded. Another example was a study by Almeida and colleagues [67] which included those with prediabetes which was therefore excluded from the present review. The line between clinical treatment of weight management and the scope of fitness professionals in weight management can be unclear. Many researchers [39, 68-70] have discussed whether having obesity is a disease or a risk factor for lifestyle diseases such as type two diabetes or hypertension. A delineation is necessary to determine whether the common practice of fitness professionals marketing themselves for weight loss purposes [40] is ethical, and within their scope of practice. While there is no universal agreement on the topic [39, 68-70], this scoping review was conducted with the operational definition of obesity as a risk factor for other chronic diseases such as hypertension and diabetes, rather than necessarily being a disease in and of itself in all cases.

Search strategy

A patient/population, intervention, comparison, outcomes, and study design (PICOS) systematic search strategy was developed for PubMed using the Word Frequency Analyzer tool [71] to suggest potentially relevant search terms. The PICOS consisted of terms for practitioners, weight loss, weight maintenance, body recomposition and described the target population, the full PICOS can be found in appendix I [64]. The Research refiner tool [72] was subsequently used to optimize the sensitivity and specificity of the search, while the Polyglot Search Translator Tool [73] was used to adapt the search to other databases. The search string used for SPORTDiscus/CINAHL Complete/MEDLINE/PubMed is reported in appendix II [64]. The search in all these databases utilised the default search settings (i.e., searching the titles, abstracts and keywords) [64].

Study selection

Duplicate references were first removed using the EndNote reference manager [74]. Two authors (JW and RH) independently screened the titles and abstracts to determine initial eligibility using the systematic review software Rayyan [75]. Authors were blinded to reduce bias during this process. Finally, the authors reviewed the full texts to determine eligibility for inclusion based on the

eligibility criteria. Disagreements in eligibility decisions were resolved through discussion, or with a third reviewer (IJ) when required.

Data extraction

Data extraction was completed in duplicate by two authors (JW and RH). The following variables of interest were extracted into an excel spreadsheet: (1) measurements of change in body mass or composition (BMI, body mass [kg], skinfolds [mm], waist circumference [cm], muscle thickness [mm], muscle mass [kg], fat mass [kg] or waist to hip ratio); (2) duration of the intervention; (3) number of individualised sessions with a health practitioner (in minutes or sessions); (4) duration of weight maintenance period (weeks); (5) type of practitioner or information source; and (6) study design.

Risk of bias assessment

Due to the overarching questions of this scoping review, a risk of bias assessment was not performed as per the PRISMA extension for scoping reviews checklist (PRISMA-ScR). Critical appraisal of individual sources of evidence falls outside the realm of scoping review methodology [76, 77]. Although it may still be done if relevant to scoping review's objectives, the overarching aims of the present review were not to appraise the sources of information.

2.3 Results

Summary of search

We identified a total of 7815 records across databases, after duplicate removal 4607 records were screened and 24 studies were initially included. The secondary search retrieved 1365 records; one additional record was included via the secondary search for a total of 25 studies. The stages of the search and study selection process is presented in Fig. 1.

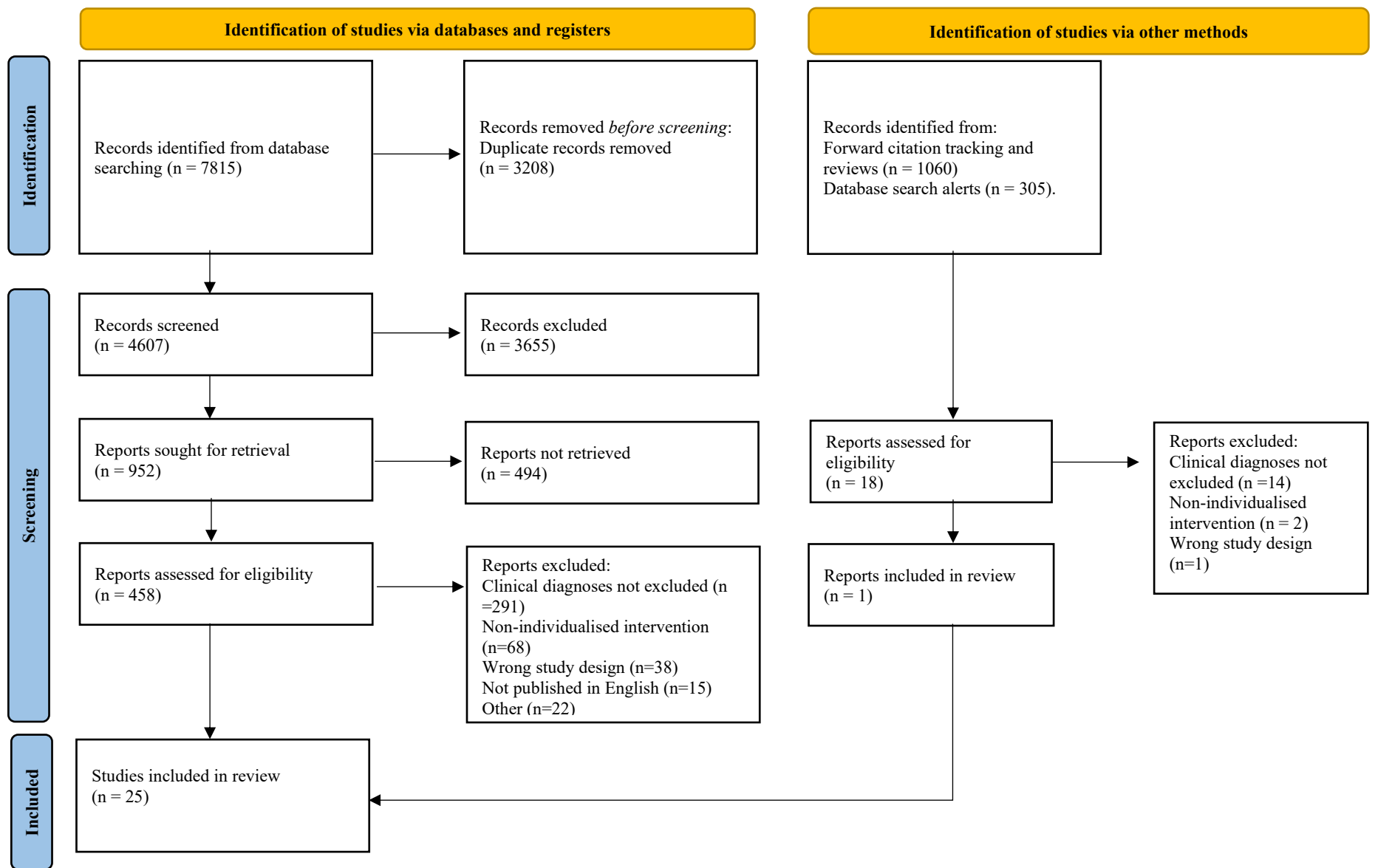


Figure 1. PRISMA diagram of the literature search and filtering results for a scoping review of the importance of nutrition and fitness professionals in weight loss, weight maintenance, and body recomposition.

Study characteristics

Of the 25 studies which met the study inclusion criteria, most (n = 19) examined RDs, while there were far fewer on PTs (n = 3), nutritionists (n = 1), and health coaches (n = 4). Furthermore, the practitioners represented the most were from clinical professions, such as RDs (n = 19), clinical/research exercise professionals such as physical therapists and exercise physiologists (n = 4), those working closely with clinicians such as health coaches (n = 4), and finally, other health professionals such as nurses, doctors, and an array of mental health specialists (n = 6). Seven studies were conducted in the USA [78-84], three in Australia [85-87], two in New Zealand [88, 89], ten in Europe [90-99], two in Canada [100, 101] and one in Brazil [102]. The latest studies were published in 2021 [92, 93, 97], while the oldest study was published in 2005 [83], and most included studies were published after 2010. Study populations were generally those with obesity (BMI $\geq 30\text{kg/m}^2$) or in the overweight (BMI $>25\text{kg/m}^2$) category; however, two studies recruited participants with a BMI below 25kg/m^2 [96, 98]. Most studies recorded age ranges of 18 to 65; however, three studies [86, 89, 101] reported broader age ranges (i.e., 18-75). BMI was the most common anthropometric variable used as an outcome measure in just over half the included studies except in [78-82, 90, 96, 97, 101], where body mass was used. More detailed information about the practitioners included in each study can be found in table 1 and further information about practitioner classification can be found in table 2.

Personal trainers

PTs were the second least common practitioner identified in this review [89, 91, 94]. The median intervention duration for PTs was 58 weeks, the median number of sessions for PTs was ~ 23.5 . In two studies, exercise trainers [89] or physical activity coaches [91] carried out the intervention, these practitioners had identical scope/function to PTs, and thus were included in this group. PTs operated in multidisciplinary teams in two studies [89, 91], both studies included an RD [91] or nutritionist [89] providing nutrition advice. Rustaden et al., 2017 [94] included PTs in two different groups. In the non-supervised group (CON2) PTs provided guidance about the exercise program twice (week 1 and week 6) relating to lifting technique, progression, and intensity, but did not receive individualised training. Thus, this group's data were not extracted, and this group was not included in tables 1 and 2. While in the supervised group (INT), the PT was present for all exercise sessions; therefore, this, group was included.

Dietitians

RDs [78, 80, 82, 83, 85, 88-93, 95-102] were the most often identified profession. The average intervention duration for RDs was 24 weeks. However, RDs provided fewer total sessions (~ 6.5 sessions)

than all other practitioner groups. In 11 studies [78, 83, 85, 88, 90, 96, 97, 99-102] RDs worked as the sole practitioner, while in the remaining eight studies [80, 82, 89, 91-93, 95, 98] RDs operated as part of a multidisciplinary team.

Nutritionists

There was only a single study on nutritionists [89] among the studies included in this review. In the one study [89] identified which utilised nutritionists within the intervention, the intervention also included an RD working in a team with other professionals including the nutritionist. The duration of the nutritionist intervention [89] was 104 weeks with 11 sessions with a nutritionist; the sessions were 35-minutes face-to-face with the nutritionists in conjunction with a PT (activity coach).

Health coaches

Health coaches were involved in four interventions [79, 80, 84, 87], three of these interventions [79, 84, 87] involved only the health coach, while the fourth [80] involved a multidisciplinary team with an RD. Health coaches' median intervention duration was 21 weeks which is lower compared to interventions involving all other practitioners except PTs. The median number of sessions provided by health coaches was less than all other practitioner groups except for RDs.

Exercise physiologists and physical therapists

Physical therapists and exercise physiologists were involved in four interventions [82, 86, 95, 98] with three [82, 95, 98] of these interventions involving a multidisciplinary team. The Median intervention duration for studies with physical therapists and exercise physiologists was 26 weeks, this included a median of 13 sessions across interventions.

Other Health Professionals

Other Health professionals were represented in five studies and were made up of physicians, registered nurses, psychotherapists, and psychologists [81, 82, 85, 89, 92]. On average, interventions involving other health professionals included 12 sessions over 24 weeks. Psychotherapists were identified in one study included in this review [93]; however, this intervention was performed in groups, therefore this was not individualised and thus, study data were not extracted and this profession was not included in the profession classifications in tables 1 or 2.

Table 1. Summary of study characteristics, methods, and findings.

Authors	Study Design; duration; location	Population characteristics and baseline characteristics	Intervention	Type of practitioner	Number of sessions with a practitioner	WT change (kg); BMI (kg/m ²); WC (cm)
Aller et al. [90]	RCT; 14 months; Europe.	Adults <65 years without diagnoses; n = 137 male; n = 202 female; BMI ^a >27kg/m ² .	INT: After 8-week low-calorie diet (PH1), participants followed 12-month ad libitum diets (PH2). For the first 6 months, food was provided for free, participants received guidance by RD. CON: control diet.	RD	A total of 17 visits ('instruction centres') and 25 visits ('shop centres') were planned for each adult during the study.	Phase 1 WT change: INT & CON = 11.2kg Phase 2 WTR: INT ^d = 3.9kg at 12 months
Anderson et al. [78]	RCT; 24 weeks; USA.	Adults aged 20-65 without diagnoses; n = 16 males; n = 29 females; BMI ^a 30-39.9kg/m ² .	INT: behaviour change strategies with diet and exercise goals. a low-energy diet (1200 kcal/day). CON: individual counselling sessions with RD.	RD	The CON group received four total sessions with RD.	WT change at 24 weeks: CON = -0.7kg INT = -13.7kg
Andrade et al. [85]	RCT; 24 weeks; Australia.	Adults aged 18-60; n = 194 males; n = 634 females; BMI ^a ≥25kg/m ² .	INT: web-based weight loss program and a social network moderated by physicians and RD. CON: Same as INT + 12-week initial course of online personalised education and feedback from RD.	RD and physicians	CON: 12-week initial course of online personalised education and feedback by an RD.	WT change: INT Class 1,2,3 = -1.2kg, -0.8kg, -1.4kg. CON Class 1,2,3 = -1.3kg, -1.7kg, -1.6kg.
Arterburn et al. [79]	RCT; 16 weeks; USA.	Healthy adults aged 18-65; n = 38 males; n = 160 females; BMI ^a 27-42kg/m ² .	(INT) participants randomised to a low-calorie diet with telephone coaching; (CON1) a reduced-calorie self-guided plan; (CON2) or a self-directed, reduced-calorie control diet.	Health coaches	The INT group had one call the day before starting the program (lasting ~45 minutes) and 22 follow up calls lasting 5-10 minutes.	WT change: INT = -5.2kg CON1 = -5.4kg CON2 = -0.2kg
Bedard et al. [100]	RCT; 12 weeks; Canada.	Healthy females aged 30-65; n=77; BMI ^a 25.8 ± 3.9kg/m ² .	Individual sessions with an RD. Women were divided into four subgroups based on median fast food consumption change (INT1, INT2, INT3, INT4).	RD	Two group and seven individual sessions with an RD to evaluate dietary changes and to select personalised objectives.	Change in BMI: INT1 = +0.0kg/m ² INT2 = -0.1kg/m ² INT3 = -0.3kg/m ² INT4 = -0.6kg/m ²

Beleigoli et al. [102]	RCT; 24 weeks; South America.	University students or employees aged 18–60; n = 302 males; n = 996 females; BMI ^a >25kg/m ² .	(1) waitlist with minimal intervention, (2) web-based platform (CON), (3) web-based platform plus online RD assistance (INT).	RD	Weekly individual chat in the web-based platform with an RD (group 3 only).	change in BMI at 24 weeks: CON = -0.6kg/m ² INT = -0.4kg/m ²
Brumby et al. [86]	RCT; 6 months; Australia.	Adults aged 18-75 years; males n = 43; females n = 29; BMI ^a ≥25 kg/m ² .	Individualised exercise program designed by an exercise physiologist and undertaken over the 6-month period.	Exercise physiologist	Regular monitoring of exercise activity and physical goal attainment by phone, email, or text message at least fortnightly.	Change in BMI at 6 months.: INT = -0.6kg/m ² CON = +0.3kg/m ²
Buevich et al. [99]	RCT; 2 months; Russia.	Adults aged 37.7 ± 10.3 (CON) and 38.4 ± 10.6 (INT); n = 105 ^c females; BMI ^a 33.9 ± 4.9kg/m ² .	All patients received an individualised RD session. INT: also received acupuncture or weight loss and Psychotherapeutic manual/recordkeeping.	RD	One visit to an RD including body composition analysis, and individual diet development program.	WT change: INT = -6.6kg CON = -2.4kg
Carpenter et al. [80]	RCT; 6 months; USA.	Adults aged 26-68; n = 6 males; n = 69 females; BMI ^a 25-35kg/m ² .	INT: coaching calls, two with RD starting with second call, with mindfulness coaching. CON: coaching calls, two with RD starting with second call, with supplemental online materials.	Health coaches and RD	Both programs consisted of 11 coaching calls with health coaches and an RD.	WT change: INT = -2.7% CON = -3.1%
Collinson et al. [88]	Single arm trial; 6 months; New Zealand.	Adults aged 45.5 ± 10.3; n = 32 males; n = 71 females; BMI ^a 35.1 ± 4.7kg/m ² .	RD counselling over the Internet via weekly interactive chat rooms and monthly e-mails. RD also gave monthly personalised feedback.	RD	Monthly personalised feedback from RD. A biweekly online chat room was held where participants could ask questions to the RD.	WT change = -3.5kg Change in BMI = -1.2kg/m ² WC change = 4.8cm.
Dale et al. [89]	RCT; 2 years; New Zealand.	Adults aged 25-70; n = 200 ^c females; BMI 31.8 ± 5.0kg/m ² .	intensive support program (RD and exercise trainer) (INT) or to an inexpensive nurse-led program involving “weigh-ins” and encouragement (CON).	Senior registered nurse, RD, nutritionist, and exercise trainer (counted as PT)	All participants met with a nutritionist to receive instruction on their diet. INT: 11 individualised 35-minute sessions with nutritionist + exercise trainer.	WT change: INT = -0.7kg CON = -0.3kg

Gabriele et al. [81]	RCT; 12 weeks; USA.	Adults aged 30-59; n = 87 females; n = 17 males; BMI ^a 25-40kg/m ² .	Randomly assigned to nondirective (INT1), directive (INT2), or minimal support (CON). All received weekly e-mails. Participants in the nondirective and directive support conditions received individualised nondirective or directive weight loss support.	E-coach (psychologist)	Minimal support group: Weekly standardised email. Directive and nondirective groups: weekly standardised email + individualised feedback email	WT change in males: INT1 = -6.57kg INT2 = -3.35kg CON = -6.67kg WT change in females: INT1 = -2.5kg INT2 = -4.5kg CON = -2.44kg
Hurkmans et al. [91]	RCT; 12 weeks; Europe.	Adults aged 18-65; n = 102, n = 78 females; n = 24 BMI ^a >29kg/m ² .	INT1: Received individualised diet and physical activity advice. CON: Received access to a m-Health app. INT2: received access to a mHealth app + one hour with health practitioners.	Physical activity coach (counted as PT) and RD	INT1: 90 minutes with each practitioner. CON: 0 minutes. INT2: 60 minutes with each practitioner.	Change in BMI: INT1 = -1.0 CON = -0.7 INT2 = -1.3
łłowiecka et al. [92]	RCT; 30 months; Europe.	Adults aged 35.6 ± 9.9 years; n = 22 females, n = 14 males; BMI ^a 35.0 ± 3.8kg/m ² .	12-month weight loss phase (PH1) followed by randomization into two groups for 18 months (PH2). INT: Received support. CON: no additional care.	RD (PH1, PH2), psychologist (PH2)	INT: 10 (PH1) + Additional support. CON: 10 (PH1) + no additional support (PH2).	Phase 1 change in BMI: -1.6kg/m ² . Phase 2 change in BMI: INT = +0.8kg/m ² CON = +1.78kg/m ²
Johnson et al. [82]	RCT; 12 weeks; USA.	Adults aged 18-65, n = 30 ^b ; BMI ^a ≥30kg/m ²	INT1: Feedback from RD and exercise physiologist through video. INT2: Feedback from RD and exercise physiologist in person. CON: Access to m-health devices.	RD, Exercise physiologist, medical doctor	Unclear, however, likely to be individualised.	WT change: CON = -2.9kg INT1 = -8.23kg INT2 = -3.2kg
Juchacz et al. [93]	RCT; 6 months; Europe.	Females aged 20-30; n=65 ^c ; BMI ^a 32.0 ± 2.0kg/m ² .	Group session with RD, randomised into four groups. CON1: No additional support. INT1: Individual RD meetings. CON2: group psychotherapy . INT2: group psychotherapy and individual RD meetings.	RD	INT1: 50 minutes per week (RD) CON2: 100 minutes (psychotherapist) per week. INT2: RD (50 minutes per week) and Psychotherapist (100 minutes per week).	WT change: CON = -1.0kg INT1 = -2.2kg CON2 = -4.9kg INT2 = -8.4kg
Lapointe et al. [101]	RCT; 6 months; Canada.	Adults aged 45-68; n = 68 ^c females; BMI ≥28kg/m ² .	INT1: Using restrictive messages to limit high fat foods.	RD	10 individual sessions.	WT change at 6 months: INT1 = -4.2kg, -3kg

			INT2: Using non-restrictive messages directed towards increasing fruit and vegetable intake.			INT2 = -2.4kg, -2kg WT change at 18 months: INT1 = -4.2kg, -3kg INT2 = -2.4kg, -2kg
O'Hara et al. [87]	RCT; 6 months; 12 month follow up; Australia.	Adults over 18 years; n = 219 males, n = 869 females; BMI ^a 31.0 ± 6.1kg/m ² .	Free telephone-based health coaching service, 6-month coaching period followed up at 12 months post coaching.	Health Coach	Unclear.	BMI: At Baseline = 16.8% <25, 83.8% >25. At 6 months = 18.1% <25, 81.9% >25 12 months = 20.3% <25, 79.7% >25
Rolls et al. [83]	RCT; 6 months; 12 month follow up; USA;	Adults aged 20-65; n = 154 females; n = 46 males; BMI ^a 26-40kg/m ² .	All groups were instructed by RD to follow energy restricted diet, months 1-3 participants attended weekly counselling sessions. Groups differed by format of snacking protocol (two snacks (INT1), one soup (INT2), two soups (INT3), CON).	RD	Months 1-3, participants received a weekly individual counselling session with RD. During months 4-6 session frequency decreased to biweekly.	WT change (kg): INT1 = -4.8 INT2 = -6.1 INT3 = -7.2 CON = -8.1
Rustaden et al. [94]	RCT; 12 weeks; Europe.	Untrained healthy adults aged 18-65; n = 143 ^c females; BMI ≥25kg/m ² .	Groups: Individual RT sessions with PT (INT), Group body pump exercise (CON1), non-supervised individual RT (CON2), and control (CON3).	PT	Three supervised RT session of 45 to 60 minutes (INT). Two Instruction sessions on RT (CON1) with a PT.	Change in BMI: INT = -0.2kg/m ² CON1 = -0.3kg/m ² CON2 = -0.3kg/m ² CON3 = -0.4kg/m ²
Stefanov et al. [95]	RCT; 6 months; Europe.	Sedentary healthy adults aged 47.5 ± 0.6; n = 27 males, n = 58 females; BMI ^a ≥25 kg/m ² .	6 month combined exercise program assigned to supervised (INT) or non-supervised RT (CON).	RD, PHT	All participants received 1 hour meeting with an RD. INT conducted 66 training session with PHT.	Change in BMI: INT = -1.6kg/m ² CON = -1.0kg/m ²
Urbain et al. [96]	Single arm trial; 6 weeks; Europe.	Healthy adults aged 37 ± 12 years; n = 11 males; n = 31 females; BMI ^a 19-30kg/m ² .	6-week Ketogenic diet with a previous preparation period including detailed instructions during classes and individual counselling by RD.	RD	All participants received instructions and individual counselling from the RD (unclear how much).	WT change ^d : -1.9kg
Walitko et al. [97]	RCT (Crossover);	Adults aged 41.4 ± 11.0 years; n = 7 males; n = 43	Participants consumed a hypocaloric (HP) followed by a low glycaemic index (LGI) diet (or vice versa). All	RD	Unclear.	FM change: INT1 = 37.1kg to 32.4kg

	8 weeks; Europe.	females; BMI ^a 33.6 ± 4.2 kg/m ² .	participants also received individualised coaching with RD. HP-LGI (INT1); LGI-HP (INT2).			INT2 = 35.4kg to 32.3kg
Williams et al. [98]	RCT; 24 months; Europe.	Adults aged 44-50 years; n = 54 ^c females; BMI 18.5-29.9 kg/m ² .	obesity prevention intervention, using motivational interviewing principles (INT). Self-directed intervention (CON) using tailored written materials.	RD, Exercise physiologist	Four 60-minute face-to-face consultations with RD and one 60 min consultation with an Exercise Physiologist (INT).	Baseline (INT & CON) WT: 68.7kg WT at 24 months: INT: 64.6kg at 24 months CON: 67.3 kg at 24 months
Zandvoort et al. [84]	Multiple baselines; single subject research design; 10 weeks.	Healthy undergraduate students aged 17-24; n = 5 ^c females; BMI >30kg/m ² .	Participants received (an average of) nine individual sessions with Health coaches (Certified Professional Co-Active Coaches).	Health coaches	average of nine, 35-minute, one-on-one sessions with the health coach.	Change in BMI: participant 1 = -0.85 kg/m ² Participant 2 = +0.33 kg/m ² Participant 3 = +0.99 kg/m ² Participants 4 = -0.05 kg/m ² Participant 5 = +0.13 kg/m ²

BMI is reported where stated, in the absence of BMI weight is reported instead. **Abbreviations used in table:** RCT = Randomised controlled trial, BMI = body mass index (kg/m²), WT = body weight (kg), PT = personal trainer, RT = resistance training, FM = fat mass, WTR = weight regain, RD = registered dietitian, INT = Intervention, CON = control, m-health = mobile health, PHT = physical therapist. ^a BMI was only reported for both sexes combined; ^b sex was not reported; ^c only one sex was included; ^d control group not reported.

Table 2. Characteristics of included studies (n=25) by practitioner type

Practitioner Type	Number of studies	Median (range) Intervention duration in weeks	Median (range) number of sessions
Dietitians	19	24 (6-104)	6.5 (1-67)
Nutritionists	1	104 (0)	11 (0)
Exercise physiologists and physical therapists	4	26 (12-52)	11 (5-67)
Personal trainers ¹	3	58 (12-104)	23.5 (11-36)
Health coaches	4	21 (10-26)	9 (9-23)
Other health professionals ²	5	24 (12-104)	12 (10-52)

¹Personal trainers included one instance of an ‘exercise trainer’ with an identical scope/function [94], as well as one instance of a ‘qualified physical activity coach’ also with identical scope/function [91]; ²Other health professionals; physicians, registered nurses, and psychologists. The total number of studies adds up to more than 25 due to some practitioners being in multiple studies. Data is missing from four studies due to unclear methods [82, 85, 87, 97].

2.4 Discussion

The purpose of this scoping review was to evaluate the depth and breadth of the literature on practitioners who provide weight loss and weight loss maintenance advice, and to determine whether there is sufficient literature to compare the effectiveness of different practitioners in helping individuals achieve weight loss, weight maintenance, and body composition change. Numerous (n = 37) types of health and fitness professionals were represented in the studies (n = 25) included in this review. RDs (n = 19) were the most common practitioner giving nutrition guidance for weight loss and weight loss maintenance among the studies included in the present review. In the one study including nutritionists, they worked in conjunction with a nurse, a PT, as well as an RD [89] and thus, this study may be more representative of a multidisciplinary approach including dietetic care, than nutritionist guidance in isolation. RDs represented over half the sample of practitioners identified, while PTs were only found three times [89, 91, 94]. Other professions, such as the new and growing profession of health coaches [79, 80, 84, 87] were also identified. PTs, health coaches, and nutritionists were all identified far less than RDs. Unfortunately, yet importantly, none of the studies compared the effectiveness of different nutrition or fitness professionals to one another in weight loss management settings. As noted, this review also included exercise physiologists and physical therapists [82, 86, 95, 98]. While these practitioners provide important guidance for participants and patients to follow a progressive, graded exposure to training in clinical and research settings, their primary function is not to aid weight loss or weight loss management for the public (unless part of a multidisciplinary team). Thus, they are not qualitatively discussed in depth in this review. Further, the classification 'other health professionals' included a variety of 'usual care' medical professionals (nurses and physicians) as well as a range of mental health professionals [81, 82, 85, 89, 92, 93]. While these professionals provide important care to their patients, they primarily practise in clinical settings. Given the breadth of the professionals included in the 'other health professionals' classification and considering this scoping review targets non-clinical weight management populations, an accurate and meaningful discussion of their role in non-clinical weight loss settings is beyond its scope. Thus, this discussion is structured around three broadly identified groups in isolation: RDs, PTs, and health coaches.

The role of dietitians in weight loss management

In the studies identified in this review RDs provided weight management care through face-to-face and telehealth counselling sessions, often working without a multidisciplinary team, which parallels dietetic practice in non-research settings. In contrast, some studies included in this review utilised interventions

which were dissimilar from standard dietetic practice, such as prescription of standardised diets (rather than personalised dietary plans) [96] and multidisciplinary studies with individualised exercise prescription in concert with dietetic counselling [82, 95, 98]. This review uncovered many studies utilising RDs in weight loss, weight loss maintenance, and body recomposition.

It is not surprising that an abundance of literature was identified which utilised RDs, as 'dietitian' is a protected term specifically for clinically trained nutrition providers who meet specific regulatory criteria and weight management is within their scope of practice [23]. Further, the efficacy of RDs in weight loss settings has the most empirical support, as demonstrated in a meta-analysis by Williams and colleagues [23], where weight loss guidance from RDs resulted in small but significantly greater reductions in body mass (~1kg) compared to minimal or usual care (typically short educational sessions from nurses or physicians). RDs also are cost effective when providing weight loss management care when compared to other practitioners [103]; although it is important to note that is in the context of healthcare spending on public RDs, rather than individuals personally financing private RDs. However, there are a smaller number of RDs practising [104, 105] relative to other health professions such as nurses or PTs [44, 106-108]. Considering the limited availability and specialised nature of dietetic care and the scope of the obesity epidemic, one could argue that it may be best to prioritise RD hours towards higher risk clinical cases such as populations with, or at risk of developing comorbidities secondary to obesity. For lower risk populations seeking weight loss an RD may not be necessary; however, for these populations, it is unclear who they should seek out while ensuring quality care. For example, 'nutritionist' is not a protected term [109-111]. In most cases, anyone can call themselves a nutritionist, and only in some American states are nutritionists required to register [105]; which is also the case in other regions where nutritionists can apply for registration after completing the required prerequisites [109, 111, 112]. Thus, the public may struggle to differentiate between RDs and between less regulated nutrition professionals of varying legitimacy [109]. While this could be framed as a problem, with the solution being to direct the public to RDs more aggressively, given the above issues, a more pragmatic solution may be to assess, and if needed, attempt to improve the quality of non-clinical nutrition professionals. Thus, further research should be conducted on the efficacy of non-dietetic nutrition professionals (such as nutritionists, health coaches, and PTs). Considering the magnitude of the obesity epidemic, potentially utilising these other nutrition and fitness professionals (if their competence can be confirmed) may greatly aid in the management of obesity.

The role of fitness professionals in weight loss management

The present scoping review did not uncover any research which evaluated the effectiveness of PTs specifically providing weight loss management advice. Rather, in the three studies identified [89, 91, 94], the PTs provided supervised resistance training [94], individualised one-on-one educational sessions [89], and a personalised physical activity plan [91]. The study by Hurkmans et al., 2018 [91] was carried out in conjunction with an RD. Rustaden et al., 2017 [94] included PTs in two different groups, and as noted earlier, the non-supervised group was not analysed in the present review as this intervention was not individualised. In the supervised group [94], the PT was present for all exercise sessions; however, guidance was primarily limited to load progression and technique, as a standardised exercise program was followed. Finally, Dale et al., 2009 [89] involved multiple practitioners in the intervention, which included a PT, and was conducted in concert with a nutritionist, nurse, and RD. In sum, few studies were identified which utilised PTs, and none were identified which compared PTs to other practitioners. Despite our findings, other research [40, 42, 113] indicates that PTs may be hired regularly for weight loss purposes, and often in a capacity that includes nutritional guidance.

Specifically, De Heer and colleagues [26] found that 68% of people instructed to lose weight by their doctor reported that they engaged in weight loss efforts, but only 10.9% sought advice from a health practitioner to do so (4.7% RD or nutritionist, 3.0% PT and 2.8% doctor). Notably, this data [26] was collected from patients who were informed they should seek weight loss from their doctor. As this study was a survey, rather than a controlled intervention, patients' doctors may have provided specific guidance as to which type of practitioner they believed was appropriate, potentially influencing patient selection [26] and may underrepresent how often fitness professionals are engaged for weight loss management when their clients are not initially prompted to seek help by their physician [40, 42]. Indeed, in the US alone, there are over 300,000 fitness professionals [102] compared to ~70,000 RDs [103]. Considering personal training clients in the US often cite frustration with their bodies as a reason for hiring a PT [114], they may be a much more common choice when individuals seek weight loss guidance of their own volition. Jackson and Colleagues [38] examined how health professionals' advice affected weight loss and motivation to lose weight; however, the authors did not mention PTs as health professionals, yet RDs, nurses, and general practitioners were mentioned. Although, PTs are likely often utilised for weight loss management and have been evaluated in the literature for other outcomes [94, 115, 116], their effect in weight loss management is yet to be examined.

The non-clinical nature of a PTs scope of practice may factor into why there is limited research involving PTs managing weight loss, as obesity is often considered a clinical condition or shares clinical comorbidities [3, 39, 69]. However, PTs' clients expect nutrition care [42], and most PTs, on average, are confident in their provision of nutrition care [41, 43]. However, PTs confidence in their own ability to provide nutritional care does not necessarily indicate their competence [43]. Nevertheless, the effectiveness of PTs in providing weight management care has only been cursorily evaluated [25]. Concerns have been raised in the literature surrounding PTs' treatment of clinical diagnoses outside of their scope of practice [41, 43, 47]. Research indicates that the majority of fitness businesses advertise personalised nutrition care outside of the scope of practice of personal training without specified dietetic input [40, 117]. McKean and colleagues [44] found that 88% of the registered exercise professionals who responded to their survey were working outside of their scope of practice despite no specific education in nutrition beyond their exercise related qualifications. Further, they reported 31.8% of the respondents were providing nutritional advice for eating disorders and 48.3% for diabetes [44]. These findings suggest that a large number of PTs work with populations misaligned with their scope of practice [65]. With that said, PTs in most countries are well within their scope of practice to provide personal training to individuals with obesity without clinical comorbidities, basic nutrition information and education in line with national guidelines, exercise assessment and prescription, and facilitation of habit change through techniques such as motivational interviewing [47]. However, providing specific nutritional plans or medical advice for managing clinical diagnoses is not permitted within the PT's scope of practice. In this regard, PTs should focus on minimising the potential for harm from malpractice, which may be easier said than done considering the expectation and demand from clients [6] and the sizeable fitness workforce [107, 108]; thus, one could argue that PTs are not entirely at fault for exceeding their scope of practice with regards to nutrition [42, 47]. Therefore, concerted efforts should be made to improve the access PTs have to education and to other health professionals whom they can refer their clients to if they have health diagnoses outside of their scope. Considering the above, and the fact that PTs' client base often expects nutrition advice and guidance [42], future research should evaluate the knowledge and effectiveness of PTs in a weight management role. The contrast between the results of this review and the reality of fitness professionals' role in weight loss management is concerning given the size of the fitness workforce and scope of the obesity epidemic.

The role of health coaches in weight loss management

Health coaching was identified in four studies included in this review [79, 80, 84, 87]. In the majority of these studies, the health coaches practised without a multidisciplinary team [79, 84, 87], and in only one

study [80] the health coaches worked in collaboration with an RD, which is common in practice as health coaches work primarily in multidisciplinary teams, supporting other healthcare practitioners [82, 118, 119]. In the studies reviewed, the health coaches provided face-to-face [84] and telephone [79, 80, 87] coaching sessions with supplemental online materials. The coaching calls utilised behavioural interventions, lasting 30-45 minutes. Some health coaches had PhDs in health science [84], while others had health coaching specific qualifications [79, 80, 87].

Although they were not represented in a large portion of the included studies, health coaches may provide a unique opportunity to reach a diverse population such as lower socioeconomic status individuals because health coaching sessions in some countries are generally fully funded [50, 53, 54]. Australia's Get Healthy Information and Coaching Service [87], which was included in our review, is one example of such a program. Considering this, it is perhaps unsurprising that the literature on health coaching is growing quickly [51], which is consistent with the rate the practice is growing [60, 61]. Searching "health coaching" on PubMed illustrates the increased research focus in recent years. This search only yields a single study in 2001, 2002, and 2003 each, yet in 2021 alone, there were 156 studies in this database, which was more than any preceding year. Similar to the growth in research, the growth in the profession is evident as there are approximately 125,200 health coaches and educators in the US [60], nearly twice the number of RDs [105]. While health coaches are outnumbered by PTs [107], this trend may shift as health coaching is a far newer profession and still growing. Despite greater numbers of health coaches than RDs in the work force, and many likely acting in weight loss management capacities, RDs dominated the present review's literature search. This phenomenon may be due to how recently health coaching developed as a profession, the established scope of practice of RDs, as well as the inconsistent range of regulatory standards for what constitutes a 'health coach' and their required qualifications [51, 61].

As stated, like nutritionists, the standards for calling oneself a 'health coach' differ regionally and are often minimal [51, 61]. Health coaches can range from well-educated, accredited professionals to untrained individuals, which presents a similar challenge as the fitness industry where the standards of registration/certification/accreditation vary greatly [47]. Health coaching focuses primarily on self-management, behaviour change, and education [51, 120]. The target population for health coaching includes patients across all stages of change [61]; however, health coaching targets patients at risk of developing preventable lifestyle diseases who can benefit from behaviour change [61]. Whereas, PTs for example, are not intended to target clients with chronic diseases [65]. It is not yet clear whether health

coaching reduces the financial burden of care; however, the consensus of evidence indicates long term cost savings [55, 121]. Given the importance of continued support during the weight loss maintenance phase [14], this cost saving potential has important implications for enabling greater support for the long term management of weight loss and thus, potentially reducing the risk of disease and societal costs associated with obesity.

While the present scoping review could not compare the effectiveness of health coaches in weight loss management care to other professions, two systematic reviews were previously published on health coaching's effect on weight loss [51, 56]. Kivelä and colleagues [56] published the first systematic review on health coaches impact on patients with chronic disease, concluding they were effective in improving the physiological, behavioural, psychological, and social wellbeing of their patients, increased their patients' physical activity levels, and most relevant to this discussion, aided weight management. More recently, Seiczowska and colleagues [51] conducted a systematic review with meta-analysis specifically on the effect of health coaching on weight loss and concluded that the quality of evidence was insufficient to determine whether health coaching provided effective weight loss and weight loss maintenance management. As exemplified in a letter to the editor in response to this meta-analysis [122] and in the authors' rebuttal by Seiczowska and colleagues [123], these unclear findings may be due to ongoing debate as to what constitutes a health coach and a health coaching intervention. Indeed, in a systematic review by Hill and colleagues [124] directly addressing the theoretical basis of health coaching techniques and the reporting quality of these techniques in the research, the authors noted that health coaching approaches vary greatly, interventions often lack sufficient reporting detail, and the techniques themselves differ from study-to-study [124]. Further illustrating this issue, in our review, a study by Johnson and colleagues [82] identified its intervention as health coaching; however, due to the description of the intervention and the involved practitioners (exercise physiologists and RDs), this study was not classified as health coaching.

To conclude, the overall findings for health coaching's effect on weight loss management are encouraging [56], although they may be currently too heterogeneous (due to the aforementioned ambiguities) to draw strong, causal, quantitative conclusions [51]. However, considering health coaching is cost effective [55, 121], effective in other capacities such as the management of chronic diseases [57-59, 125], and operates in a multidisciplinary manner [49, 50], it may prove effective for weight loss management in the future. For this to be ascertained, the definition of health coaching needs to become

clearer, health coaching as a profession must establish a standard of care, and then more literature can be conducted which evaluates health coaches' effectiveness in weight management.

Limitations, considerations, and directions for future research

A limitation of this scoping review, like all scoping reviews, is that it does not assess the effectiveness of different practitioners, but rather the extent of the literature evaluating their effectiveness. Additionally, the proportion of practitioners represented across the studies identified in this review does not represent the proportions of these practitioners working in the field. For example, although this review found only three studies including PTs, and 19 studies including RDs, this does not indicate there are over sixfold more RDs working in the field of weight loss than PTs. Another consideration lies within the eligibility criteria, only studies which excluded participants with clinical diagnoses were included; thus, many studies were excluded that otherwise fit the inclusion criteria and the findings may have differed with a more clinically focused review. Also, this review may not have captured many studies utilising health coaching as an intervention as health coaching is more common in studies with clinical populations, is sometimes referred to as wellness coaching [126, 127], and is sometimes not considered a profession, but a methodology, which other practitioners such as nurses [61], may practise. Finally, due to some studies describing practitioners in terms other than the practitioner types we set out to examine, such as PTs being described as exercise trainers [89] or physical activity coaches [91]; assumptions were needed to place different practitioners into the correct group.

Regarding future directions of research, it is the authors' conclusion that there are likely many more fitness professionals working in a weight management capacity than indicated by the distribution of professions in the literature. Thus, while multiple researchers have carried out significant work to evaluate malpractice within the personal training industry [40, 42-44, 47, 113], more research is needed to understand the current level of malpractice occurring within the fitness industry specifically regarding the nutrition guidance trainers provide. Further, the effectiveness of PTs in providing nutrition guidance has not yet been evaluated, and it is thus essential to consider how to support PTs in their current practice, as efforts to restrict or control the nutrition guidance PTs provide may be challenging. Indeed, Barnes and Colleagues [42] have called for future research into the awareness and acceptability of the current scope of practice for registered fitness professionals; a notion supported by our findings. Similarly, to personal training, but for different reasons as health coaching is a newer profession, more research should be conducted to evaluate different health coaching interventions and their effectiveness. Guidance already exists in this regard, as Hill and colleagues [124] have called for clarity in

intervention reporting, as well as clearer definitions of health coaching. Further, Sforzo [128] has also called for improvements in the methods of recruiting participants, utilising proper control groups without negatively influencing attrition rates, and recommended standardisation of health coaching interventions. Due to varying terminology used for health coaching interventions [126, 127], the authors of this review also encourage standardisation of health coaching interventions to improve the quality of future literature.

2.5 Conclusion

This review established that 'usual care' healthcare practitioners and RDs are relatively known quantities in comparison to other less-studied professions which may be engaging with the public in greater numbers. Indeed, the present review identified multiple gaps in the weight loss management literature for different professions, such as for PTs, nutritionists, and health coaches. Given the literature's inadequate evaluation of nutritionists' and PTs' effectiveness in weight loss management, conclusions cannot yet be made regarding whether they are overall aiding or hindering the obesity epidemic. The same can be said for literature on health coaches' effectiveness; however, less risk may be present when the public engages with these professionals considering the common role health coaches play in multidisciplinary teams. In sum, although more research should be conducted on these practitioners, authors should note that the strategies needed for conducting this research differs by profession based on the current gaps in the literature.

Chapter 3: Conclusion

Initially this dissertation set out to determine if different weight loss management practitioners were more, or less effective than one another in providing care through a systematic review. However, after preliminary searching it became apparent that there were very few, if any studies where different classes of weight loss management practitioners were quantitatively compared to one another. Since this precluded carrying out a systematic review, a scoping review was conducted to fully examine this potential gap in the literature, better understand it, and to characterise what research broadly existed on this topic. The hope was that doing so would help other researchers in the field identify what is currently known on this topic and what is not, to inform directions for future research, and to also better inform weight loss management practice by highlighting the limitations of the evidence. This scoping review found minimal research on all professions except for 'usual care' healthcare practitioners (nurses and physicians) and RDs, which being identified in 19 studies, were by far the most abundant. PTs were identified three times, health coaches were identified four times, and nutritionists were identified only once. Other professions were also identified such as primary health professionals, psychologists, exercise physiologists, and physical therapists. It is still unclear which practitioners are providing weight loss management in real-world settings, which was one of the questions of this review. This is important to evaluate, considering, it is likely that professions other than RDs are providing weight management care in large numbers, such as PTs and health coaches. In conclusion, although research on weight loss management is being conducted, more research is warranted for certain practitioners, such as PTs, nutritionists, and health coaches, who are not frequently-studied in weight management settings, but who may be frequently practicing in such settings. Finally, research comparing different practitioners is nearly non-existent. Thus, once more studies are published which evaluate these less-studied professions, subsequent research comparing practitioners should be carried out with the goal of improving the understanding of which practitioner should be utilised for weight loss management in different situations.

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Appendices

Appendix I: PICOS

Population: Apparently healthy adults without any clinical diagnoses seeking advice for weight loss, body composition change or weight maintenance across the BMI spectrum.

Intervention: Groups that received consultations from registered dietitians, personal trainers, strength and conditioning specialists, sport coaches, health coaches, or nutritionists.

Comparison or Control: No intervention (self-guided); Usual care (where individuals received usual care from general practitioner, nurse, or health program); minimal care (nutrition related print material or a once off general nutrition seminar).

Outcome: Weight loss, weight maintenance, body composition change; change in any anthropometric measure: Body mass, Body Mass Index, skinfolds, waist circumference, waist-to-hip ratio.

Study Design: Randomised controlled trials, case studies, observational studies, Cohort studies.

Appendix II: Search String:

("nutritionist" OR "dietitian" OR "dietician" OR "registered dietitian" OR "registered dietician" OR "personal trainer" OR "health coach" OR "fitness professional" OR coach*) AND ("weight loss" OR weight main* OR "fat loss" OR "body composition")