

**Dietary intake and physical activity
behaviour change for weight gain
prevention in mid-age Australian women**

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A thesis submitted for the degree of PhD (Nutrition and Dietetics)

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Jenna Hollis

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Jenna Hollis reports no conflict of interest.

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7. Hollis J, Williams L, Collins C and Morgan P. The application of motivational interviewing to a weight control intervention for mid age women: The 40-Something study. Dietitians Association of Australia 29th Annual conference, Adelaide, May 26-28, 2011.

8. Williams L, **Hollis J**, Collins C and Morgan P. Can a weight gain prevention intervention in mid-age women prevent development of metabolic syndrome usually associated with menopause? The 40-Something study. Dietitians Association of Australia 29th Annual conference, Adelaide, May 26-28, 2011.

Glossary of common abbreviations

ALSWH	Australian Longitudinal Study on Women's Health
APD	Accredited Practicing Dietitian
BIA	Bioelectrical impedance analysis
BMI	Body Mass Index
CI	Confidence interval
cm	Centimetre
CVD	Cardiovascular Disease
IPAQ	International Physical Activity Questionnaire
ITT	Intention to treat
JBI	Joanna Briggs Institute
Kg	Kilogram
LOCF	Last observation carried forward
m	metre
MI	Motivational Interviewing
MISC	Motivational Interviewing Screening Code
MITI	Motivational Interviewing Treatment Integrity
RCT	Randomised Controlled Trial
SD	Standard deviation
SDI	Self-Directed Intervention
SF-36	Short Form - 36

SWAN	Study of Women's Health Across a Nation
TFEQ	Three Factor Eating Questionnaire
WHLP	Women's Healthy Lifestyle Project
WHO	World Health Organisation

Table of Contents

Abstract.....	1
Chapter One: Introduction	4
1.1 Background and context	5
1.1.1 The need for weight gain prevention in adults.....	5
1.1.2 Prevalence of overweight and obesity	5
1.1.3 Causes of overweight and obesity	6
1.1.4 Health consequences of overweight and obesity	7
1.1.5 Economic consequences of overweight and obesity	8
1.1.6 Risk of weight gain in mid-age women.....	8
1.1.7 Weight gain during the menopause transition	9
1.2 Research aims and hypotheses	11
1.3 Thesis structure and study design.....	14
1.3.1 Overview	16
1.3.2 The development of the 40-Something Study	18
Chapter two: Literature review: weight control in mid-age women.	20
2.1 Overview.....	21
2.2 Evidence for weight gain prevention interventions in mid-age women	23
2.3 Effectiveness of weight gain prevention interventions in adults	24
2.3.1 The effectiveness of weight gain prevention studies on weight control	25
2.3.2 The effectiveness of weight gain prevention studies on dietary intake	26
2.3.3 The effectiveness of weight gain prevention studies on physical activity and sedentary behaviour	27
2.4 Evidenced-based recommendations for weight management	27
2.4.1 Dietary restriction.....	29
2.4.2 Physical activity and sedentary behaviour	30
2.4.3 Behaviour change models	31

2.4.4 Goal setting	33
2.4.5 Self-monitoring	34
2.5 Nutrition and physical activity counselling by health professionals	35
2.5.1 The traditional advice-giving, informing communication style	36
2.5.2 Client-centred counselling approaches	37
2.5.3 Motivational Interviewing	38
2.5.4 The effectiveness of motivational interviewing in improving health outcomes	40
2.6 Conclusion	42
Chapter three: Effectiveness of interventions using Motivational Interviewing for dietary and physical activity modification in adults: A Systematic Review (Paper 1).43	
3.1 Overview	44
3.2 Executive summary	44
3.3 Introduction	46
3.3.1 Background	46
3.4 Objectives	48
3.5 Inclusion criteria	49
3.5.1 Types of participants	49
3.5.2 Types of intervention(s)/phenomena of interest	49
3.5.3 Types of studies	49
3.5.6 Types of outcomes	49
3.6 Search strategy	49
3.7 Method of the review	50
3.7.1 Data collection	50
3.7.2 Data synthesis	50
3.8 Results	50
3.8.1 Description of studies	51
3.8.2 Methodological quality	53

3.8.3 Findings of the review.....	54
3.9 Discussion	61
3.10 Conclusion	66
3.10.1 Implications for practice	66
3.10.2 Implications for research.....	66
Chapter four: Methods - The 40-Something randomized controlled trial to prevent weight gain in mid-age women (Paper 2).....	68
4.2 Abstract.....	69
4.3 Background.....	70
4.3.1 Study aim	72
4.4 Methods	72
4.4.1 Study design.....	72
4.4.2 Participants and recruitment	74
4.4.3 Randomization, Blinding and Quality Assurance	75
4.4.4 Goals of the intervention.....	76
4.4.5 Sample size	77
4.4.6 Theoretical framework and intervention materials.....	77
4.4.7 Protocol	80
4.5 Outcome measures.....	82
4.5.1 Measurement Procedure	82
4.5.2 Anthropometry	83
4.5.3 Biomarkers of metabolic syndrome.....	83
4.5.4 Blood pressure and resting heart rate.....	83
4.5.5 Dietary intake	83
4.5.6 Physical activity	84
4.5.7 Dietary restraint	85
4.5.8 Quality of life.....	85
4.5.9 Menopause status and symptoms	85

4.6 Process evaluation	85
4.7 Data cleaning and checking	86
4.8 Data analysis	86
4.9 Discussion	87
Chapter five: Results - The 12 month weight outcome of the 40-Something study (Paper 3).	89
5.1 Overview.....	90
5.2 Abstract	90
5.3 Introduction.....	91
5.4 Materials and Methods:.....	92
5.4.1 Study design and participants:.....	92
5.4.2 Intervention goals and description:	93
5.4.3 Outcome measures	94
5.5 Statistical Management and Analysis	95
5.6 Results:.....	95
5.6.1 Participants	95
5.6.2 Intervention delivery	96
5.6.3 Effects on 12 month body weight of intervention and baseline BMI	99
5.6.4 Achievement of intervention goals for weight change	100
5.6.5 Intervention effects on secondary outcome measures: other anthropometry and biomarkers of metabolic syndrome.....	101
6.0 Discussion	103
Chapter six: Results - The 12 month diet and physical activity outcomes of the 40- Something Study (Paper 4).	107
6.1 Overview.....	108
6.2 Abstract	108
6.3 Introduction.....	109
6.4 Methods.....	110
6.4.1 Self-Directed Intervention	111

6.4.2 MI Intervention.....	111
6.4.3 Intervention goals for both MI and SDI.....	113
6.4.4 Outcome measures	113
6.4.5 Statistical analysis	114
6.5 Results.....	115
6.5.1 Dietary intake	115
6.5.2 Physical activity and sedentary behaviour	116
6.5.3 Diet and physical activity behaviour change by goal attainment.....	120
6.6 Discussion	123
6.7 Conclusion.....	126
Chapter seven: Results - The diet and physical activity mediators of 12 and 24 months weight loss from the 40-Something study (Paper 5).....	127
7.1 Overview.....	128
7.2 Abstract.....	128
7.3 Background.....	129
7.4 Methods.....	130
7.4.1 Weight control guidance	132
7.4.2 Self-Directed Intervention (control)	132
7.4.3 Motivational Interviewing Intervention	133
7.4.4 Measures	133
7.4.5 Data checking and analysis	134
7.4.6 Compliance score (CS).....	134
7.4.6 Statistical analysis	135
7.5 Results.....	137
7.5.1 Mediation analysis	137
7.6 Discussion	143
7.7 Conclusion	146

Chapter eight: Results - A critical review of how motivational interviewing aligns within international dietetic scope of practice, competency standards, and evidenced-based guidelines (Paper 6).....	147
8.1 Overview.....	148
8.2 Abstract	148
8.3 Introduction.....	149
8.4 Description of the competency review.....	151
8.4.1 How MI aligns with dietetic scope of practice and competency standards	151
8.4.2 How MI aligns with evidenced-based weight management guidelines ...	155
8.5 Implications for Dietetic Research.....	159
8.6 Implications for Dietetic Practice	163
8.7 Conclusion.....	164
Chapter nine: Discussion and recommendations for research and clinical practice	165
9.2 Summary of findings and discussion.....	166
9.2.1 Findings of the systematic literature review	166
9.2.2 The effectiveness of the 40-Something Study on weight control.....	167
9.2.3 The effectiveness of the 40-Something Study on dietary intake.....	171
9.2.4 The effectiveness of the 40-Something Study on physical activity and sedentary behaviour.....	172
9.2.5 Behavioural mediators of success in the 40-Something Study.....	173
9.2.6 Review of how MI aligns with dietetic professional practice	175
9.3 Overall findings from this thesis in relation to the research hypotheses.....	176
9.4 Strengths and limitations of the research project.....	179
9.5 Summary of the implications of the research findings	180
8.5.1 Recommendations for research	180
8.5.2 Recommendations for clinical practice	183
9.6 Concluding remarks.....	183
References	184
Appendices	204

Appendix 1: Ethical Approval for the 40-Something Study	205
Appendix 2: Statement of author contributions for systematic review paper	208
Appendix 3: Permission to reproduce the published systematic review manuscript granted by the publishers.....	210
Appendix 4. The Search Strategy as used in CINAHL database search	210
Appendix 5. Critical Appraisal instruments	212
Appendix 6. Data extraction instruments.....	213
Appendix 7. Methodological characteristics of included studies that monitored MI fidelity	215
Appendix 8: Statement of author contributions for Methods paper	217
Appendix 9: The 40-Something Study invitation letter	219
Appendix 10: The 40-Something Study consent form	222
Appendix 11: The 40-Something Study baseline survey instrument.....	224
Appendix 12: The 40-Something Study diet and physical activity diary	236
Appendix 13: The weight control booklets provided to participants in the 40- Something Study	243
Appendix 14: A sample of the 40-Something Study consultation protocols	275
Appendix 15: Additional file 1 – Goals for weight according to BMI	277
Appendix 16: Additional File 2 - Intervention components (Phase 1) of the 40- Something RCT	278
Appendix 17: Additional file 3 - Procedure for each data collection event.....	280
Appendix 18: Statement of author contributions for the 12 month weight outcomes paper	281
Appendix 19: Supplementary materials – Examples of the application of Motivational Interviewing (MI) in health professional consultations of the structured intervention.	283
Appendix 20: Statement of author contributions for the 12 month diet and physical activity outcomes paper	284
Appendix 21: Ten messages aimed at preventing weight gain in mid-age	286
Appendix 22: Baseline characteristics of study sample	287

Appendix 23: Number of women meeting the Nutrient Reference Values and macronutrient distribution range recommendations.....	289
Appendix 24: Statement of author contributions for the mediation analysis paper.....	290
Appendix 25: Supplementary file 1 - The 10 weight control recommendations provided to both Motivational Interviewing and Self-directed Intervention participants.	292
Appendix 26: Supplementary file 2 - Table. Effect of the 40-Something study on potential mediators and the association between changes in mediators and changes in weight (using LOCF for missing data).	294
Appendix 27: Supplementary file 3 - Weight change results for the Motivational Interviewing Intervention (MI) and Self-directed Intervention (SDI) groups at baseline, 3-, 12- and 24 months.....	296
Appendix 28: Statement of author contributions for the critical review of using MI in dietetic professional practice paper.....	298

List of Tables

<i>Table 1.1 WHO Body Mass Index categories.....</i>	<i>6</i>
<i>Table 1.2 Outline of the subsequent thesis chapters, corresponding research papers and research aims</i>	<i>15</i>
<i>Table 2.1 Core components of counselling in the behaviour change models of Social Cognitive Theory, Transtheoretical Model of Change and Cognitive Behavioural Therapy.</i>	<i>33</i>
<i>Table 2.2 Realistic goals for short, medium and long term weight loss.....</i>	<i>34</i>
<i>Table 2.3 Examples of how to adhere to the four MI principles that guide its practice .</i>	<i>40</i>
<i>Table 3.1. Critical appraisal of the included studies.....</i>	<i>56</i>
<i>Table 3.2. Findings of the included studies</i>	<i>59</i>
<i>Table 4.1 Eligibility criteria for the 40-Something study</i>	<i>74</i>
<i>Table 4.2 Ten messages aimed at preventing weight gain in mid-age</i>	<i>79</i>
<i>Table 4.3 Motivational interviewing (MI) protocol demonstrating how the MI principles were upheld in the health professional consultations of the structured intervention.....</i>	<i>80</i>
<i>Table 5.1 Baseline characteristics of participants according to intervention group</i>	<i>98</i>
<i>Table 5.2 Mean (SD) weight (kg) showing weight change according to intervention type and baseline BMI (Healthy weight and Overweight) using ITT analysis.....</i>	<i>99</i>
<i>Table 5.3 Anthropometry and biomarkers of metabolic syndrome according to intervention type (ITT analysis)</i>	<i>102</i>
<i>Table 6.1 Changes in diet and physical activity behaviour variables for participants by treatment group from baseline and 12 months.</i>	<i>118</i>
<i>Table 6.2 Changes in diet and physical activity behaviour variables from baseline and 12 months by those who did and did not meet their weight control goals.</i>	<i>121</i>
<i>Table 7.1 Protocol for evaluating compliance with each of the 10 weight control recommendations.</i>	<i>136</i>
<i>Table 7.2 Baseline characteristics of the 40-Something Study participants.....</i>	<i>139</i>
<i>Table 7.3 Mean participant compliance scores for the 10 weight control recommendations at baseline and three months.....</i>	<i>140</i>
<i>Table 7.4 Effect of the intervention on potential mediators and the association between changes in mediators and changes in weight (using imputation for missing data).</i>	<i>141</i>

<i>Table 8.1 Examples of how core MI constructs align with International dietetic professional competency standards.....</i>	<i>153</i>
<i>Table 8.2 Examples of how MI clinical strategies align with dietetic evidenced-based weight management recommendations.</i>	<i>156</i>
<i>Table 8.3 Examples of how the MI principles and communication skills can be upheld in dietetic consultations</i>	<i>161</i>

List of Figures

<i>Figure 1.1 Diagram showing the transition through menopause between the ages of 45 and 55 years.....</i>	<i>9</i>
<i>Figure 2.1 Content, structure and flow of the literature review.....</i>	<i>22</i>
<i>Figure 2.2 Potential factors that influence a person's decision making process leading up to an eating event</i>	<i>32</i>
<i>Figure 3.1. Flow of method of determining studies to be included in the review</i>	<i>52</i>
<i>Figure 4.1 CONSORT Flow chart describing the progress of participants through the trial.....</i>	<i>73</i>
<i>Figure 5.1 Participation and dropout rates for both groups for the intervention stage of the study.</i>	<i>97</i>
<i>Figure 5.2. Mean (SE) 12 month weight change for the motivational interviewing (MI) group and the Self-directed intervention (SDI) group N=54 and sub-analyses according to BMI at baseline</i>	<i>100</i>
<i>Figure 5.3. Mean (SE) 12 month weight change for the subgroups of healthy weight (HW) or overweight (OW) and intervention group MI or SDI.....</i>	<i>100</i>
<i>Figure 5.4 Weight goal attainment and drop-out according to intervention group and baseline BMI</i>	<i>101</i>
<i>Figure 6.1 CONSORT flow chart describing the progress of 40-Something participants through the trial.....</i>	<i>112</i>
<i>Figure 6.2 Number of women meeting the dietary and physical activity recommendations at baseline, 3- and 12 months.....</i>	<i>117</i>
<i>Figure 7.1 Flowchart outlining phase one (12-month intervention period) and phase two (12 months follow-up to assess effect maintenance) of the 40-Something study.....</i>	<i>131</i>
<i>Figure 7.2 Weight change results for the Motivational Interviewing Intervention (MI) and Self-directed Intervention (SDI) groups at baseline, 3-, 12- and 24 months.....</i>	<i>140</i>
<i>Figure 8.1. Examples of how clients may verbally demonstrate the five MI categories of change talk during a consultation.</i>	<i>164</i>

Abstract

The rising prevalence of overweight and obesity, the health and financial consequences associated with weight gain, and the modest and often unsustainable weight loss from obesity treatment interventions mean that it is now considered more effective to prevent obesity in healthy weight and overweight populations. Mid-age women (45-54 years) are at high risk of weight gain and studies indicate women will likely continue to gain weight and increase their waist circumference post menopause unless effective weight gain prevention initiatives are implemented. Despite this, there is limited evidence for weight control interventions in women about to undergo the menopause transition, with only one published study. The primary purpose of this thesis was to determine the effectiveness of a 12-month health professional Motivational Interviewing (MI) intervention aiming to improve dietary intake and physical activity behaviours for weight gain prevention in non-obese, mid-age women. This thesis explored the use of MI, a client-centred, guiding counselling style, for dietary and physical activity behaviour change. Three research studies were undertaken to meet these aims.

The first study was a systematic review of evidence for diet and physical activity behaviour change in response to MI interventions in comparison to an attention control. Two of the five articles reporting on dietary behaviour change found a significant positive effect on fat and percent energy from fat favouring MI. None of the six articles reporting on physical activity found any difference between MI and an attention control. Due to the limited number of studies and the poor methodological quality of the included studies, there is not yet sufficient evidence to conclude that MI enhances diet and physical activity behaviour change above an attention control, although the results from two studies suggest a positive effect. More high quality studies that objectively measure diet and physical activity, evaluate and report MI fidelity and compare the MI intervention to an attention control are required.

The second and major study was the '40 Something' parallel-group Randomised Controlled Trial (RCT) which tested the effectiveness of a 12 month MI health professional intervention (MI; n=28) for weight gain prevention in non-obese, mid-age women in comparison to a self-directed intervention (SDI; n=26) that received tailored written materials. The study followed participants for an additional 12 months to assess effect maintenance. At 12 months, the MI group weighed 65.6 kg (95% CI 64.5, 66.8)

which was significantly different ($p=0.034$) from the SDI group who weighed 67.4 kg (95% CI 66.2, 68.6). When stratified by baseline BMI category, the MI group lost significantly more weight (-2.6kg, 95% CI -3.9, -1.2) than the SDI group (-0.1 kg 95% CI -1.2, 1.0 $p=0.002$) for the healthy weight women. The overweight women lost weight regardless of whether they were allocated to the MI (-3.5kg, 95% CI -6.1, -1.0) or SDI group (SDI=-2.3, 95% CI -4.1, -0.5) with no between group difference ($p=0.467$). At 12 months, the MI group had diets significantly more nutrient dense for iron ($p=0.01$) and potassium ($p=0.04$), and consumed more fruit servings ($p=0.02$) than the SDI women. Women who achieved their weight control goals consumed significantly more fruit servings (+0.76 serves/day, $p=0.02$) and less meat/meat alternatives (-0.34 serves/day, $p<0.01$) than women who did not achieve weight control. There were no significant group by time effects found for physical activity. In a mediation analysis assessing whether compliance to 10 weight control recommendations mediated weight loss, step count compliance was found to significantly mediate the 12 and 24 month effect on weight (12 months $AB=-0.74$, 95%CI=-1.95, -0.14; 24 months $AB=-1.06$, 95%CI=-2.56, -0.36). Compliance to the vegetable serving recommendation was also found to significantly mediate the effect on weight at 24 months ($AB=-0.54$, 95%CI=-1.50, -0.04).

A challenge of employing any counselling style in dietetic practice is ensuring that the professional standards are upheld whilst also employing the most effective counselling method. The final study was an examination of United States, Canadian, European and Australian dietetic scope of practice statements, competency standards and evidenced-based weight management guidelines for congruency with MI principles and strategies. Two of the four MI concepts, partnership and compassion, were consistent with scope of practice statements and competency standards. Reference to acceptance was evident in European and Canadian standards, whereas evoking intrinsic motivation was absent from all standards. The majority of MI strategies were supported by international evidenced-based guidelines.

The findings presented in this research thesis provide evidence of the effectiveness of a health professional consultation intervention for weight gain prevention and improving diet quality in mid-age women soon to experience menopause. Encouraging women to take 10,000 steps and eat five vegetable servings per day may be a promising strategy to achieve long-term weight control at mid-life. While there is substantial evidence showing the effectiveness of MI on a variety of health outcomes, more high quality

studies that examine the effect of MI on diet and physical activity behaviour change are needed. The study also found that training in MI is compatible with international dietetic practice standards and could be a valuable asset to dietetic research and practice. The results of the thesis have implications for mid-age women, the dietetic profession and behavioural researchers, and provide both clinical practice and research recommendations for weight gain prevention and motivational interviewing.