



Position Statement for Healthcare Professionals

Eggs and Obesity

Updated June 2012

Figures suggest that more than half of all adults (54%), or 7.4 million Australians aged 18 years and over, are either overweight or obese ¹. The proportion of Australian men who are obese has almost doubled, and the proportion of obese women has increased from 8% to 20% over the past two decades ². However the population appears to underestimate the extent of this health problem. Data from the Australian Bureau of Statistics illustrates the discrepancy between self-reported weight versus actual weight, with just 32% of males and 38% of females considering themselves as overweight despite the actual calculated weight categories for the same group showing 62% of the same males and 45% of females were classified as overweight ³. Overweight and obesity also affects children, with the 2007 Children's Nutrition Survey of over 4000 Australian children aged 2-16 years reporting 17% of children are considered overweight and 6% obese ⁴. The 2010 NSW School Physical Activity and Nutrition Survey (SPANS) showed the prevalence of overweight in NSW children may be as high as 27.4% for some age groups⁵.

A consumer survey found that most Australians believed obesity was caused by an unhealthy diet, followed by a lack of exercise and self-discipline ⁶. However Australian health professionals have identified that although most overweight people understand what foods contribute to a healthy diet, many struggle to put this knowledge into practice ⁷.

In an Australian survey of beliefs and practices about egg intake, approximately 28% of respondents reported restricting their egg intake because they were either trying to lose weight, improve their diet or thought that eggs were fattening or too high in fat ⁸. However a serve of eggs provides just 15% of a person's daily fat requirements and 14% of daily saturated fat needs, while being a good source of high quality protein and providing at least 11 vitamins and minerals. Eggs are also relatively low in kilojoules, with a serve of eggs* providing 7% of a person's daily kilojoule requirements - around the same amount of kilojoules as 2 medium apples or 2 small slices of whole grain bread.

Weight management approaches

The conventional dietary approach to weight management (recommended by health authorities and most health professionals for the past 25 years) has been a high-carbohydrate, low-fat eating pattern ⁹. However, whatever the macronutrient profile, successful dietary approaches to weight loss require a negative energy balance, equivalent to a daily reduction of 2000-4000 kilojoules ¹⁰. High carbohydrate, low fat diets may not prevent weight gain or result in weight loss, as fat restriction alone does not necessarily result in lower energy intakes ¹⁰.

Research has shown that higher protein eating patterns may have benefits for some people including those with obesity, hyperinsulinaemia, type 2 diabetes, acne and polycystic ovarian syndrome ¹¹⁻¹⁷.

However, any successful approach to the prevention of weight gain or weight loss requires kilojoule restriction tailored appropriately to a person's level of energy expenditure ¹⁰.



High carbohydrate, low fat eating patterns (55-60% energy from carbohydrate, fat intake less than 30% energy)

The conventional high carbohydrate, low fat eating pattern is still considered to be an effective strategy for weight loss¹⁰, particularly if the carbohydrate-rich foods selected have a low glycemic index^{10,18}. The contribution of protein to most high carbohydrate diets is 15-20% of total energy. Eggs fit well within this eating pattern with one serve of eggs* providing around 10% of daily energy intake in a 6000kJ weight loss diet.

Moderate Protein, Moderate Carbohydrate eating patterns (30% energy from protein, 40% energy from carbohydrate)

A growing body of evidence, including a number of Australian clinical trials, have demonstrated moderately higher protein, lower carbohydrate kilojoule controlled diets can provide an effective weight loss strategy^{11,19-21}. These diets may be particularly useful for individuals who have trouble with compliance on low fat, high carbohydrate diets due to hunger, or individuals with insulin resistance or diabetes²¹⁻²⁵. Studies have also found that the style of eating recommended in a moderate protein, moderate carbohydrate eating plan, is easy to maintain, satisfying, and meets the needs of dieters^{23,25-27}.

These moderate protein, moderate carbohydrate diets rely on regular serves of a wide range of high quality protein rich foods. Low saturated fat meals incorporating eggs would provide such protein and contribute to the variety of foods that are encouraged in this type of eating plan.

Weight Loss Studies Involving Eggs

Few studies have looked specifically at the effect of eggs on weight loss however new evidence supports the inclusion of eggs in an energy restricted diet with one study suggesting eggs may even enhance weight loss²⁸⁻³⁰. A study involving 152 overweight and obese adults found that those consuming two eggs for breakfast on at least 5 days of the week lost 65% more weight ($P < 0.05$) and 34% more from their waist circumference ($P < 0.06$) than those eating a bagel breakfast²⁹. Similarly another study found that weight loss was achievable when two eggs were included in the daily menus of those following an energy-restricted diet with no adverse effects on blood cholesterol. This was despite a two-fold increase in dietary cholesterol intake³⁰. Another group of researchers looked at the effect of eating 3 eggs per day as part of a carbohydrate-restricted (10-15% of energy from carbohydrate) weight loss diet in men. They found the egg group experienced similar changes in weight, waist circumference and LDL cholesterol to the group not eating eggs, but that the egg group had a more favourable effect on HDL cholesterol and inflammatory markers, two risk factors for heart disease^{28,31}.

A 2010 study³², involving twenty-one men aged 20-70 years, assessed the effect of consuming eggs for breakfast on satiety and energy intake throughout the day and found that those who consumed the egg-based breakfast experienced less variation of plasma glucose and insulin, a suppressed ghrelin response, and reduced energy intake. Furthermore, it has been shown that eating an omelette for lunch increases feelings of fullness more than a jacket potato³³. These studies help to demonstrate the mechanism as to why eggs may help people to lose weight.

How Dietary Protein Regulates Food Intake and Body Weight

A review of dietary protein in the regulation of food intake has shown that protein makes a stronger contribution to satiety than carbohydrate and fat, and also causes greater suppression of food consumption³⁴. As a consequence, individuals may find it easier to comply with a higher protein diet due



to reduced hunger. Eggs, as a high protein food, have been shown to increase satiety related hormones following consumption. In one study, the effect of feeding 2 whole eggs, 2 egg whites, 2 egg yolks, or no eggs with a standard breakfast on gastric emptying, glycemic and hormonal responses were studied in 12 healthy young males³⁵. Whole eggs and egg yolk induced a significant delay of gastric emptying, together with reduced blood glucose and insulin peaks (yolk only). Egg ingestion, whatever the part, increased gastric inhibitory peptide level in the blood. Cholecystokinin levels increased after whole egg or egg yolk ingestion, potentially explaining the effect of eggs on satiety.

A study has also assessed the effect on satiety and subsequent short term energy intake of a bagel based breakfast versus a breakfast containing eggs³⁶. Twenty-eight overweight women aged 25-60 years were randomized to attend two test days two weeks apart. Participants ate either an egg breakfast consisting of eggs, toast and reduced kilojoule fruit spread or a bagel breakfast consisting of a bagel, cream cheese and yoghurt. The breakfasts varied in their macronutrient content but provided the same amount of kilojoules and were the same weight. Results showed a significant increase in satiety following consumption of the egg breakfast compared to the bagel breakfast. Energy (kilojoule) intake for the entire study period, from breakfast until noon the next day, was significantly lower by 1,759 kilojoules in those eating the egg breakfast (8652.3 ± 2418.9 vs. 10411.7 ± 3221.6 , $p < 0.001$). The greater satiety and lower total energy intake for at least 24hrs after the egg breakfast indicates eggs may play a useful role in weight loss treatments.

A study among 9 men consuming a normal amount of protein or a higher protein diet showed that a higher protein breakfast was more filling during an energy-restricted diet phase than other high protein meals consumed throughout the day³⁷. The initial and sustained feelings of fullness following protein consumption at breakfast suggests that the timing of protein intake differentially influences satiety during weight loss diets.

A study³⁸ assessed the effects of dietary protein intake and eating frequency on appetite and satiety in overweight/obese men. Thirteen men consumed kilojoule controlled diets containing either 14% of energy intake as protein or higher protein (25% of energy intake as protein) equally divided among three eating occasions (every 4 hours) or six eating occasions (every 2 hours). Results found that feelings of fullness were consistently greater with higher protein intake, but lower with increased eating frequency. The results of this study support a higher protein diet as being associated with increased satiety independent of eating frequency. These findings were supported by a similar study³⁹ in 2011 which found higher protein intake, but not greater eating frequency, improved appetite control and satiety in overweight/obese men during energy restriction-induced weight loss.

A British Nutrition Foundation 2006 review paper included a summary of key studies promoting the satiating effect of eggs in assisting weight control. The researchers concluded that "moderate consumption of eggs (1-2 eggs per day) should be actively encouraged as part of an energy-restricted, weight-losing dietary regimen"⁴⁰.

Benefits of a higher protein diet

Preserve Lean Body Mass

A number of studies have shown that higher protein diets may also preserve lean body mass (muscle) whilst reducing body fat. In a weight loss study of women consuming either 68g protein/day or 125g protein/day (15% or 28% of daily energy intake from protein respectively), changes in body weight were not significantly different between the 2 groups but the high protein group had a significantly higher loss



of fat mass than the lower protein group ⁴¹. In this study, the two diets were isoenergetic and provided similar amounts of fat (approximately 50g per day). In a similar weight loss study controlled for energy and fat intake, total lean mass was significantly better preserved in women undertaking a higher protein diet when compared to those following a standard protein diet ²¹. None of these studies have assessed the independent effect of eggs on weight loss.

Improves Body's Ability to Burn Fat

An Australian study ⁴² has shown that among overweight and obese people, choosing a low kilojoule eating plan based on higher protein meals improves the body's ability to burn fat, which may in turn help with weight loss. The eighteen study participants were provided with high protein meals that contained carbohydrate foods with either a high glycemic index (GI) or a low GI. All meals contained the same amount of kilojoules and were provided on separate occasions. After eating each meal, the amount of kilojoules subjects burnt up was measured. Consuming the higher-protein meal plans led to greater levels of fat burning than regular lower protein meals. These higher protein plans included an omelette for breakfast, and a beef and salad sandwich with a tub of low-fat yoghurt for lunch. A 2012 study also showed that a higher protein diet reduced the percentage of body fat more effectively than a high carbohydrate diet over a 12 month weight loss and maintenance period ⁴³.

Weight Maintenance

Results of one of the largest diet studies to date, The Diogenes study ⁴⁴ has shown that the best diet to maintain weight after weight loss, is higher in protein while lower in high-glycaemic carbohydrates. A total of 938 adults took part in an 8-week, energy-restricted weight-loss diet to achieve a weight loss of 8% of their original starting weight (for most participants this was about 11 kg.) Those successful in meeting this target were then given the opportunity to take part in the 6-month 'preventing weight gain' stage of the study. The researchers then randomly assigned 773 adults to one of five diets for a 26-week period. These were not kilojoule controlled diets – those taking part could eat as much food as they liked from their assigned diet group. All five diets were designed to have a moderate fat content (25–30% of total energy). The diets were: 1) a low-protein diet (13% of energy) with a high glycaemic index (GI), 2) a low-protein, low-GI diet, 3) a high-protein (25% of energy consumed), low-GI diet, 4) a high-protein, high-GI diet and 5) a control group which followed the current dietary recommendations of a low fat, high carbohydrate diet without special instructions regarding GI. The average weight regain among all participants was half a kilo over the six month period, however among the participants who completed the study, those in the low-protein/high-GI group showed the poorest results with a significant weight gain of 1.67 kg. The weight regain was 0.93 kg less for participants on a high-protein diet than for those on a low-protein diet and 0.95 kg less in the groups on a low-GI diet compared to those on a high-GI diet.

Conclusions

Overall, research to date suggests there is no one dietary pattern for weight management that will suit all individuals. However, one of the challenges for all dietary approaches aimed at weight loss is meeting recommended dietary intakes within a kilojoule-controlled diet. Eggs are a nutrient dense food, providing 581 kilojoules per serve*, a high quality source of protein and 11 vitamins and minerals. While different weight loss diets are suitable for different people, eggs, as a nutrient dense food, are likely to play a useful role in most approaches.



This statement is for healthcare professionals only.

**One serve = 2x60g eggs (104g edible portion)*

Useful links:

Australian Better Health Initiative - Measure Up
<http://www.measureup.gov.au>

Dietitians Association of Australia
www.daa.asn.au

CSIRO's Total Wellbeing Diet
http://www.csiro.au/index.asp?type=blank&id=TotalWellbeingDiet_Book

Heart Foundation
http://www.heartfoundation.com.au/downloads/Very_low_carb_dietsPP_04.pdf

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