Appetite

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Physiological changes during ageing

- Sensory perception
- Mechanisms of satiety (CCK)
- Gastrointestinal tract
- Body composition
- Bone Health

Physical factors affecting nutrition

- Ability to shop
- Ability to prepare food (standing, manual dexterity)
- Visual problems
- Fatigue
- Access to kitchen (residential care or sheltered environment)
- Stroke, diabetes mellitus
- Oesophageal problems

Effect of normal ageing on oral intake

- Older people eat less
- Taste thresholds alter – bitterness the greatest and sweetness the least
- More physical and psychological morbidity
- Availability of food declines – shopping, preparation, social

Anorexia of Aging and its Role for Frailty

- Negative consequences on weight and muscle mass
- Alteration in stress hormones and inflammatory mediators can lead to excess metabolism, cachexia and reduced appetite
- Mood disorders including anxiety and depression are powerful inhibitors of appetite
- Frailty determines everything!

Sandford AM, Curr Opin Clin Nutr Metab Care, 2016

Age-related Changes in Acute Central Leptin Effects on Energy Balance

- Leptin is a key catabolic regulator of food intake (FI) and energy expenditure
- Ageing and obesity induce Leptin resistance
- Leptin induced anorexia varied with age
- Acute central effects of Leptin on anorexia and hyper metabolism change in different ways during ageing which implies a separate mechanism (e.g. signal transduction pathways) of different Leptin actions

Rostas I, Tenk J, Miko A, Furedi N, Soos S, Solymar M et al, Exp Gerontol, 2016

Evidence from Residential Care

- Systematic reviews 01/01/1990 – 25/11/2015
- Aged care residents
  - Half of all residents are malnourished
  - Most prevalent factors are appetite, dietary intake nutrient absorption
  - Malnutrition associated with ↑ infection, ↑ falls, ↑ pressure ulcers, ↑ hospital admissions, ↑ healthcare costs and ↓ quality of life
  - Multidisciplinary approach still not 100% successful

Agarwal E, Marshall S, Miller M, Isenring E Maturitas, 2016

Effect of Anorexia on Professional Care Givers

- Formal care setting = agitation/aggression and depression/dysphoria (42.4%)
- Informal care setting = aberrant motor behaviour (59%)
- Appetite and eating behaviours more prevalent in the formal care setting but less related to care giver distress
- Hallucinations, sleep and night time disturbances, anxiety and aberrant motor behaviour are best predictors of professional care givers distress
- Is nutrition missed when major psychological issues are present?

Lorenzo-Lopez L, de Labra C, Maseda A, Lorenzo T, Agrafojo H, Rodriguez-Villamil JL et al, Geriatri Nurs, 2016

Evidence from Cancer

- Nutritional status after pancreatic cancer surgery
- 28.9% malnutrition at admission (MUST)
- 86.6% malnutrition on discharge (MUST)
- Mean values of daily intake
    - Energy 588 kcal
    - 96g carbohydrates
    - 11.8g fat
    - 27g protein
- 64.5% = 2 or more symptoms (anorexia, bloating, early satiety)
- Negative coloration between C-reactive protein and total intake energy, protein, fat and zinc)

Kang J, Park JS, Yoon DS, Kim WJ, Chung HY, Lee SM et al Clin Nutr Res 2016

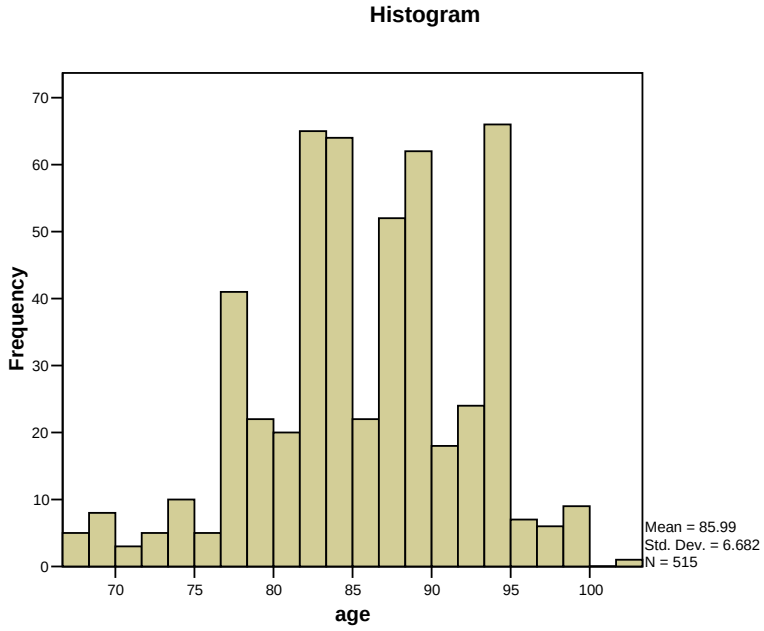
Effect on Quality of Life

- Study of patients with diabetes mellitus
- 110 hospitalised aged over 60 years
- Multiple regression analysis to determine physical health domain of quality of life
- ADL, depression and APPETITE were statistically significant
- Depression and instrumental ADL contributed to psychological domain
- Social support and cognitive status determine social relationship
- Nutritional, functional and psychological aspects need to be incorporated into rehabilitation support programmes

Johari N, Manaf ZA, Ibrahim N, Shahar S, Mustafa N Clin Interv Aging, 2016

Berkshire Hospital Project

- N = 117, 72 females, 45 males, mean age 85.99, range 68 – 102
- 4 weeks, 2 menu repetitions
- 514 kitchen orders and food questionnaires
- Normal diet, good cognition



Age of participants

Berkshire Hospital Project

- Lunch offered the widest variety
- Q: Why was the particular food chosen, what were the favourite foods and what proportion of a meal was eaten
- Eating rate based on patients memory immediately after meal and completed food charts

Berkshire Hospital Project

Similar foods put into groups (3 in soup range, 3 in potatoes, 13 in main course, 7 in vegetables, 6 in dessert range)

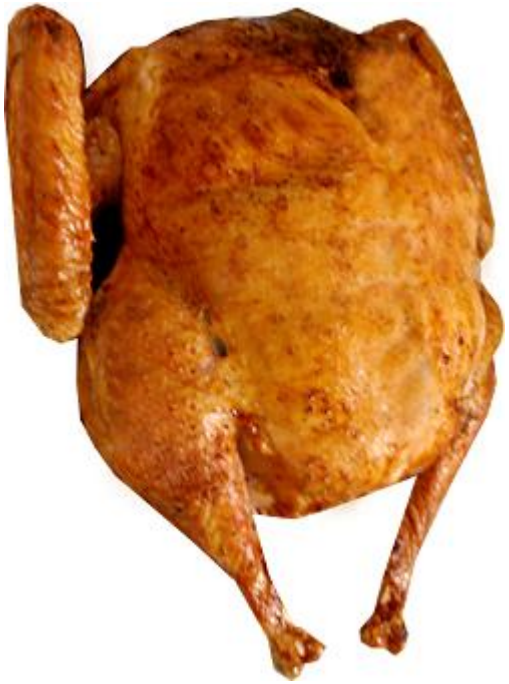
	Divided by repetitions in 4 weeks =	To compare ranges **multiplied by number of groups in range** =
CHOOSING FREQUENCY	CHOOSING RATIO	OVERALL CHOOSING RATIO
EATEN PORTION = portion size * proportion eaten	EATING RATIO	OVERALL EATING RATIO

Results - Choice

Choosing ratio of 3 groups in each range

	Group	***Choosing frequency***	***Choosing ratio***	***Overall choosing ratio***
Juice/soup	Ethnic or unusual soup	126	12.6	37.8
	Traditional soup	192	10.7	32
	Juice	132	4.7	14.1
Main course	Meat (also minced) roasted or baked	74	12.33	160.29
	Fish	78	9.75	126.75
	Meat in pastry	78	7.8	101.4
Potatoes	Mashed potatoes	322	11.5	34.5
	Roasted or fried potatoes	124	6.9	20.7
	Boiled rice	25	2.5	7.5
Vegetables	Peas and beans	132	11	77
	Carrots	39	9.8	68.3
	Mixed vegetables	64	8	56
Dessert	Apple and pear	92	6.6	39.6
	Garden fruits*	51	6.4	38.4
	Desserts containing sultanas	34	5.7	34.2

Results – Choice



Food range	*Food group*	*Overall choosing ratio*
Main course	Meat (also minced) roasted or baked	160.29
Main course	Fish	126.7
Main course	Meat in pastry	104
Main course	Poultry in sauce	100.75
Main course	Liver	84.5
Vegetables	Peas and beans	77
Main course	Red meat and sauce	76.18
Vegetables	Carrots	68.3
Vegetables	Mixed vegetables	56
Vegetables	Roast parsnips	54.3
Vegetables	Sweet corn	54.3
Vegetables	Swede and cabbage family	48.3
Vegetables	Grilled tomatoes	45.5
Main course	Ethnic or unusual main course	42.9
Desserts	Apple and pear	39.6
Desserts	Garden fruits*	38.4
Soup or juice	Ethnic or unusual soup	37.8
Potatoes or rice	Mashed potatoes	34.5
Desserts	Desserts containing sultanas	34.2
Soup or juice	Traditional soup	32
Desserts	Apricots and peaches	28.8
Desserts	Exotic fruit	27
Main course	Vegetables or no meat, baked or rich	26
Main course	Vegetables and mushrooms in pastry	22.75
Potatoes or rice	Roasted or fried potatoes	20.7
Desserts	No fruit desserts and jam sponge	20.1
Main course	Beans and vegetables	14.69
Soup or juice	Juice	14.1
Main course	Meat sandwich	8.45
Potatoes or rice	Boiled rice	7.5
Main course	Fish sandwich	6.5
Main course	Cheese or egg sandwich	2.6

What is not chosen?

This could be the most important finding

Food range	*Times when no food chosen*
Main course	11
Dessert	17
Potatoes/rice	54
Soup/juice	59
Vegetables	108

Advice

- Present foods that the older person has always liked
- Be prepared to swap foods in middle of meal to ↑ intake
- Don’t use sandwiches to supplement meals
- Remember umami which may account for some choices

Evidence for calorie shots (energy rich formula)

- What are we providing? (in 3 x 30ml shots)

Calories (Kcal)	Protein (g)
~ 405 Kcal	~0g

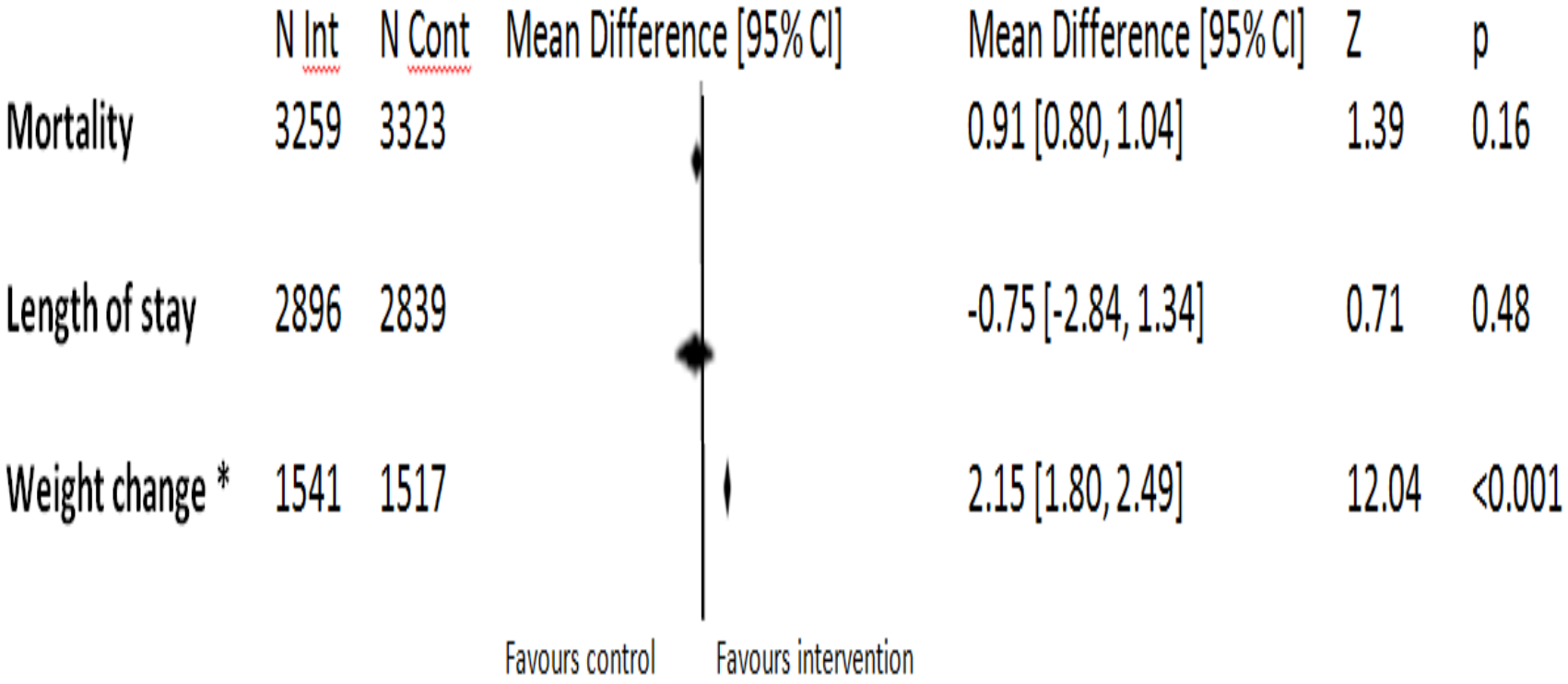
Evaluation in acute elderly care patients

	Intervention (n=34)	Control (n=37)	P value
Weight change (%)	0.26 +/- 4	- 1.36 +/- 3.6	0.013

Faxén-Irving & Cederholm (2011) Clin Nutr 30 : p202

Evidence for nutritionally complete supplement drinks (sip-feeds)

Oral protein and energy versus routine care :



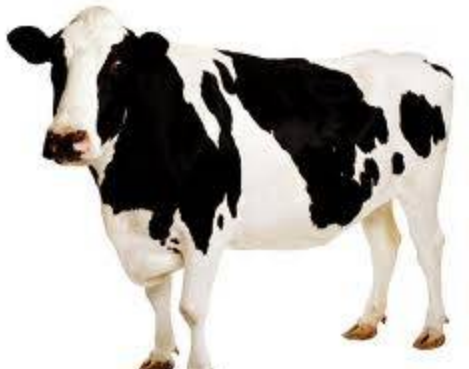
Milne et al 2009 Cochrane Database Syst Rev 15;(2): CD003288.

High protein vs normal ONS?

	High protein ONS only	All types of ONS drinks
Number of studies	36 (n = 3,790)	62 (n = 10,187)
Weight	Increased 1.7 kg (95% CI 0.8–2.7) p < 0.05,	Increased 2.2% (1.8 to 2.5) p<0.05
Length of Stay	Decreased by −2.65 days (95% CI −6.22 to 0.94) p = NS	Decreased by -0.8 days (-2.8 to 1.3) p = NS
	Cawood et al 2012 Ageing Res Rev.11 :p 278	Milne et al 2009 Cochrane Database Syst Rev 15;(2): CD003288.

High protein ONS drinks may result in better ....

But, more direct comparison research require



Barriers to success

- Compliance!

  Average compliance in elderly inpatients = 75% (range 38-90%).

  Correlation between age and consumption (r^2 = - 0.148, p = 0.01)

  Hubbard et al (2012) Clin Nutr 31 : p293.

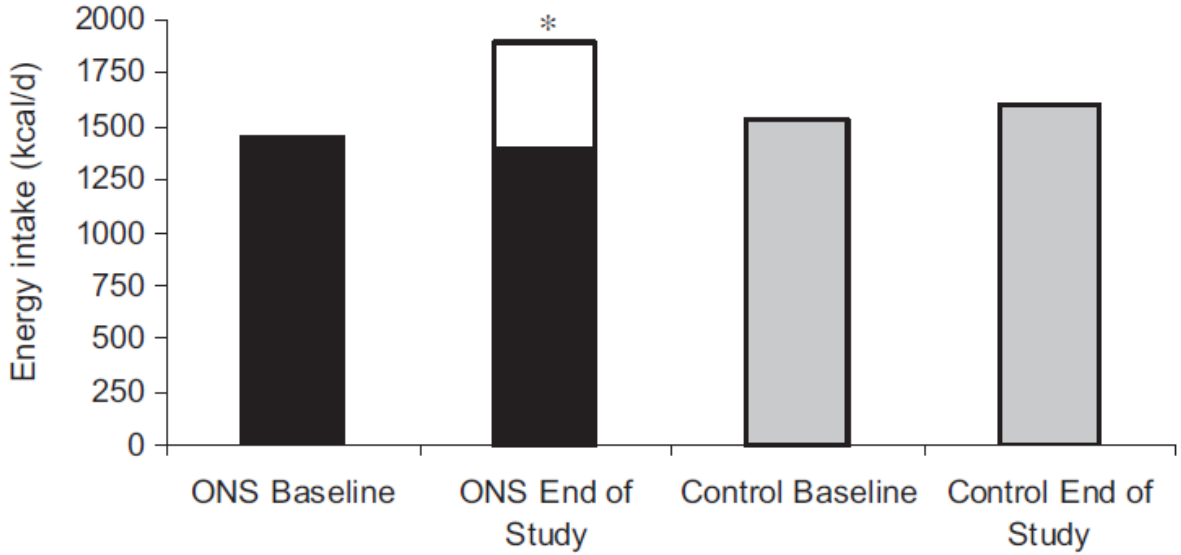
– *Hov*

- *S* 8 :E37)

An	cream (-13'c)
	2.3 [B]

•	A

- Perception habitual food intake will decrease.



Hubbard et al (2012) Clin Nutr 31 : p293.

However, our advice is to give between meals..

Why?

- In controlled enviroments milk given 30min before food effect oral intake at meal times (Rolls 1998, AJCN 67 : p1170),
- Current methods used in clinical enviroments is poor

Steroids (Nandrolone)…

- Steroids contribute to muscle growth and stimulation of appetite

N = 60, (age range 70–92), acute #NOF

6 month intervention. Compared three groups;

	Calcium / Vit D	Calcium / Vit D Sip feed	Calcium / Vit D Sip feed Nandrolone
6 months	Decrease in lean body mass & fat mass.	Decrease in lean body mass Maintained fat mass	Decrease in fat mass Maintained lean body mass Strength increased

Tidermark et al (2004) Clin Nutr 23 :p587

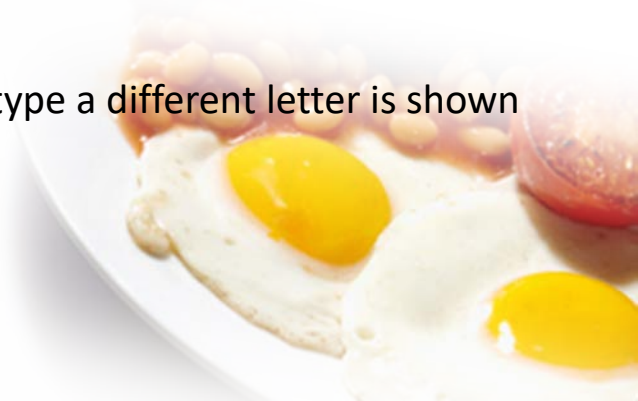
Evidence for cooked breakfasts

- What are we providing?

	Calories (Kcal)	Protein (g)
Cooked breakfast	324 +/- 79 C	20.2 +/- 6.2 B
Cereal or Toast	171 +/- 55 B	4.1 +/- 1.3 A
Porridge	101 +/- 8 A	3.5 +/- 0.2 A

Diet plan data calculated from 43 breakfasts of cereal toast and porridge given at three hospitals. Cooked breakfasts calculated from breakfasts given in 3 nursing homes.

If significantly more ($p<0.05$) calories or protein given by breakfast type a different letter is shown in the table



- One study has evaluated this in older hospitalised patients (n=8 control, 14 intervention)

	Cooked breakfast, normal diet lunch and supper	**V's**	**Cereal/Toast/Porridge for breakfast, normal diet lunch and supper**	**p - value**
Energy intake	1744 +/- 176		1425 +/- 136	<0.001
Protein intake	57.4 +/- 6		47.4 +/- 6.5	<0.05

Barton et al (2000) *Clin Nutr* 19: p451

Even though overall protein and calories increased, wastage was high (36%) of food provided daily.

Evidence for fortified diets

What are fortified diets?

Fortified diets are usually made up by adding more fat to diet (saturated fat intake increases) . Fortified diets provide more energy per spoon eaten.

Evidence…

- Meal fortification can improve energy (+14 to 26%) (Gall et al 1998 Clin Nutr 17:p259;Barton et al 2000 Clin Nutr 19:p451)
- The addition of extra energy does not impact satiety or amount eaten (this is linked to volume consumed). (Rolls et al 1998 AJCN 67:p1170; Goetze et al 2007 AJPGLP 292:p11)

Evidence for snack rounds

- What are we providing?

	Calories (Kcal)	Protein (g)
Sweet biscuits (chocolate)	84	1.2
Sweet biscuits (plain)	60	0.8
Crisps	148	1.6
Cake	188	2.5
Nuts	194	8.2

Obtained from Diet Plan v.6




Limited research..

Snacks and fortification (In-patients)

- Improve energy (+26%) and protein (+23%) intake (Gall et al 1998 Clin Nutr 7:p259)
- Provision of six nutritionally dense mini-meals to older patients is being investigated (to include biscuits, ice-creams, soups and cakes). See : http://www.hospitalfoodie.com/

Snacks (Nursing home)

- Improve energy intake (+30%) (Turic et al 1998 *ADA 98:p1457)*

Evidence for music

No direct research for oral intake..

Cognitively impaired residents in nursing homes

- Significant reductions in;
  - Total agitated behaviours (63.4%)
  - Physically nonaggressive behaviours (56.3%)
  - Verbally agitated behaviours (74.5%)

(Goddaer and Abraham 1994 Arch Psychiatr Nurs 8 : p150 ;
Ho et al 2011 Arch Psychiatr Nurs 25: p49)

Evidence for communal dining

- Significant increase in intake (Wright et al 2006 J Hum Nutr Diet 19: p. 23).
- Significant benefit on weight (Nursing home) (Nijs et al 2006 BMJ 332: p1180–4 and J Gerontol A Biol Sci Med Sci 61A: p935).

Barriers to success:

- Attendance in the dining room

Intervention	Beneficial ?	Evidence
Micro nutrient supplements	Improves micro-nutrient intake	Excellent
Calorie Shots	Improves calorie intake and weight gained	Fair
Oral Nutritional Supplements	Improves calorie, protein and micronutrient intake, small weight gain	Excellent
NG feeding	Improves calorie, protein and micronutrient intake and weight (poorly tolerated!)	Good
Enhancing food flavours	Disputed	(Conflicting)
Cooked breakfasts	Improves calorie and protein intake	Very Poor
Fortified diets	Improves calorie intake	Poor
Snack rounds	Improves calorie intake	Poor
Music whilst eating	Improves behaviour – no direct evidence for improved intake / outcomes	Very Poor
Communal dining	Improves intake (weight & QoL in NH)	Good
Coloured cutlery and crockery	Improves intake	Poor