

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

Validation of the nutrition screening tool
'Seniors in the Community: Risk Evaluation for Eating and Nutrition,
version II'
among people in advanced age.

A thesis presented in partial fulfilment of the requirements for
the degree of
Masters of Science in Human Nutrition
at
Massey University, Albany, New Zealand.

Kristy Maree Redwood

2012

Acknowledgements

This research project would not have been possible without the support of many people. I wish to express my deepest gratitude to my supervisor, Dr. Carol Wham who offered invaluable assistance, motivation and guidance (as well as patience!). Many thanks to Professor Ngaire Kerse for the opportunity to work with the LiLACS team, without your knowledge and assistance this study would not have been successful. To Karen Hayman, Denise Green, Kas Green, Simon Moyes, Tina Elliot and the rest of the Tauranga LiLACS team thank you for all your support during my data collection stages. Thank-you to Welma Stonehouse for making statistics relevant and enjoyable. A huge thank-you to the participants who agreed to take part in my study, you are an inspiration.

Special thanks also to my husband Nigel who has supported me, motivated me and did more than his fair share of the housekeeping for the past two years. To Mum for always being on the end of a phone and agreeing to read through my drafts no matter the length or topic. And thank you to Dad for always offering a kind word of encouragement.

I would also like to convey thanks to the Massey University for providing the financial means to complete this study.

Table of Contributions	
Planning for NZ photographic atlas	Dr. Carol Wham (LiLACS lead investigator) and Kristy Redwood (Masters candidate)
Formatting of NZ photographic atlas and MPR forms	Kristy Redwood
Baseline SCREEN II administration	LiLACS NZ interviewers
Follow - up SCREEN II administration	Kristy Redwood
Recruitment for validation study	Kristy Redwood and LiLACS project co-ordinator
Twenty-four hour dietary recall x 2 – weekdays	LiLACS NZ nurses
Twenty-four hour dietary recall x1 – weekend	Kristy Redwood
Quality checking of 24 hour recalls	Kristy Redwood, Dr. Carol Wham
Dietitian's nutrition risk rating assessment	Kristy Redwood
Physical assessment (including anthropometrics)	LiLACS NZ nurses
Dietary analysis (Foodworks)	Kristy Redwood

Abstract

Background:

This study aims to determine the validity of the nutrition screening tool 'Seniors in the Community: Risk Evaluation for Eating and Nutrition' (SCREEN II) among adults of advanced age in Life and Living in Advanced Age: a cohort study in New Zealand (LiLACS NZ). SCREEN II is widely used in Canada and has been found to be valid and reliable amongst well community living older people. As the LiLACS NZ participants are considerably older than those recruited in Canada it was important to validate the SCREEN II tool among participants in advanced age and in the New Zealand setting.

Methods:

Forty-five people, 85-86 years, were recruited on the basis of their baseline nutrition risk score. SCREEN II consists of 14 items with a total summed score ranging from 0 to 64. Equal proportions of participants were recruited at low (>54), medium (50-53) and high risk (<50). One year later participants completed a follow up SCREEN II assessment and underwent a dietitian's nutrition risk rating assessment. The assessment included a medical history, anthropometric measures and a dietary assessment using three 24 hour multiple pass recalls. Using clinical judgement the dietitian ranked participants from low risk (score of 1) to high risk (score of 10). A Spearman's correlation determined the association between the SCREEN II score and the dietitian's risk score. Receiver operating characteristic (ROC) curves were completed to determine sensitivity and specificity of cut-offs.

Results:

There was no change in nutrition risk over the year. Participants who lived alone ($p=0.02$), were women ($p=0.03$), widowed ($p=0.01$), former or current smokers ($p=0.03$), took multiple medications (polypharmacy) ($p=0.03$), had depressive symptoms ($p=0.02$) were significantly more likely to be at nutrition risk. SCREEN II was significantly correlated with the dietitian's risk rating ($r= -0.73$, $p<0.01$). A new cut-off of <49 was established for high nutrition risk based on ROC curves and was associated with high sensitivity 90% and specificity 86%.

Conclusion:

SCREEN II appears to be a valid tool for the identification of nutrition risk in community-living older adults 85 years and older using a cut-off of <49 for high nutrition risk.

Key Words: SCREEN II, nutrition, screening tool, advanced age, older adults

Table of Contents

ACKNOWLEDGEMENTS	i
ABSTRACT	ii
LIST OF TABLES	vi
LIST OF FIGURES	vii
1.0 INTRODUCTION	1
2.0 LITERATURE REVIEW	3
2.1 Older People in New Zealand	3
2.2 Health of Older People	4
2.2.1 Chronic diseases and conditions of older people	4
2.2.2 Functional health	5
2.2.3 Mental health of older people	8
2.2.4 Perceived state of health	9
2.3 Nutritional Health of Older people	10
2.3.1 Factors that affect the nutrition status of older people	10
2.3.2 Body weight and composition	18
2.4 Dietary Recommendations and Intakes of Older People	22
2.4.1 Food groups and dietary patterns	22
2.4.2 Nutrient recommendations and intakes	24
2.5 Nutritional Assessment of Older People	31
2.5.1 Dietary assessment	32
2.5.2 Nutrition screening	35
2.5.3 Validation of screening tools	35
2.6 Summary	38
3.0 METHODS	40
3.1 Aims and Objectives	40
3.2 Study design: Life and Living in Advanced Age: A cohort study in New Zealand (LiLACS NZ)	41
3.2.1 LiLACS NZ participants and recruitment	41
3.2.2 LiLACS NZ data collection	41
3.2.3 Health measures	42

3.2.4	Nutrition measures	43
3.2.5	Dietary assessment - Multiple Pass 24 Hour Recalls	44
3.3	SCREEN II Validation Sub-Study Design	47
3.3.1	Ethical approval.....	47
3.3.2	Participants and recruitment	47
3.3.3	Data collection.....	48
3.3.4	Nutrition measures	48
3.4	Data and statistical analysis.....	53
3.4.1	Data analysis.....	53
3.4.2	Statistical analysis.....	54
4.0	RESULTS	56
4.1	The participants	56
4.1.1	Demographics of participants by gender	56
4.1.2	Lifestyle characteristics of participants and self-reported health.....	57
4.1.3	Anthropometric characteristics of participants	58
4.1.4	Functional status of participants.....	58
4.1.5	Other participant characteristics: polypharmacy and depression	59
4.1.6	Nutrition risk of participants as determined by SCREEN II and Dietitian’s Risk Rating	59
4.1.7	Macronutrient and micronutrient intakes by gender	62
4.2	Nutrition risk status of the participants.....	67
4.2.1	Demographics of participants	67
4.2.2	Lifestyle factors and self-reported health by SCREEN II risk group	68
4.2.3	Functional status by SCREEN II nutrition risk groups	68
4.2.4	Anthropometric characteristics by SCREEN II nutrition risk groups.....	69
4.2.5	Other participant characteristics: polypharmacy and depression	69
4.2.6	SCREEN II and Dietitian’s Risk Rating Score by nutrition risk.	70
4.2.7	Food groups.....	72
4.2.8	Macronutrient intakes by nutrition risk derived from the 24 hour MPRs.....	73
4.2.9	Micronutrient intakes derived from 24 hour MPRs’ by nutrition risk.....	76
4.2.10	SCREEN II validation	78
5.0	DISCUSSION	81

6.0 CONCLUSION	91
REFERENCES	92
APPENDICES	106

List of Tables

Table 2-1: Possible side effects of common medications used in older people	14
Table 3-1: Items included in SCREEN II	44
Table 3-2: Dietitian’s Nutrition Risk Rating Checklist	50
Table 3-3: Food groups - recommended servings for healthy older people	53
Table 4-1: Socio-demographic characteristics of participants.....	56
Table 4-2: Lifestyle factors and self-reported health of the participants.....	57
Table 4-3: Anthropometric characteristics of participants.....	58
Table 4-4: Functional performance measures of participants.....	58
Table 4-5: Medication use of participants.....	59
Table 4-6: Depressive symptoms of participants.....	59
Table 4-7: SCREEN II and Dietitian’s Risk Rating Scores between baseline and 12 months follow-up.....	59
Table 4-8: Proportion of men and women with an ‘at risk’ response to individual SCREEN II items	60
Table 4-9: Macronutrient intakes from the 24 hour MPRs, by gender	62
Table 4-10: Micronutrient intakes from the 24hour MPRs by gender	64
Table 4-11: Participants demographics by nutrition risk (SCREEN II follow-up).....	67
Table 4-12: Lifestyle factors and self-reported health by nutrition risk (SCREEN II follow-up)	68
Table 4-13: Functional performance measures by nutrition risk (SCREEN II follow-up)	68
Table 4-14: Anthropometric characteristics by nutrition risk (SCREEN II follow-up).....	69
Table 4-15: Geriatric Depression Scores by nutrition risk (SCREEN II follow-up)	69
Table 4-16: Medication use by nutrition risk (SCREEN II follow-up).....	70
Table 4-17: Change in SCREEN II scores between baseline and follow-up	70
Table 4-18: Proportion of participants with ‘at risk’ response to individual SCREEN II items	71
Table 4-19: Comparison of risk factor items.....	72
Table 4-20: Macronutrient intakes derived from the 24 hour MPRs, by the Dietitian’s Risk Rating.....	74
Table 4-21: Micronutrient intakes derived from the 24 hour MPRs, by Dietitian’s Risk Rating	76
Table 4-22: Correlation between Dietitian’s Risk Rating score and SCREEN II score.....	78
Table 4-23: Sensitivity and specificity of SCREEN II (medium risk)	79
Table 4-24: Sensitivity and specificity of SCREEN II (high risk)	80

List of Figures

Figure 2.1: Population age pyramid projections from 2009 – 2061	3
Figure 2.2: Factors contributing to nutrition related health	11
Figure 3.1: Example of a participant with high nutrition risk.....	52
Figure 4.1: The percentage of participants meeting the RDI's for individual nutrients	67
Figure 4.2: The percentage of participants who reported low servings of food groups.....	73
Figure 4.3: ROC curve for total SCREEN II compared to the dietitian's risk rating (medium risk).....	79
Figure 4.4: ROC curve for SCREEN II compared to dietitian's risk rating (high risk).....	80

Appendices

Appendix 1:	SCREEN II form
Appendix 2:	Multiple Pass Recall Assessment form
Appendix 3:	Prompt card for Multiple Pass Recall
Appendix 4:	Photographic atlas page – single food kumara
Appendix 5:	Photographic atlas page – guide page bread slices
Appendix 6:	Photographic atlas page – guide page crockery
Appendix 7:	Equivalent foods
Appendix 8:	Ethical Approval Letter
Appendix 9:	Information sheet
Appendix 10:	Consent form
Appendix 11:	Standardised Dietitian's Nutrition Risk Rating Checklist
Appendix 12:	Australia and New Zealand Nutrient Reference Values for older adults
Appendix 13:	Abbreviations