Weekend days are not required to accurately measure oral intake in hospitalised patients

Lee-anne S. Chapple^{a,b}

Adam M. Deane^{a,b,c}

Kylie Lange^b

Amelia J. Kranz^a

Lauren T. Williams^d

Marianne J. Chapman^{a,b,c}

^a Discipline of Acute Care Medicine, University of Adelaide, North Terrace, Adelaide, South Australia, Australia.

^b National Health and Medical Research Council of Australia Centre of Research Excellence in Translating Nutritional Science to Good Health, Level 6, Eleanor Harrald Building, North Terrace, Adelaide, South Australia, Australia.

^c Intensive Care Unit, Level 4, Emergency Services Building, Royal Adelaide Hospital, North Terrace, Adelaide, South Australia, Australia.

^d Menzies Health Institute of Queensland, Griffith University, Queensland, Australia.

Running title:

Quantifying oral intake in hospitalised patients

Keywords:

Nutrition; oral intake; dietary intake methodology; weighed food record; head injured patients

Corresponding author:

Ms. Lee-anne Chapple

Phone: +61 8 8222 4624

Email: lee-anne.costello@adelaide.edu.au

Author details:

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/jhn.12432](https://doi.org/10.1111/jhn.12432)

33 Ms. Lee-anne Chapple
34 PhD Candidate, MNutDiet, BMedSc
35 Centre of Research Excellence in Translating Nutritional Science to Good Health
36 Level 6, Eleanor Harrald Building, The University of Adelaide, SA 5005 AUSTRALIA
37 Phone: +61 8 8222 4624
38 Fax: +61 8 8223 3870
39 Email: lee-anne.costello@adelaide.edu.au
40
41 Dr Adam Deane
42 MBBS, PhD, FRACP, FCICM
43 Staff Specialist
44 Intensive Care
45 Royal Adelaide Hospital
46 North Terrace, Adelaide 5000, South Australia
47 Phone: +61 8 8222 4624
48 Mobile: +61 431 967 560
49 Email: adam.m.deane@gmail.com
50
51 Ms. Kylie Lange
52 BSc (Ma&CompSci) (Hons)
53 Biostatistician
54 Centre of Research Excellence (CRE) in
55 Translating Nutritional Science to Good Health
56 Discipline of Medicine
57 The University of Adelaide, Adelaide 5005, South Australia
58 E-mail: kylie.lange@adelaide.edu.au
59
60 Ms. Amelia Kranz
61 BNutDiet (Hons)
62 Discipline of Acute Care Medicine
63 University of Adelaide, North Terrace, Adelaide, South Australia, Australia.
64 Phone: +61 8 8222 4624
65 Fax: +61 8 8223 3870
66 Email: amelia-jk@hotmail.com

67
68 Professor Lauren Williams
69 PhD, PGradDipHlthSc, GradDipSocSc, GradDipNutDiet, AdvAPD
70 Menzies Health Institute of Queensland
71 Griffith University, Queensland, Australia
72 Phone: +61 7 5678 0155
73 Email: lauren.williams@griffith.edu.au
74

75 Professor Marianne Chapman
76 BMBS, PhD, FFARCSI, FANZCA, FJFICM
77 Director of Research/ Senior Staff Specialist
78 Intensive Care
79 Royal Adelaide Hospital
80 North Terrace, Adelaide 5000, South Australia
81 Mobile: +61 412 183 894
82 Email: Marianne.chapman@health.sa.gov.au
83
84
85
86
87
88
89
90

91 **Acknowledgements:**
92

93 The authors of this paper would like to acknowledge Annie Chung for her contributions to
94 data entry of weighed food records. This research was funded by an Australasian Society of
95 Parenteral and Enteral Nutrition (AuSPEN) small project grant and a Neurosurgical Research
96 Foundation grant.
97

98 **Conflict of Interest and Funding Sources Statement:**

The authors declare that they have no competing interests; such as employment, consultancies, stock ownership, honoraria, paid expert testimony, patent applications/registrations, grants or other funding.

AMD has received honoraria for participation on Clinical Advisory Board to treat nutritional insufficiency (Medtronic).

Funding Disclosure

This research was funded by an Australasian Society of Parenteral and Enteral Nutrition (AuSPEN) small project grant and a Neurosurgical Research Foundation grant. The first author was supported by an Australian Post-Graduate Award and Royal Adelaide Hospital Dawes Top-Up Scholarship.

Statement of Authorship:

LSC was responsible for study design, recruitment, data collection, data entry, data analysis, statistical analysis, interpretation of the data and drafting the manuscript. She is guarantor of this work, and as such, had full access to all the data in the study and takes responsibility for the accuracy of the data analysis.

MJC, AMD, and LTW contributed to the study design, interpretation of the data, and critical revision of the manuscript for important intellectual content.

KL was responsible for analysis and interpretation of the data, contributed to the study design, and critical revision of the manuscript for important intellectual content.

132 AK contributed to data collection, data entry, interpretation of the data, and critical revision
133 of the manuscript for important intellectual content.
134
135 All authors read and approved the final manuscript.

Received Date : 20-Jul-2016

Revised Date : 05-Sep-2016

Accepted Date : 07-Sep-2016

Article type : Original Research

Weekend days are not required to accurately measure oral intake in hospitalised patients

Abstract

Background

Nutrition studies in patients admitted to hospital frequently disregard oral intake because measurement is time-intensive and logistically challenging. In free-living populations, weighed food records (WFR) are the gold-standard and are conducted on weekend and weekdays to capture variations in intake; yet this may not translate during hospitalisation. The study objective was to determine whether oral intake differs between weekends and weekdays in hospitalised patients.

Methods

For adult patients initially admitted to ITU with a moderate-severe head injury over a 12-month period, WFR were conducted each week on Tuesday, Thursday and Saturday throughout hospitalisation. Meal components were weighed before and after consumption, and energy and protein intakes calculated with specialised software. Data are mean (SD). Differences were assessed using paired t-tests and agreement using Bland-Altman.

Results

Thirty-two patients had WFR collected on 220 days, 68% (n=149) on weekdays and 32% (n=71) on weekends. Overall, daily intakes were 1367 (877) kcal and 62 (40) g protein. There were no differences in intake across all days ($p=0.937$ energy, $p=0.797$ protein) or between weekdays and weekends in weeks one to three of oral intake (all $p>0.1$). Limits of agreement between mean intakes across days were wide for energy (range: -2680 to 2283 kcal) and protein (range: -125 to 110 g).

Conclusions

Grouped energy and protein intakes from WFR in hospitalised patients are similar on weekdays and weekends but large intra-patient variations occur. Future quantification of oral intake during hospitalisation should include as many days as feasible, but not necessarily weekend days, to reflect true intake.

Keywords:

Nutrition; oral intake; dietary intake methodology; weighed food record; head injured patients

Introduction:

Studies of nutrition practices in a hospitalised setting frequently disregard oral intake due to the time-intensive nature and logistic challenges associated with obtaining accurate intake measures. This may explain the absence of recommendations on oral intake in critical illness^(1, 2). Excluding orally ingested nutrient may lead to considerable underestimation of energy and protein intakes over the entire hospitalisation. Of note inferences from nutrition interventions conducted within the intensive therapy unit (ITU) have not measured oral intake either in ITU or after ITU discharge^(3, 4-7). The lack of detailed information regarding oral intake means that much of the nutritional intake throughout hospitalisation remains an unmeasured confounder, which could lead to incorrect inferences for both observational and interventional studies⁽⁸⁾. Accordingly, a precise but efficient and feasible method to measure oral intake in hospitalised patients is required.

Hitherto, hospital-based nutrition studies have used a range of methods to assess oral intake including recall, measures of waste, and estimates of intake⁽⁹⁻¹¹⁾. These methods contain inherent inaccuracies, which may limit their use in high-quality research⁽¹²⁾. Methods that rely on patient memory are prone to recall bias and exclude patients with acute delirium and following certain presentations, such as head injury, reducing the generalisability of results. Similarly, methods that provide an indirect measure of intake lack precision⁽¹²⁾.

Weighed food records (WFR) are considered the gold-standard technique for precise measurement of nutrient intakes in free-living populations⁽¹³⁾. It is recommended these be conducted at least three days per week, comprising two week days and one weekend day, to account for social variations and provide a reliable representation of actual intake⁽¹⁴⁾. The extent to which this is true in an institutionalised setting, such as a hospital, where variations in intake may differ from free-living individuals, has never been evaluated. If, similar to free-living individuals, intake varies between week days and weekends WFR will need to be conducted on both to accurately quantify intake in

hospitalised patients. Such a requirement has considerable cost and feasibility implications for studies of nutritional therapies in critically ill and hospitalised patients, whereas if variations in intake do not occur across different days of the week, the need to conduct WFR on a range of days, or outside of usual work days, may be unnecessary. Finally, a rigorous evaluation of oral intake over time as patients recover from ITU has not been done.

It was therefore hypothesised that, because of fewer fasting periods for procedures and greater periods when family were present to assist with feeding, head-injured patients recovering from critical illness would consume more energy and protein on weekends. The primary aim of this study was to compare energy and protein intakes derived from investigator-led WFR conducted on weekdays and weekends in patients with a head injury. The secondary aim was to determine if energy and protein intakes increased over time as patients recovered from their primary illness.

Materials and Methods:

Adult patients consecutively admitted to ITU with a moderate-severe head injury (Glasgow Coma Scale score 3-12) to the major neuro-trauma referral centre in the state of South Australia over a 12-month period were screened for eligibility. Data on energy and protein consumed orally throughout the hospital stay were collected prospectively and censored at 90 days.

To precisely quantify oral intake WFR were conducted once tube feeding was ceased and on three pre-determined days per week, including two weekdays (Tuesday and Thursday) and one weekend (Saturday), by trained research dietitians. Patients received hospital meals as per usual practices, based on individual meal selection or standard menu choices. Individual meal components (e.g. meat portion, mashed potato, gravy) provided from breakfast to one hour post-dinner were weighed prior to delivery to the patient. Meal components were weighed separately as they were plated on the plating line using Salter Brecknell Model 405 digital scales (Australia) to the nearest 0.1 gram. After consumption individual components of waste were weighed and deducted from the pre-weights to calculate the total proportion consumed in grams. Items provided outside of observation times were estimated using collection of wrappers, nursing notes, and communication with patient, family, and nursing staff.

Recorded weights were entered into FoodWorks 8 Xyris dietary analysis software (Brisbane, Australia) using pre-entered hospital recipes to calculate energy and protein intakes. WFR were excluded if they were partial days (due to hospital discharge or day leave) or if patients also

105 received artificial nutrition simultaneous (e.g. overnight enteral tube feeding). Energy and protein
106 requirements prescribed by the hospital dietitians as part of standard care were recorded.

107

108 **Ethical Approval**

109 This study was conducted according to the guidelines laid down in the Declaration of Helsinki and
110 all procedures involving human patients were approved by the Royal Adelaide Hospital Human
111 Research Ethics committee (HREC/14/RAH/100). Written informed consent was obtained from all
112 patients or their legal authorised guardian where appropriate.

113

114 **Statistical Analysis**

115 Data are presented as mean (SD). For weekend versus weekday analyses, mean intake data from the
116 two weekdays per week were combined to be representative of a single weekday and this was
117 compared to the corresponding weekend day for that week. Differences between energy and protein
118 intakes on week versus weekend days were assessed using linear mixed models with a fixed effect
119 for day of week and random effects to account for clustering of multiple days within subjects.
120 Agreement between energy and protein intakes assessed on week versus weekend days were
121 determined using Bland-Altman plots with the bias (mean difference) and limits of agreement
122 calculated at two standard deviations from the derived mean and difference variables. Based on
123 these results, all analyses were repeated for individual days. Poor agreement was defined a.priori to
124 be approximately 25% of the patient's requirements⁽¹⁵⁾ (>500 kcal/day and >25 g protein/day) given
125 prior research suggests that weight loss occurs when less than 75% of daily requirements are
126 delivered and therefore this is considered inadequate⁽¹⁰⁾.

127

128

129 **Results:**

130

131 Consent to participate was obtained in 32 patients admitted to ITU following a moderate-severe
132 head injury and who were subsequently ingesting food orally while hospitalised. Baseline patient
133 characteristics are shown in **Table 1**.

134

135 A total of 220 days of WFR were included, 68% (n=149) on a weekday and 32% (n=71) on a
136 weekend. Patients contributed data from a mean of 6.9 (range 1-26) days; 5.0 (range 1-21)
137 weekdays and 2.3 (range 1-7) weekends.

138

139 Overall, mean daily oral intake was 1367 (877) kcal/d and 62 (40) g protein/d, with similar amounts
140 consumed on week and weekend days (1368 (894) vs 1364 (845) kcal/d, 61 (41) vs 63 (39) g
141 protein/d). Total mean prescribed energy and protein requirements were 2249 (412) kcal and 105
142 (20) g protein, respectively. Days with interruptions were similar between groups (49.4% for
143 weekdays and 50.6% for weekends).

144
145 There were no differences in energy or protein intakes received on any individual day ($p=0.937$
146 energy, $p=0.797$ protein) or between combined week versus weekend days ($p=0.913$ energy,
147 $p=0.567$ protein). There were no differences in energy or protein intakes consumed across days in
148 the first ($p=0.665$ energy, $p=0.433$ protein; $n=83$ WFR), second ($p=0.529$ energy, $p=0.907$ protein;
149 $n=56$ WFR), or third ($p=0.426$ energy, $p=0.110$ protein; $n=30$ WFR) week of oral intake. In patients
150 that remained in hospital for at least two full weeks, mean oral energy and protein intakes increased
151 over time (**Table 2**).

152
153 Bland Altman plots of mean difference in energy and protein intake across individual days are
154 shown in **Figure 1**. There were wide limits of agreement for both energy and protein, but these
155 were consistent across days. There were consistently wide limits of agreement across days and
156 between combined weekdays and weekend days in both week one and week two (**Table 3**).

157 158 159 **Discussion:**

160
161 This is the first study to explore variations in oral intake in hospitalised patients measured on
162 weekdays compared to weekends using the gold standard technique, investigator-led WFR. At the
163 population level (e.g. mean intake for all patients) there were no differences in mean energy or
164 protein intakes between weekday and weekends, or individual days per week. Hence, these results
165 negate the hypothesis of this study, that head-injured patients recovering from critical illness would
166 consume more energy and protein on weekends. This observation is important for future
167 population-based research, such as observations of intake in specific patient groups, as
168 representative intake could be collected on any day of the week.

169
170 Only one other study has previously attempted to quantify oral intake in a critically ill population.
171 Peterson and colleagues reported that energy and protein intakes from oral intake were less than
172 50% of estimated requirements each day, however data were limited to the week following weaning
173 from ventilatory support⁽⁹⁾. Given the lack of data the need to collect precise dietary intake

information post-ITU has been identified by several authorities as an important objective^(16,17). Given the scarcity of research that includes the measurement of nutrition consumed orally in both critically ill and head-injured patients the finding that representative intake does not require measurement on weekend days provides an achievable, sufficiently accurate methodology to quantify energy and protein intakes, with positive inferences for funding.

However, on an individual patient-level, there was considerable day-to-day variation in energy and protein intakes, irrespective of the measurement day, and large intra-patient variation across days. Given this, in studies exploring the influence of oral intake in individual hospitalised patients (e.g. interventional or observational studies exploring associations between variables)^(18,19), a single day is an imprecise measure of mean intake for that patient. Accordingly, WFR should be collected on as many days as possible to precisely reflect actual intake. This finding also has implications for clinical practice where estimates of oral intake made on a single day will need to be repeated as frequently as possible to improve accuracy. While in free-living populations a small selection of both week and weekend days are required to provide a true reflection of intake, in this patient group large intra-patient variation occurred across all days demonstrating the need to include measurements on as many days as possible. That there was no difference in oral intake between week and weekend days also has implications for staffing a clinical service as this information does not require measurement on the weekend.

In this study there was also an increase in mean energy and protein intakes over time. This requires consideration, both for research and clinical practice. Based on these results a longer duration of measurement is required when evaluating for nuanced relationships between oral intake and recovery^(15,20).

While this study was conducted in a specific population, the measurement of energy and protein consumed via the oral route has been described in other patient groups. These studies have all used single day snapshots of oral intake, with data from self-reported intakes⁽²¹⁾, visual reports of categorised food waste (e.g. nothing, <1/2, >1/2, all),^(22,23) or measures of plate waste but not the portion provided⁽²⁴⁾. While these studies have not been able to show changes in intake longitudinally, taken together they are consistent with the concept that patients consuming nutrients orally receive suboptimal nutrition^(21,22,24,25), which is associated with adverse outcomes such as increased infection rates and mortality⁽²¹⁻²³⁾. Therefore, assessment of ingested nutritional intake is important, and greater emphasis on accurate measurement of nutrients consumed via this route should take place both in clinical practice and nutrition research.

209

210 This study has a number of strengths. It is the first to investigate the variance and agreement
211 between energy and protein intakes quantified using WFR on weekdays versus weekends in an
212 institutional setting. Compared to WFR in free-living populations where the individual completes
213 the measurements, these WFR were conducted by two independent study investigators not open to
214 respondent bias. The main limitation was that two weekdays and one weekend were considered
215 representative of weekly intake, as is common practice in dietary methodology. Additionally, any
216 items consumed overnight were not included in the observation period. However, the latter was
217 consistent for all days. Finally, these data were obtained from a small, defined group of patients
218 admitted to a single-centre and so results may not be generalisable to all healthcare settings and
219 patient groups.

220

221

222 **Conclusion**

223

224 In hospitalised head-injured patients recovering from critical illness, mean energy and protein
225 intakes were observed to be similar across days but with large intra-patient variations. This suggests
226 that future quantification of oral intake in hospitalised populations, but not individuals, could be
227 performed using investigator-led WFR on any day of the week. This has significant implications for
228 resourcing nutrition research. Studies of individual treatment effects should include as many days as
229 feasible, but not necessarily weekends, to adequately reflect true intake.

230

231

232 **References:**

233

- 234 1. McClave SA, Taylor BE, Martindale RG et al. Guidelines for the Provision and Assessment of
235 Nutrition Support Therapy in the Adult Critically Ill Patient: Society of Critical Care Medicine
236 (SCCM) and American Society for Parenteral and Enteral Nutrition (A.S.P.E.N.). JPEN.
237 2016;40:159-211.
- 238 2. Jacobs D, Jacobs D, Kudsk K et al. Practice management guidelines for nutritional support of the
239 trauma patient. J Trauma Inj Infect Crit Care: 2004;57:660-679.
- 240 3. Casaer MP, Mesotten D, Hermans G et al. Early versus late parenteral nutrition in critically ill
241 adults. NEJM. 2011;365:506-517.
- 242 4. Heyland D, Muscedere J, Wischmeyer PE et al. A randomized trial of glutamine and antioxidants
243 in critically ill patients. NEJM. 2013;368:1489-1497.

- 244 5. Doig GS, Simpson F, Sweetman EA et al. Early parenteral nutrition in critically ill patients with
245 short-term relative contraindications to early enteral nutrition: a randomized controlled trial. JAMA:
246 2013;309:2130-2138.
- 247 6. Harvey SE, Parrott F, Harrison DA et al. Trial of the route of early nutritional support in
248 critically ill adults. NEJM. 2014;371:1673-1684.
- 249 7. Peake SL, Young PJ, Chapman M et al. Permissive Underfeeding or Standard Enteral Feeding in
250 Critical Illness. NEJM. 2015;373:1173-1174.
- 251 8. Braunschweig CA, Sheean PM, Peterson SJ et al. Intensive nutrition in acute lung injury: a
252 clinical trial (INTACT). JPEN. 2015;39:13-20.
- 253 9. Peterson SJ, Tsai AA, Scala CM et al. Adequacy of oral intake in critically ill patients 1 week
254 after extubation. J Am Diet Assoc. 2010;110:427-433.
- 255 10. Kondrup J. Can food intake in hospitals be improved? Clin Nutr. 2001;20:153-160.
- 256 11. Dupertuis Y. Food intake in 1707 hospitalised patients: A prospective comprehensive hospital
257 survey. Clin Nutr. 2003;22:115-123.
- 258 12. Rutishauser IH. Dietary intake measurements. Public Health Nutr. 2005;8:1100-1107.
- 259 13. Wrieden W, Peace H, Armstrong J et al. (2003) A short review of dietary assessment methods
260 used in National and Scottish Research Studies [Monitorig of Scottish Dietary Targets Workshop].
- 261 14. Yang PH, Black JL, Barr SI et al. Examining differences in nutrient intake and dietary quality
262 on weekdays versus weekend days in Canada. Applied Physiol Nutr Metab. 2014;39:1413-1417.
- 263 15. Chapple LS, Deane AM, Heyland DK et al. Energy and protein deficits throughout
264 hospitalization in patients admitted with a traumatic brain injury. Clin Nutr (E-pub ahead of print).
265 2016;DOI: 10.1016/j.clnu.2016.02.009.
- 266 16. Merriweather J, Smith P & Walsh T. Nutritional rehabilitation after ICU - does it happen: a
267 qualitative interview and observational study. J Clin Nurs. 2014;23:654-662.
- 268 17. Tan T, Brett SJ, Stokes T et al. Rehabilitation after critical illness: summary of NICE guidance.
269 BMJ. 2009;338:b822.
- 270 18. Bruce D, Laurance I, McGuinness M et al. Nutritional supplements after hip fracture: poor
271 compliance limits effectiveness. Clin Nutr. 2003;22:497-500.
- 272 19. Neumann M, Friedmann J, Roy MA et al. Provision of high-protein supplement for patients
273 recovering from hip fracture. Nutrition. 2004;20:415-419.
- 274 20. Hackett AF, Yeung CK & Hill GL. Eating patterns in patients recovering from major surgery-a
275 study of voluntary food intake and energy balance. Br J Surg. 1979;66:415-418.
- 276 21. Hiesmayr M, Schindler K, Pernicka E et al. Decreased food intake is a risk factor for mortality
277 in hospitalised patients: the NutritionDay survey 2006. Clin Nutr. 2009;28:484-491.

278 22. Dupertuis YM, Kossovsky MP, Kyle UG et al. Food intake in 1707 hospitalised patients: a
 279 prospective comprehensive hospital survey. Clin Nutr. 2003;22:115-123.

280 23. Thibault R, Makhoulouf AM, Kossovsky MP et al. Healthcare-associated infections are associated
 281 with insufficient dietary intake: an observational cross-sectional study. PloS one.
 282 2015;10:e0123695.

283 24. Barton AD, Beigg CL, Macdonald IA et al. High food wastage and low nutritional intakes in
 284 hospital patients. Clin Nutr. 2000;19:445-449.

285 25. Thibault R, Chikhi M, Clerc A et al. Assessment of food intake in hospitalised patients: a 10-
 286 year comparative study of a prospective hospital survey. Clin Nutr. 2011;30:289-296.

287 **Figure Legend:**

Figure 1: Bland Altman plots of difference versus mean of energy and protein intake measured
 across days

Table 1: Patient demographics, n=32

	Total
Age (y), mean (SD)	44 (16)
Sex (male) n, (%)	28 (88)
Initial GCS:	
GCS 3-8, n (%)	20 (63)
GCS 9-12, n (%)	12 (37)
APACHE II score, median [IQR]	18 [13 - 21]
SOFA score, mean (SD)	6 (3)
Body Mass Index (kg/m ²), mean (SD)	26 (6)
ITU LOS (d), median [IQR]	12 [6 - 17]
Hospital LOS (d), median [IQR]	30 [19 - 50]
Days to commence oral intake, median [IQR]	13 [5 - 25]
Days received oral intake, median [IQR]	15 [9 - 23]

APACHE II: Acute Physiology and Chronic Health Evaluation, GCS: Glasgow Outcome Scale, IQR: Interquartile Range, LOS: Length Of Stay, SOFA: Sequential Organ Failure Assessment

Table 2: Mean (SD) energy and protein intakes per day for week one and week two for patients with complete data, n=15

	Energy (kcal), mean (SD)			Protein (g), mean (SD)		
	Week 1	Week 2	p-value	Week 1	Week 2	p-value
Saturday	1073 (858)	1313 (729)	0.31	52 (44)	64 (36)	0.29
Thursday	935 (907)	1440 (914)	0.035	39 (35)	69 (45)	0.005
Tuesday	1140 (772)	1600 (945)	0.91	55 (41)	68 (44)	0.39
Mean for all days	1050 (833)	1451 (856)	0.004	49 (40)	67 (41)	0.009

SD= Standard deviation

Paired-samples t-test for means comparison

Table 3: Mean energy and protein intakes and limits of agreement across days from Bland Altman plots

	Energy (kcal)		Protein (g)	
	Mean difference intake	Limits of agreement (Mean+/-2SD)	Mean difference intake	Limits of agreement (Mean+/-2SD)
Week one (n=25)				
Tues vs Thurs	-36	-2355, 2283	4	-103, 110
Thurs vs Sat	-175	-2281, 1931	-13	-108, 83
Tues vs Sat	-211	-2680, 2258	-9	-125, 107
Weekend vs weekday	-153	-2135, 1828	-11	-90, 67
Week two (n=15)				
Tues vs Thurs	161	-958, 1279	-2	-56, 53
Thurs vs Sat	126	-1779, 2031	5	-88, 98
Tues vs Sat	287	-1055, 1629	3	-59, 66
Weekend vs weekday	155	-1398, 1708	-2	-97, 94

SD= Standard deviation

jhn_12432_f1.jpg

Minerva Access is the Institutional Repository of The University of Melbourne

Author/s:

Chapple, LS;Deane, AM;Lange, K;Kranz, AJ;Williams, LT;Chapman, MJ

Title:

Weekend days are not required to accurately measure oral intake in hospitalised patients

Date:

2017-06-01

Citation:

Chapple, L. S., Deane, A. M., Lange, K., Kranz, A. J., Williams, L. T. & Chapman, M. J. (2017). Weekend days are not required to accurately measure oral intake in hospitalised patients. JOURNAL OF HUMAN NUTRITION AND DIETETICS, 30 (3), pp.378-384. <https://doi.org/10.1111/jhn.12432>.

Persistent Link:

<http://hdl.handle.net/11343/291824>