| Author Year<br>Country<br>Research<br>Design<br>Sample Size | Methods | Outcomes |
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| Sabour et al.<br>2016<br>Iran<br>Observational<br>N=103 | **Population:** Mean age: 39.5 yr; Gender: males=86, females=17; Injury etiology: unspecified; Level of injury: cervical=23, thoracic=63, lumbar=17; Level of severity: AIS A=76, B=13, C=4, D=10.<br>**Intervention:** Participants were assessed upon admission to a research centre.<br>**Outcome Measures:** Caloric Intake, Protein Intake, Body Mass Index (BMI), Bone Mineral Density (BMD). | 1. Measurements were taken at the femoral neck (FN), femoral trochanter (FT), femoral intertrochanteric zone (FIZ), lumbar vertebrae (LV), and hip.<br>2. BMD was significantly correlated with BMI at all measured points (p<0.05).<br>3. BMD was significantly greater in female participants at all measured points (p<0.05), except at the FN.<br>4. BMD of the LV was significantly greater in participants with incomplete injury (p<0.05) and with paraplegia (p<0.05).<br>5. BMD of the FIZ was significantly greater in participants with AIS D (p<0.05).<br>6. Caloric intake was not significantly correlated with BMD at any point.<br>7. Protein intake was negatively correlated with BMD of the LV (r=-0.24, p=0.03).<br>8. BMD of the LV was negatively correlated with intake of tryptophan, isoleucine, lysine, cysteine, tyrosine, threonine, leucine, methionine, phenylalanine, valine, and histidine (p<0.05). |
| Gorgey et al.<br>2015<br>USA<br>Observational<br>N=16 | **Population:** Mean age: 38 yr; Gender: males=16, females=0; Injury etiology: unspecified; Level of injury: C5-7=6, T3-10=10; Level of severity: AIS A=12, B=4; Time since injury: >1yr.<br>**Intervention:** Participants from the community were assessed and dietary intake was recorded for 4wk.<br>**Outcome Measures:** Dietary Record Frequency, Percentage of Macronutrients, Caloric Intake, Total Energy Expenditure (TEE), Basal Metabolic Rate (BMR), Fat-Free Mass (FFM), Fat Mass (FM). | 1. Caloric intake decreased over 4 wk, but the difference was not significant (p=0.056). There was no significant difference (p=0.93) or interaction (p=0.54) in measuring caloric intake among different dietary record frequencies (1, 3, or 5 d/wk).<br>2. TEE was significantly higher than caloric intake using 1 d (p=0.001), 3 d (p=0.015), or 5 d (p=0.005) dietary frequency records.<br>3. BMR was not significantly different from caloric intake for any dietary record frequency, and the two were not significantly correlated.<br>4. BMR was significantly correlated with total FFM (r=0.71, p=0.005), leg FFM (r=0.55, p=0.04), and trunk FFM (r=0.62, p=0.018).<br>5. Percentage of macronutrients consumed was not significantly different among dietary frequency records: fat (p=0.92), carbohydrates (p=0.50), or protein (p=0.35).<br>6. Percentage of fat consumed was significantly different across 4 wk (p=0.031), particularly at 2-3 wk (p=0.034). There was no significant interaction among dietary record frequencies in measuring fat intake (p=0.80).<br>7. Percentage of carbohydrates consumed was significantly different across 4 wk (p=0.032), particularly at 1-3 wk (p=0.026) and 2-3 wk (p=0.014). There was no significant interaction among dietary record frequencies in measuring carbohydrate intake (p=0.30). |

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| | | 8. Percentage of protein consumed was significantly different across 4 wk (p=0.021), particularly at 1-3 wk (p=0.008). There was no significant interaction among dietary record frequencies in measuring protein intake (p=0.025).<br>9. Percentage of fat consumed accounted for 29% of total FM ($r^2$=0.29, p=0.037), 34% of leg FM ($r^2$=0.34, p=0.022), and 24% of trunk FM ($r^2$=0.24, p=0.066). It was negatively correlated with total FFM (r=-0.53, p=0.04), trunk FFM (r=-0.54, p=0.036), and BMR (r=-0.52, p=0.059).<br>10. Percentage of carbohydrates was negatively correlated with % fat (r=-0.92, p<0.0001), % protein (r=-0.67, p=0.005), total FM (r=-0.56, p=0.031), leg FM (r=-0.64, p=0.01), and trunk FM (r=-0.50, p=0.059). It was positively correlated with total FFM (r=0.54, p=0.037) trunk FFM (r=0.52, p=0.046), and BMR (r=0.55, p=0.04).<br>11. Percentage of protein was not correlated with FM, FFM, or BMR. |
| Tsunoda et al. 2015<br>Japan<br>Observational<br>N=841 | **Population:** Mean age: 61 yr; Gender: males=718, females=123; Injury etiology: unspecified; Level of injury: cervical=245, thoracic=434, lumbar=162; Level of severity: unspecified; Mean time since injury: 27 yr.<br>**Intervention:** Participants from the community were assessed via questionnaires, and categorized as superior (n=413) or subordinate (n=428) based on food intake score.<br>**Outcome Measures:** Food Intake, Trans-Theoretical Model (TTM), Self-Efficacy (SE), Outcome Expectancy (OE). | 1. Food intake frequency scores between the superior and subordinate groups were significantly different in age (p<0.001), gender (p=0.002), living situation (p=0.002), and care services status (p=0.007).<br>2. In univariate analysis, all food intake variables were significantly correlated (p<0.001) with TTM (OR range: 2.55-5.89) SE (OR range: 1.93-4.08), and OE (OR range: 1.61-2.76).<br>3. In multivariate analysis, TTM was significantly correlated with the following food intake variables: 'to eat vegetable dishes' (OR=2.76, p<0.001), 'to eat green/yellow vegetables (OR=2.29, p=0.003), 'to eat dairy products' (OR=2.75, p<0.001), and 'to eat fruits' (OR=1.87, p=0.003).<br>4. In multivariate analysis, SE was significantly correlated with the following food intake variables: 'to eat vegetable dishes' (OR=2.12, p=0.008), 'to eat dairy products' (OR=1.91, p=0.001), and 'to eat fruits' (OR=1.97, p=0.001).<br>5. In multivariate analysis, OE was not significantly correlated with any food intake variable. |
| Lieberman et al. 2014<br>USA<br>Observational<br>N=100 | **Population:** Mean age: 45.3 yr; Gender: males=78, females=22; Injury etiology: unspecified; Level of injury: paraplegia=43, quadriplegia=57; Level of severity: AIS A=66, B=16, C=18; Mean time since injury: 15.1 yr;<br>**Intervention:** Participants from the community were assessed and compared to age- and gender-matched controls (n=100).<br>**Outcome Measures:** Nutrient Intake, Food Intake, Dietary Guideline Adherence. | 1. Nutrient intake: participants consumed significantly less calcium (means: 1049 versus 1415 mg; p=0.004) and Vitamin D (means: 223 versus 315 IU; p=0.009) when compared to controls.<br>2. Food intake: participants consumed significantly fewer mean daily servings of dairy (2.10 versus 4.79, p<0.0001), fruit (2.01 versus 3.64, p=0.002), whole grains (1.20 versus 2.44, p=0.007), and sugars (1.46 versus 3.50, p=0.002) when compared |

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| | | to controls.<br>3. Guidelines: fewer participants adhered to recommended daily servings of fruits and vegetables (≥5 cups; 40.3% versus 68.7%, p<0.001), whole grains (≥3 oz; 8.9% versus 21.1%, p=0.01), and dairy (≥3 cups; 23.4% versus 48.6%, p<0.001). |
| Wong et al.<br>2014<br>UK<br>Observational<br>N=150 | **Population:** Median age: 44 yr; Gender: males=46, females=104; Injury etiology: trauma=107, non-trauma=43; Level of injury: cervical=57, thoracic=59, lumbar=22, sacral=1; Level of severity: AIS A=70, B=10, C=28, D=31; Mean time since injury: unspecified.<br>**Intervention:** Participants were assessed upon admission to SCI centers.<br>**Outcome Measures:** Spinal Nutrition Screening Tool (SNST), Malnutrition Universal Screening Tool (MUST), Length of Stay (LOS), Mortality. | 1. 44.6% of participants were at risk for undernutrition (SNST≥11 / MUST≥1).<br>2. LOS was significantly higher in at-risk participants than those not at risk (129 versus 85 d, p=0.012).<br>3. Increased LOS was associated with higher SNST score (p=0.012), higher MUST score (p=0.013), new admission (p<0.01), prior ICU stay (p<0.01), low protein (p=0.022), low albumin (p<0.01), and weight loss >10% (p<0.01).<br>4. Mortality rate at 1 yr was significantly higher in at-risk participants than those not at risk (10.2% versus 1.4%, p=0.036).<br>5. Higher mortality was associated with age ≥60 yr (p<0.01), readmission (p=0.018), pressure ulcers (p=0.028), and mechanical ventilation (p=0.025).<br>6. In univariate analyses, predictors of LOS were SNST score (p=0.003), MUST score (p=0.003), injury level (p=0.027), admission type (p<0.001), mechanical ventilation usage (p=0.003), prior ITU stay (p<0.001), serum protein (p=0.002), and serum albumin (p<0.001).<br>7. In multivariate analysis, predictors of LOS were admission type (B=81.23, p<0.001) and serum albumin (B=-3.62, p=0.013). |
| Pellicane et al.<br>2013<br>USA<br>Observational<br>N=78 | **Population:** SCI (n=16): Mean age=41.1±21.2 yr; Gender: males=13, females=3; Level of injury: tetraplegia=8, paraplegia=8; Other injury etiologies: TBI=9, stroke=43, Parkinson's disease (PD)=10.<br>**Treatment:** Rehabilitation inpatients were assessed by a Registered Dietitian for dietary intake once weekly.<br>**Outcome Measures:** Calorie and protein intake. | **1.** Total calorie intake was significantly higher in individuals with SCI compared to stroke (p<0.003) and PD (p<0.45).<br>**2.** Calorie intake per body weight (cal/kg) was significantly higher in individuals with SCI compared to stroke (p<0.025).<br>**3.** There were no significant differences in total protein intake between varying etiologies.<br>**4.** Age (p<0.001), gender (p=0.023), were significant predictors of calorie and protein intake; admission weight also predicted calorie intake (p=0.025). |
| Krempien & Barr<br>2012<br>Canada<br>Observational<br>N=32 | **Population:** Mean age: 30.6 yr; Gender: males=24, females=8; Injury etiology: unspecified; Level of injury: paraplegia=12, quadriplegia=20; Level of severity: unspecified; Time since injury: unspecified.<br>**Intervention:** Participants with professional athletic history were assessed.<br>**Outcome Measures:** Three-Factor Eating Questionnaire (TFEQ), Body Mass Index (BMI), Sum of Skinfolds (SoS), Dietary Intake. | 1. Participants with low dietary restraint (≤11; n=16) had significantly lower TFEQ disinhibition score (2.1 versus 3.5, p<0.05) and percentage of energy from protein (16.9% versus 18.4%, p<0.05) than those with high dietary restraint.<br>2. There were no significant differences in BMI, SoS, or other dietary intakes (i.e. calories, carbohydrates, fat, fibre) between high and low dietary restraint groups.<br>3. TFEQ dietary restraint score was not significantly associated with BMI, SoS, or dietary intakes (p>0.05). |

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| | | 4. TFEQ disinhibition score was significantly associated with SoS (r=0.513, p=0.003).<br>5. TFEQ hunger score was significantly associated with intake of calories (r=0.354, p=0.047), carbohydrates (r=0.361, p=0.042), and protein (r=0.456, p=0.009). |
| Sabour et al. 2012 Iran Observational N=162 | **Population:** Mean age=34.2±0.7 yr; Gender: males=131, females=31; Level of injury: tetraplegia=94, paraplegia=68; Time since injury=8.0±0.5 yr.<br>**Treatment:** Face-to-face interviews examining habitual daily food intake patterns.<br>**Outcome Measures:** Macronutrient intake, simple carbohydrate intake, total calorie intake. | **1.** Percentages of total energy intake derived from macronutrients were 53% vs. 52% carbohydrate, 10% vs. 11% protein, and 37% vs. 39% fat for men and women, respectively.<br>**2.** There was excessive consumption of simple carbohydrates (102.2±40.4 g/d).<br>**3.** Males consumed a greater number of calories than women (p<0.05).<br>**4.** No difference in total intake between those with tetraplegia versus paraplegia.<br>**5.** Individuals with incomplete injuries consumed significantly more monounsaturated fatty acids than those with complete injuries (p=0.03).<br>**6.** Age, education and gender significantly predicted calorie intake; time since injury, education, and gender were significant predictors for carbohydrate intake.<br>**7.** Smoking and level of injury were not related to any dietary variable, and there were no significant predictors for dietary protein and simple carbohydrate intake. |
| Wong et al. 2012 UK Observational N=150 | **Population:** Age: <60 yr=109, >60 yr=38; Level of injury: C=41.1%, T=42.4%, L=15.8%, S=0.7%; Severity of injury: AISA A=50.4%, B=7.2%, C=20.1%, D=22.3%.<br>**Treatment:** Assessment of nutritional risk on admission to SCI centers.<br>**Outcome Measures:** Malnutrition Universal Screening Tool, Body Mass Index (BMI) | 1. At the time of hospital admission, 40.0% of the sample were found to be nutritionally 'at risk' and 21.4% were assessed as being 'at high risk' of malnutrition.<br>2. The highest prevalence of nutritional risk was found in groups with prior intensive care unit stays (p=0.035), mechanical ventilation (p=0.183) and 'artificial' nutritional support at the time of arrival (<0.001).<br>3. Nutritional risk showed no significant difference with increased age (p=0.913).<br>4. Compared with 'no-risk' patients, at-risk patients were found to have significantly lower concentrations of total protein, albumin, Hb, creatinine and Mg, with lower BMI and less appetite.<br>5. 'At-risk' patients were found to be receiving more prescribed medications. |