Short Communication

A multicentre assessment of malnutrition, nutritional risk, and application of nutritional support among hospitalized patients in Guangzhou hospitals

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Background: To assess nutritional status, the prevalence of nutritional risk, and nutritional support in hospitalized patients in Guangzhou, to determine gender or age associated differences in the prevalence of nutritional risk. Methods: A total of 2550 patients admitted during April to December 2008 from six departments (Gastroenterology, Pulmonology, Neurology, Nephrology, General Surgery and Thoracic Surgery) of four teaching hospitals were screened using the Nutritional Risk Screening 2002 tool. Results: Overall prevalence of undernutrition and nutritional risk was 17.8% and 41.5%, respectively. The department of Pulmonology had the highest prevalence of undernutrition (28.2%) and nutritional risk (55.9%). The prevalence of nutritional risk was significantly higher in patients ≥70 years of age than patients <70 years (64.2% vs 32.6%, $p<0.001$). No gender difference in the prevalence of nutritional risk was observed in general. In total, 47.6% of "at risk" and 19.4% of "not at risk" patients received nutritional support. Parenteral nutrition accounted for 88.8% of the nutritional support. Conclusions: The present study documented the prevalence of nutritional risk defined by NRS2002 and inappropriate assignment of nutritional interventions in Guangzhou hospitals.

Key Words: nutritional assessment, nutritional status, hospital, malnutrition, nutritional support

INTRODUCTION

The impact of a patient's nutritional condition on clinical outcome has been widely recognized. Studies showed that application of nutritional support based on nutritional screening results significantly reduced the incidence of complications and the length of hospital stay.[1] For a long time, there was a lack of simple and reliable screening tool for precise assessment of nutritional risk among inpatients. Nutritional Risk Screening 2002 (NRS2002) established by Kondrup *et al* was recommended by the European Society of Parenteral and Enteral Nutrition (ESPEN) for nutritional assessment in hospitalized patients and was the first screening tool validated against 128 randomized controlled trials with respect to clinical outcome.[2,3] Evidence from a multicentre, prospective study involving 26 hospital departments from more than 10 countries showed that nutritional risk defined by NRS2002 was an independent predictor of poor clinical outcome.[4]

In this study, we conducted a multicentre, cross-sectional analysis of the prevalence of nutritional risk assessed by NRS2002 and the application of nutritional support among hospitalized patients in four teaching hospitals in Guangzhou, China. We also compared the prevalence of nutritional risk between different gender or age groups. We believe this is one of the most comprehensive nutritional risk screening studies in southern China.

METHODS

Patients

A total of 2602 consecutive patients admitted to the departments of Gastroenterology, Pulmonology, Neurology, Nephrology, General Surgery and Thoracic Surgery were

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recruited from April to December 2008 in the First (876 patients) and the Sixth Affiliated Hospital (393 patients) of SUN Yat-Sen University, the First Affiliated Hospital of Guangzhou Medical University (642 patients), and Guangzhou Red Cross Hospital (691 patients). Of these, 15 patients refused to cooperate with the questionnaire, and 37 others failed to meet the inclusion criteria: 1) 18-80 years of age; 2) length of hospital stay >1 day; 3) not subjected to surgery within 24 hours after admission; 4) well oriented to time and place; 5) speaking and understanding Chinese; and 6) providing a written informed consent form. The protocol was approved by the Ethics Committee of all four teaching hospitals (Register No S054, Clinical trail register No NCT00289380). The study was performed in accordance with the ethical standards laid down in the Declaration of Helsinki.

Nutritional risk screening and data collection

Patients were interviewed within 24 hours after admission with a questionnaire composed according to the items in NRS2002. According to the Working Group on Obesity in China, undernutrition is defined by a BMI<18.5 kg/m^2 combined with an impaired general condition; overweight is defined by 24.0 kg/m^2≤BMI<28kg/m^2; and obesity is defined by a BMI≥28.0 kg/m^2. The total NRS score was calculated by adding the nutritional status score (0 to 3) to the disease severity score (0 to 3), plus a score of 1 for patients ≥70 years of age. The nutritional status score was based on weight loss within 3 months, food intake reduced in the preceding week, and BMI, as described previously.[2] The severity of disease was categorized as absent, mild, moderate or severe (score 0-3) according to prototype provided previously and converted to a score of 0-3.[2] Patients with an NRS score ≥3 were considered nutritionally "at risk". Patients who received nutritional support for at least 3 days were included in the nutritional-support group.

Quality control

Each patient was interviewed separately by two dieticians specifically trained to perform NRS2002 screening, resulting in two independent sets of answers. Disagreements were submitted for discussion in the committee that consisted of the deans of the Dept of Clinical Nutrition from each of the four hospitals. Patients were given a third interview by one of the committee members if consensus could not be reached. The precision of height or weight measurement was as described previously.[5] Both height and weight were measured by nurses and documented in medical records. The severity of disease and the application of nutritional support were recorded by attending doctors who were blinded to the NRS score of a patient in each hospital. Parenteral nutrition (PN) was defined as nutrients administered intravenously that contain a combination of carbohydrate, amino acids or fat. Enteral nutrition (EN) was defined as oral nutrient supplements or tube feeding. Patients who received EN or PN for at least 3 days were considered nutritionally supported. All primary data were confirmed within 24 hours after the patient was discharged and put into the Epidata database where the software was able to perform logical check and finally determine object database.

Statistical analysis

Statistical analysis was performed with SPSS (Chicago, IL, USA), version 13.0. Descriptive data were presented as mean±SD or percentages. Student-t test or F test were used for the comparison of continuous variables among different groups. Chi-square analysis was used for the comparison of the prevalence of malnutrition or nutritional risk among different groups. A p-value <0.05 was considered statistically significant.

RESULTS

Demographic data

A total of 2550 patients were finally screened, including 1487 men and 1063 women. The demographics and nutritional assessment results upon admission were listed in Table 1. The mean age ± SD was 56.9±17.2 years in male and 55.8±17.8 years in female patients. There was no significant difference in age between men and women in general (t = 1.64, p=0.1). The percentage of patients with an NRS score ≥3 was the highest in the Dept of Pulmonology (55.9%, χ^2 = 50.5, p<0.001). Overall, 1059 (accounting for 41.5% of the total population) patients were under nutritional risk as defined by NRS2002.

The prevalence of undernutrition, overweight and obesity upon admission

Patients' BMI were recorded as mean±SD. There were 2142 patients with a measurable BMI, accounting for 84% of the total population. No significant difference in BMI was found between male and female patients (t = 0.851, p=0.395). Undernutrition, overweight and obesity were defined by BMI, as shown in Table 1. No significant difference was observed in the total percentage of undernutrition (χ^2 = 2.6, p=0.107), normal (χ^2 = 0.484, p=0.487), overweight (χ^2 = 0.113, p=0.737) or obesity (χ^2 = 3.32, p=0.068) between male and female patients. The percentage of obesity in males was significantly higher than that in female in the Dept of Nephrology (χ^2 = 8.13, p=0.004) and General Surgery (χ^2 = 9.68, p=0.002), while the situation was opposite in the Dept of Pulmonology (χ^2 = 6.34, p=0.012). However, the sample size of obese cases in each department may be too small to have enough statistical power.

The prevalence of nutritional risk in different age and sex group

A score of 1 is included in the NRS score of a patient who is 70 years or older. We wondered whether there would be any difference in the prevalence of nutritional risk between patients <70 years and patients ≥70 years. Not surprisingly, the prevalence of nutritional risk in patients ≥70 years was significantly higher than that in patients <70 years (χ^2 = 212, p<0.001), as shown in Table 2. Meanwhile, we analyzed the prevalence of nutritional risk in male and female patients within each age group. No gender associated difference in the prevalence of nutritional risk was observed within the "≥70 years" group (χ^2 = 0.512, p=0.474). However, statistics showed that the prevalence of nutritional risk was higher in males than in females within the "<70 years" group (χ^2 = 3.9, p=0.048). We further compared the prevalence of nutritional risk in men <70 years and that in women <70 years within each

Table 1. Patient demographics and nutritional risk status at admission in each department

		Gastroenterology	Pulmonology	Neurology	Nephrology	General Surgery	Thoracic Surgery	Total
Number of patient	Men	303	291	99	195	369	230	1487
	Women	213	149	113	193	288	107	1063
	total	516	440	212	388	657	337	2550
BMI (kg/m^2) †, Mean±SD	Men	21.3±3.45	20.6±3.36	22.6±2.81	23.2±4.23	21.7±3.42	22.0±3.48	21.7±3.59
	Women	21.8±3.54	21.2±4.55	22.1±2.58	21.4±3.36	21.3±2.89	21.7±3.48	21.5±3.44
	Overall	21.5±3.49	20.8±3.8	22.4±2.69	22.3±3.91	21.5±3.21	21.9±3.48	21.6±3.53
Age (years), mean±SD	Men	55.8±16.8	60.1±17.4	67.3±11.1	55.8±19.5	53.8±17.5	55.8±14.8	56.9±17.2
	Women	57.6±17.1	56.9±17.2	67.2±14	54±20.9	52.4±16.5	50.7±15.3	55.8±17.8
	total	56.5±16.9	59±17.4	67.2±12.6	54.9±20.2	53.2±17	54.2±15.1	56.4±17.4
Age ≥70 years, % (n)	Men	23.8 (72)	40.5 (118)	57.6 (57)	32.3 (63)	23.3 (86)	17.0 (39)	29.3 (435)
	Women	25.8 (55)	27.5 (41)	51.3 (58)	32.6 (63)	18.4 (53)	12.1 (13)	26.6 (283)
	total	24.6 (127)	36.1 (159)	54.2 (115)	32.5 (126)	21.2 (139)	15.4 (52)	28.2 (718)
NRS score≥3, % (n)	Men	40.9 (124)	57.7 (168)	42.4 (42)	42.6 (83)	36.3 (134)	38.3 (88)	43.0 (639)
	Women	36.2 (77)	52.3 (78)	38.9 (44)	42.0 (81)	34.7 (100)	37.4 (40)	39.5 (420)
	total	39.0 (201)	55.9 (246)*	40.6 (86)	42.3 (164)	35.6 (234)	38.0 (128)	41.5 (1059)
Undernutrition, % (n/n)	Men	17.5 (44/252)	28.1 (74/263)	4.92 (3/61)	10.5 (16/153)	16.1 (52/323)	17.4 (39/224)	17.9 (228/1276)
	Women	15.6 (26/165)	28.5 (37/130)	5.48 (4/73)	19.4 30/155)	14.6 (35/240)	20.4 (21/103)	17.7 (153/866)
	Overall	16.8 (70/417)	28.2 (111/393)	5.25 (7/134)	14.9 (46/308)	15.5 (87/563)	18.3 (60/327)	17.8 (381/2142)
Normal, % (n/n)	Men	60.7 (153/252)	55.9 (147/263))	63.9 (39/61)	53.6 (82/153)	59.1 (191/323)	50 (112/224)	56.7 (724/1276)
	Women	57 (94/165)	46.9 (61/130)	71.2 (52/73)	58.1 (90/155)	65.8 (158/240)	55.3 (57/103)	59.1 (512/866)
	Overall	59.2 (247/417)	52.9 (208/393)	67.9 (91/134)	55.8 (172/308)	62 (349/563)	51.7 (169/327)	57.7 (1236/2142)
Overweight, % (n/n)	Men	17.5 (44/252)	14.4 (38/263)	27.9 (17/61)	24.2 (37/153)	19.8 (64/323)	28.6 (64/224)	20.7 (264/1276)
	Women	23 (38/165)	17.7 (23/130)	23.2 (16/73)	19.4 (30/155)	19.2 (46/240)	20.4 (21/103)	20.1 (174/866)
	Overall	19.7 (82/417)	15.5 (61/393)	24.6 (33/134)	21.8 (67/308)	19.5 (110/563)	26.0 (85/327)	20.4 (438/2142)
Obesity, % (n/n)	Men	4.4 (11/252)	1.5 (4/263)	3.3 (2/61)	11.8 (18/153)	5.0 (16/323)	4 (9/224)	4,7 (60/1276)
	Women	4.2 (7/165)	6.9 (9/130)	1.4 (1/73)	3.2 (5/155)	0.4 (1/240)	3.9 (4/103)	3.1 (27/866)
	Overall	4.3 (18/417)	3.3 (13/393)	2.2 (3/134)	7.5 (23/308)	3.0 (17/563)	4 (13/327)	4.1 (87/2142)

*p<0.001, The Dept of Pulmonology had the highest prevalence of nutritional risk, compared with other departments.
†Note that BMI was available in 2142 out of 2550 patients

Table 2. The prevalence of nutritional risk in different age and sex group

	Age <70 years			Age ≥70 years			Overall
	Male	Female	Total	Male	Female	Total	
At risk, % (n/n)	34.5 (363/1052)*	30.1 (235/780)	32.6 (598/1832)	63.4 (276/435)	65.4 (185/283)	64.2 (461/718)**	41.5 (1059/2550)
No risk, % (n/n)	65.5 (689/1052)	69.9 (545/780)	67.4 (1234/1832)	36.6 (159/435)	34.6 (98/283)	35.8 (257/718)	58.5 (1491/2550)

*p<0.05, gender associated difference was found in patients <70 years.
** p<0.001, the prevalence of nutritional risk in patients ≥70 years was significantly higher than that in patients <70 years.

Table 3. Application of nutritional support in each department

Departments	Gender	Nutritional support % (n/n)	PN % (n/n)	EN % (n/n)	PN and EN % (n/n)	Nutritional support in at-risk patients % (n/n)	Nutritional support in not-at-risk Patients % (n/n)
Gastroenterology	Men	43.6 (132/303)	40.6 (123/303)	2.97 (9/303)	2.31 (7/303)	58.1 (72/124)	33.5 (60/179)
	Women	40.8 (87/213)	39.9 (85/213)	0.939 (2/213)	0.469 (1/213)	51.9 (40/77)	34.6 (47/136)
	Overall	42.4 (219/516)	40.3 (208/516)	2.13 (11/516)	1.55 (8/516)	55.7 (112/201)	34 (107/315)
Pulmonology	Men	30.6 (89/291)	26.5 (77/291)	4.12 (12/291)	3.78 (11/291)	41.7 (70/168)	15.4 (19/123)
	Women	26.8 (40/149)	22.1 (33/149)	4.7 (7/149)	2.68 (4/149)	42.3 (33/78)	9.86 (7/71)
	Overall	29.3 (129/440)	25 (110/440)	4.32 (19/440)	3.41 (15/440)	41.9 (103/246)	13.4 (26/194)
Neurology	Men	11.1 (11/99)	8.08 (8/99)	3.03 (3/99)	1.01 (1/99)	14.3 (6/42)	8.77 (5/57)
	Women	16.8 (19/113)	14.2 (16/113)	2.65 (3/113)	0.885 (1/113)	25 (11/44)	11.6 (8/69)
	Overall	14.2 (30/212)	11.3 (24/212)	2.83 (6/212)	0.943 (2/212)	19.8 (17/86)	10.3 (13/126)
Nephrology	Men	30.8 (60/195)	22.6 (44/195)	8.21 (16/195)	4.10 (8/195)	55.4 (46/83)	12.5 (14/112)
	Women	21.8 (42/193)	18.7 (36/193)	3.11 (6/193)	1.04 (2/193)	40.7 (33/81)	8.04 (9/112)
	Overall	26.3 (102/388)	20.6 (80/388)	5.67 (22/388)	2.58 (10/388)	48.2 (79/164)	10.3 (23/224)
General Surgery	Men	29.3 (108/369)	27.4 (101/369)	1.90 (7/369)	1.36 (5/369)	51.5 (69/134)	16.6 (39/235)
	Women	25.7 (74/288)	24.7 (71/288)	1.04 (3/288)	1.04 (3/288)	51 (51/100)	12.2 (23/188)
	Overall	27.7 (182/657)	26.2 (172/657)	1.52 (10/657)	1.22 (8/657)	51.3 (120/234)	14.7 (62/423)
Thoracic Surgery	Men	40.4 (93/230)	33 (76/230)	7.39 (17/230)	3.48 (8/230)	60.2 (53/88)	28.2 (40/142)
	Women	35.5 (38/107)	31.8 (34/107)	3.74 (4/107)	1.87 (2/107)	50 (20/40)	26.9 (18/67)
	Overall	38.9 (131/337)	32.6 (110/337)	6.23 (21/337)	2.97 (10/337)	57 (73/128)	27.8 (58/209)
Total	Men	33.1 (493/1487)	28.9 (429/1487)	4.3 (64/1487)	2.69 (40/1487)	49.5 (316/639)	20.9 (177/848)
	Women	28.2 (300/1063)	25.9 (275/1063)	2.35 (25/1063)	1.22 (13/1063)	44.8 (188/420)	17.4 (112/643)
	Overall	31.1 (793/2550)	27.6 (704/2550)	3.49 (89/2550)	2.08 (53/2550)	47.6 (504/1059)	19.4 (289/1491)

department, but found no gender associated differences (all $p>0.05$).

Application of nutritional support

The percentage of patients who received nutritional support was reported in Table 3. Totally, 31.1% of patients received nutritional support, including 19.8% at risk and 11.3% not at risk. The application of PN was far more frequent than that of EN. There was no statistically significant difference in the application of PN among different hospitals. The biggest contrast was found in the Dept of Gastroenterology where patients who received PN were nearly 19 times more than those who received EN. In general, PN was used in 88.8% of nutritional support.

DISCUSSION

The current study evaluated the practicability and effectiveness of NRS2002 in Guangzhou hospitals with a considerable sample size. NRS 2002 employs a few points that ensure more objective assessment. Firstly, in order to avoid misclassification of a patient with a low BMI or presence of edema, an impaired general condition must also be present. Secondly, a score is assigned to different disease severity as proxy for adjustment. Thirdly, an age adjustment score of 1 is added if a patient ≥70 years, taking the age-related susceptibility to undernutrition into account. Furthermore, NRS2002 has been put in good use for nutritional risk screening in hospitals in both China and the United States.[6-8] In our study, the prevalence of undernutrition (17.8%) and nutritional risk (41.5%) was slightly higher compared with the aforementioned studies done in China,[6,8] probably because people in our area (Canton Area, Southern China) were more slightly built and more likely to have a low BMI than those living in the North. A significantly higher prevalence of nutritional risk was observed in senior patients, which was consistent with Liang's study in Beijing hospitals.[4] Compared with Liang's study, we did not include serum albumin into the

assessment of nutritional status. Use of albumin to assess nutritional status and nutritional risk has been discussed often but essentially discredited.[9,10] Albumin is considered a measure of inflammation and/or disease severity and should not be assumed as a marker for malnutrition in chronic diseases. It is also recommended that more attention should be paid to clinical features of malnutrition, including BMI, unplanned weight loss and overall disease severity,[11] which further support the role of NRS2002 in nutritional screening in hospitalized patients.

Data of gender differences in the prevalence of nutritional risk in hospitalized patients were somewhat controversial.[8,12-16] In our study, no gender difference was observed in the prevalence of undernutrition or nutritional risk in general, which was consistent with studies done in Beijing,[8] Baltimore,[8] Hongkong[12] and Berlin.[13] The reasons to the discrepancy in the aforementioned studies may be as the following: 1) the city of Guangzhou is also a metropolitan as Beijing, Hong Kong and Berlin. Hence the social factors associated with malnutrition in hospitalized patients tend to be similar; 2) studies in which gender differences were observed were mostly conducted among older adults in rural area where there might be dramatic differences in food choices, energy and nutrient intake or functional status between men and women. [14-16]

In our study, unrestrained usage of PN in nutritional therapy was observed. This was consistent with a previous study.[7] It was demonstrated that the enteral route of feeding causes fewer complications than the parenteral route.[17] In a study conducted among 1286 patients in the ICU in the United Kingdom, 57.6% of the patients were given EN, while only 11% were given PN, establishing a model for nutritional support practice.[18] In contrast, PN was used in 88.8% of the nutritional support in our study, indicating there was a great disparity in priority when choosing a feeding route between our practice and the most advanced nutrition care practice in UK.

The present study documented the prevalence of nutritional risk defined by NRS2002 and inappropriate assignment of nutritional interventions in Guangzhou hospitals, highlighting that NRS2002 is a simple and reliable tool for nutritional assessment in hospital setting.

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AUTHOR DISCLOSURES

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REFFERENCES

1. Payne-James J, Grimble G, Silk D. Artificial Nutrition Support In Clinical Practice. 2 ed. London, UK: Greenwich Medical Limited; 2001. pp. 243-4
2. Kondrup J, Allison SP, Elia M, Vellas B, Plauth, M. ESPEN guidelines for nutrition screening 2002. Clin Nutr. 2003;22: 415-21.
3. Kondrup J, Rasmussen HH, Hamberg O, Stanga Z. Nutritional risk screening (NRS 2002): a new method based on an analysis of controlled clinical trials. Clin Nutr. 2003; 22:321-36.
4. Sorensen J, Kondrup J, Prokopowicz J, Schiesser M, Krahenbuhl L, Meier R, Liberda M. EuroOOPS: an international, multicentre study to implement nutritional risk screening and evaluate clinical outcome. Clin Nutr. 2008;27: 340-9.
5. Liang X, Jiang ZM, Nolan MT, Wu X, Zhang H, Zheng Y, Liu H, Kondrup J. Nutritional risk, malnutrition (undernutrition), overweight, obesity and nutrition support among hospitalized patients in Beijing teaching hospitals. Asia Pac J Clin Nutr. 2009;18:54-62.
6. Liang X, Jiang ZM, Nolah MT, Efron DT, Kondrup J. Comparative survey on nutritional risk and nutritional support between Beijing and Baltimore teaching hospitals. Nutrition. 2008;24:969-76.
7. Jie B, Jiang ZM, Nolan MT, Efron DT, Zhu SN, Yu K, Kondrup J. Impact of nutritional support on clinical outcome in patients at nutritional risk: a multicenter, prospective cohort study in Baltimore and Beijing teaching hospitals. Nutrition. 2010;26:1088-93.
8. Jiang Z, Chen W, Zhan WH, Jiang H, Cai W, Zhang ST. Parenteral and enteral nutrition application in west, middle and east China: A multi-center investigation for 15098 patients in 13 metropolitans using Nutritional Risk Screening 2002 tool (abstract). Clin Nutr. 2007;2(Suppl 2): 133-4.
9. Gehring N, Imoberdorf R, Wegmann M, Ruhlin M, Ballmer PE. Serum albumin-a qualified parameter to determine the nutritional status? Swiss Med Wkly. 2006; 136:664-9.
10. Kuzuya M, Izawa S, Enoki H, Okada K, Iguchi A. Is serum albumin a good marker for malnutrition in the physically impaired elderly? Clin Nutr. 2007;26:84-90.
11. Baron M, Hudson M, Steele R, the Canadian Scleroderma Research Group (CSRG). Is serum albumin a marker of malnutrition in chronic disease? The scleroderma paradigm. J Am Coll Nutr. 2010;29:144-51.
12. Shum N, Hui WWH, Chu FCS, Chai J, Chow TW. Prevalence of malnutrition and risk factors in geriatric patients of a convalescent and rehabilitation hospital. Hong Kong Med J. 2005;11:234-42.
13. Pirlich M, Schutz T, Kemps M, Luhman N, Minko N, Lubke HJ, Rossnagel K, Willich SN, Lochs H. Social risk factors for hospital malnutrition. Nutrition. 2005;21:295-300.
14. Castel H, Shahar D, Harman-Boehm I. Gender difference in factors associated with nutritional status of older medical patients. J Am Coll Nutr. 2006;25:128-34.
15. Ledikwe JH, Smiciklas-Wright H, Mitchell DC, Jensen GL, Friedmann JM, Still CD. Nutritional risk assessment and obesity in rural older adults: a sex difference. Am J Clin Nutr. 2003;77:551-8.
16. Quandt S, Chao D. Gender differences in nutritional risk among older rural adults. J Appl Gerontol. 2000;19:138-50.
17. Jeejeebhoy KN. Enteral nutrition versus parenteral nutrition-the risks and benefits. Nat Rev Gastro Hepat. 2007;4:260-5.
18. Sharifi MN, Walton A, Chakrabarty G, Rahman T, Neild P, Poullis A. Nutrition support in intensive care units in England: a snapshot of present practice. Br J Nutr. 2011; 106:1240-4.

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对广州医院住院病人营养不良、营养风险及营养支持现状的多中心调查

背景：在广州住院病人中评估其营养现状、营养风险的流行情况及营养支持現况，调查性别或年龄因素在营养风险流行中所造成的差异。方法：从 2008 年 4 月到 12 月，在广州市 4 家教学医院的六个科室（消化内科、呼吸内科、神经内科、肾内科、普通外科及胸外科），共计 2550 位病人接受了以“营养风险 2002”为工具的筛查。结果：患营养不良或面临营养风险的病人分别占总人数的 17.8%和 41.5%。其中，呼吸内科病人患营养不良（28.2%）及营养风险（55.9%）的比例在所有科室中是最高的。此外，年龄≥70 岁的病人比年龄<70 岁的病人更易罹患营养风险（64.2%相对 32.6%，p<0.001）。营养风险的流行情况，无性别相关差异。总体而言，47.6%有营养风险的病人与 19.4%无营养风险的病人接受了营养支持治疗。肠外营养占营养支持的 88.8%。结论：本研究采用了“营养风险 2002”为筛查工具，记录了广州医院住院病人中的营养风险流行情况及营养干预的不合理分配情况。

關鍵字：营养筛查、营养状态、医院、营养不良、营养支持