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Research Article

Investigation on the Difference between Urban and Rural Cancer Inpatients and Analysis of Nursing Intervention Strategies

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Abstract

Objective: To understand the difference between urban and rural cancer inpatients, and to provide theoretical support and technical reference for precision nursing intervention strategy.

Methods: Three hundred and eighty (380) patients with malignant tumors hospitalized in our hospital from November 2020 to February 2021 were selected by convenient sampling method, including 199 in urban group and 181 in rural group. The socio statistical data of the two groups, the proportion of tumor prevalence spectrum, tumor stage, nutritional risk score of patients according to nrs2002, and seven electrolytes (serum potassium, serum sodium, serum chlorine, serum calcium, serum magnesium, serum phosphorus and serum iron) were measured at the same time; Blood routine (red blood cell count, white blood cell count, lymphocyte count); Biochemical indexes (serum albumin, total protein, prealbumin, blood urea nitrogen, blood creatinine, blood uric acid); The Prognostic Nutritional Index (PNI) was calculated. The bone mineral density of the patients was measured by ultrasonic bone densitometer.

Results: There were significant differences in the proportion of tumor between the rural group and the city group ($p<0.001$), and the difference was not significant in cervical cancer (27% vs. 14%), breast cancer (5% vs. 11%) and lymphoma (13% vs. 7%). There was no significant difference in the proportion of tumor stages I and II, and there was extremely significant difference between stages III and IV. There was no significant difference in bone mineral density between stages III (41% vs. 27%) and IV (31% vs. 42%). There were significant differences in nutritional evaluation indexes, including body mass index ($P=0.019$). The body mass index of rural patients was higher than that of urban patients; There was significant difference in total protein ($P=0.015$), which was higher in rural patients than in urban patients. There was significant difference in the evaluation value of nutritional risk screening in 2002 ($P=0.042$). The evaluation value of nutritional risk in urban patients was higher than that in rural patients, and the total number of leukocytes was significantly different ($P=0.021$). Urban patients were higher than that in rural patients, and there were no significant differences in prognostic nutritional index, seven electrolytes, bone mineral density and other biochemical indicators.

Conclusion: According to the proportion of tumor spectrum in the hospitalized patients, the nursing propaganda and education in rural areas are mainly cervical cancer and lymphoma, and the city is mainly breast and cervical cancer. The nursing intervention of calcium and phosphorus nutrition in patients with stage IV tumor needs to be strengthened.

Keywords: Urban-rural difference; Nutrition intervention; Body mass index; Total protein; Nursing education

Introduction

With the growth and aging of the population, it has been become an important health issue that the global cancer burden is gradually increasing [1]. Cancer is one of the leading causes of death in China. In 2018, The new cases of cancer in China were up to 0.42 billion, in which the number of deaths reached 28 million, accounting for more than 19 percent of global deaths [2]. It can effectively improve the quality of life and survival time of tumor inpatients by the methods of scientific education and precise nursing intervention. Due to the differences in economic conditions, lifestyles and living environments in urban and rural areas of China, there are significant differences in the incidence spectrum of cancer [3]. Malnutrition is a common problem in patients during the development of cancer. The hazards of malnutrition include increased risk of surgery, increased incidence of postoperative complications, decreased tolerance to chemoradiotherapy, decreased quality life, extended hospital stays, increased mortality, etc. 30%-80% of tumor patients have experienced various degrees of malnutrition from diagnosis to treatment recovery [4,5]. This study analyzed the difference between cancer patients in rural and urban groups by the evaluation of sociological survey, tumor type, tumor staging, biochemical index detection, bone health, and nutritional status of cancer inpatients, to provide technical support and theoretical guidance for the formulation of targeted and precise nursing intervention for urban and rural cancer inpatients.

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Objects and Methods

Research objects

By convenient sampling, a total of 380 patients with malignant tumors hospitalized in our hospital from November 2020 to February 2021 were recruited in this study. And all the research objects met the criteria for inclusion as follows: 1. In patients with the requirement of clinical criteria for tumor diagnosis, and with pathological report diagnosed for malignant tumors; 2. Over 18-year-old; 3. Volunteers to join the study with an informed consent form signed under the state of clear consciousness. Patients were excluded from the study by the following criteria: 1. Patients unable to cooperate with the questionnaire; 2. patients in critical condition; 3. Patients who dropped out of the study.

Research tools

General information questionnaire: The social statistics and general health data of the patients were recorded, including patient's gender, age, marital status, education level, way of paying medical expenses, family income, current family living status, diagnosis, clinical stage, course of disease, treatment, etc.

Anthropometric measurement index: The height and weight of the patients were measured and the body mass index (BMI) was calculated with the equation: BMI=body weight (kg)/height^2 (m^2) with precision down to 0.1.

Bone densitometry: Radius bone density was determined with a Ultrasound bone densitometer (OSTEOKJ7000, Nanjing Kejin Company), diagnosed with the criteria of T-scoring method recommended by WHO [5], which were assigned to types of osteoporosis (T ≤ -2.5), osteopenia (-1.0 ≥ T ≥ -2.5), normal (T ≥ -1), expressed in standard deviation units.

Nutritional risk screening: Nutritional Risk Screening 2002(NRS2002) [6] as recommended by the European Society for Parenteral and Enteral Nutrition (ES-PEN) was used to calculate the scores of patients by measurement of BMI and the questionnaire of their recent food intake, disease severity, and age. A score of 3 or greater is considered a nutritional risk.

Laboratory index: Seven electrolytes (serum potassium, serum sodium, serum chloride, serum calcium, serum magnesium, serum phosphorus, serum iron), blood routine (red blood cell count, white blood cell count, lymphocyte count), biochemical parameters (serum albumin, total protein, prealbumin, blood urea nitrogen, creatinine, uric acid), Prognostic Nutritional Index (PNI) were included. PNI can accurately and objectively assess and predict the prognosis of cancer patients [7] with the following equation: PNI=total lymphocyte count (10-9/L) × 5+serum albumin (g/L).

Statistical method

SPSS22.0 statistical software package was used for analysis. Descriptive analysis, one-factor analysis and quantitative data using t-test were used as data analysis methods. $\chi 2$ test was used for enumeration data, a value was 0.05 as the test level, which was two-sided probability. Person correlation test was used for continuous variables, and Spearman correlation test was used for categorical variables. P<0.05 was considered as statistical difference.

Results

General demographic information of the respondents

A total of 380 in patients with malignant tumors in our hospital from November 2020 to February 2021 were selected as the research object, with age from 15~89 (55.95 ± 13.61) year-old; 131 males (34.5%), 249 females (65.5%); 199 urban patients (52.4%) and 181 rural patients (47.6%); 361 married (95.0%), unmarried 19 (5.0%). The levels of education in those patients included 28 cases of bachelor degree or above (7.4%), 117 cases of high school/junior college (30.8%), 201 cases of junior high school/primary school (52.9%), 34 cases of illiteracy (8.9%). The occupation information in patients indicated 84 cases from Professional/management (22.1%), 75 cases from workers/services (19.7%), 125 cases from farmer (32.9%), 96 other cases (25.3%). Their living pattern showed that 307 cases lived with spouses (80.8%), 54 cases with their children (14.2%), 8 cases (2.1%) lived alone, 11 others (2.9%). The duration of malignant tumors ranged from 1 to 257(20.94 ± 36.33) months, as shown in Table 1.

Analysis of correlative factors of cancer inpatients in urban and rural areas

The correlation factors of urban and rural in patients with cancer, significantly different, included BMI (p=0.007), education level (p=0.000), occupation (p=0.000), leukocyte (p=0.03), total lymphocyte count (p=0.000), total protein (p=0.017), Urine protein (p=0.027) (Table 2).

Analysis of the differences in nutritional indexes of urban and rural malignant tumor patients

Of the 380 hospitalized tumor patients in this study, including 199 patients from urban areas and 181 patients from the rural areas, the results indicated that the indexes with significant differences were shown in Table 3, including BMI (22.11 ± 0.30 *vs.* 23.11 ± 0.29, p=0.019), values of Nutritional Risk Screening 2002 Assessment (1.73 ± 0.07 *vs.* 1.53 ± 0.05, p=0.042), white blood cell count (6.82 ± 0.24 *vs.* 6.03±0.22, p=0.021), total protein (64.22 ± 0.49 *vs.* 66.05 ± 0.55, p=0.015). And other indexes such as T values of radius bone density, seven indexes of serum ions, creatinine, urea nitrogen, Hemoglobin hematuric acid, did not show significant differences.

Analysis of the difference in the proportion of hospitalized tumor inpatients in urban and rural areas

In the comparison of 4 different stages during the tumor development (Figure 1), the ratios in stages three and four of rural and urban groups showed extremely significant difference with 0.005 of p value. The proportion of stage III in rural group was 41%, which is much higher than that of urban group.

Analysis of the difference of tumor ratio between urban and rural cancer inpatients

In the rural and urban groups, fourteen types of tumors were investigated, shown in Figure 2 Cervical cancer (27%). Five types of tumors accounted for a high proportion in rural groups were cervical cancer (27%), lymphoma (13%), lung cancer (8%), ovarian cancer (6%), stomach cancer (6%), and breast cancer (5%). And in urban group, the top five tumors were cervical cancer (14%), breast cancer (11%), stomach cancer (11%), lung cancer (9%), ovarian cancer (9%), and lymphoma (7%). In the differential comparison of the proportion of tumors, three types of tumors showed significant difference between the urban and rural groups, cervical cancer (14% *vs.* 27%, p=0.000), breast cancer (11% *vs.* 5%, p=0.000), lymphoma (7% *vs.* 13%, p=0.000).

Difference analysis of nutritional indexes in patients with stage three and four of malignant tumors

The anthropometric measurement, bone densitometry and nutritional risk screening were investigated in 127 patients in

Table 1: Background information of patients.

Items	Classification	Urban group [N=199, n (%)]	Rural group [N=181, n (%)]
Age		56.21 ± 0.95	55.66 ± 1.02
Tumor progression (Mons)		24.67 ± 3.14	16.84 ± 1.79
Gender	Male	68 (34.17)	63 (34.81)
	Female	131 (65.83)	118 (65.19)
Marital status	Married	189 (94.97)	170 (93.92)
	Widowed	7 (3.52)	8 (4.42)
	Divorced	0	2 (1.11)
	Single	3 (1.51)	1 (0.55)
Education	Bachelor degree or above	23 (11.56)	5 (2.76)
	High school/junior college	89 (44.72)	28 (15.47)
	Middle school/primary school	80 (40.20)	121 (66.85)
	Illiteracy	7 (3.52)	27 (14.92)
Occupation	Management/ Professional	69 (34.67)	15 (8.29)
	Workers /Service	45 (22.61)	30 (16.57)
	Farmers	29 (14.57)	96 (53.04)
	Others	56 (28.15)	40 (22.10)
Living Pattern	With spouse	162 (81.41)	145 (80.11)
	With children	26 (13.07)	28 (15.47)
	Alone	6 (3.01)	2 (1.11)
	Others	5 (2.51)	6 (3.31)
Long-term bedridden	Y (yes)	19 (9.55)	12 (6.62)
	N (none)	178 (89.45)	169 (93.37)
Tumor stage	I	22 (11.05)	19 (10.50)
	II	39 (19.60)	34 (18.78)
	III	54 (27.14)	73 (40.33)
	IV	84 (42.21)	55 (30.39)
Diagnosis	cervical cancer	30 (15.08)	48 (26.52)
	breast cancer	23 (11.56)	10 (5.52)
	ovarian cancer	18 (9.05)	13 (7.18)
	gastric carcinoma	28 (14.07)	14 (7.73)
	lung cancer	21 (10.55)	12 (6.63)
	colon cancer	19 (9.55)	10 (5.52)
	soft tissue sarcoma	15 (7.54)	21 (11.60)
	lymphoma	16 (8.04)	23 (12.71)
	endometrial cancer	4 (2.01)	5 (2.76)
	pancreatic cancer	7 (3.52)	7 (3.87)
	others	18 (9.05)	18 (9.94)
Treatment	Surgical treatment	103 (51.76)	108 (59.67)
	Non-surgical treatment	91 (45.73)	67 (37.02)
	Palliative care	3 (1.51)	4 (2.21)
	Others	2 (1.01)	2 (1.10)
Number of combined chronic diseases	None	121 (60.80)	113 (62.43)
	1	47 (23.62)	52 (28.73)
	2	25 (12.56)	14 (7.73)
	≥3	6 (3.02)	2 (1.10)
ADL assessment	Non dependency	70 (35.18)	57 (31.49)
	Mild dependency	109 (54.77)	105 (58.01)
	Moderate dependency	14 (7.04)	15 (8.29)
	Severe dependency	6 (3.01)	4 (2.21)

stage three and 139 patients in stage four shown in Table 4). The laboratory index and result analysis indicated that the average age in stage three and four (p=0.011), T value of bone density (p=0.024), ADL assessment score (p=0.005), serum calcium (p=0.002), serum phosphorus (p=0.036), serum albumin (p=0.012) revealed significant differences. And there was a trend of differences in nutritional risk screening 2002 assessment values (p=0.052).

Table 2: Analysis of correlation factors between urban and rural cancer patients.

Factors	Correlation	P
BMI	-0.159	0.007**
Education level	-0.459	0.000**
Occupation	0.255	0.000**
Bone density	-0.065	0.272
Serum albumin (g/L)	-0.034	0.568
Hemoglobin	0.008	0.894
Leukocyte	0.128	0.030*
Total lymphocyte count	0.226	0.000*
Total protein	-0.142	0.017*
Prealbumin	-0.052	0.379
Electrolyte potassium	0.016	0.782
Electrolyte sodium	0.022	0.711
Electrolyte chlorine	0.056	0.342
Electrolyte calcium	0.012	0.834
Electrolyte magnesium	-0.063	0.294
Electrolyte iron	0.05	0.41
Electrolyte phosphorus	-0.005	0.932

Results and Discussion

Targeted cancer prevention and popularization strategies established according to the different incidence spectrum of cancer in urban and rural areas

According to the China Cancer Registry Annual Report [8], the number of new cancer cases in urban areas was about 2.352 million, accounted for 59.86% of total new cases in China, and the rest 40.14% (with 1.577 million cases) was reported in rural areas. The incidence of malignant tumors in urban areas is found higher than that in rural areas. In urban areas, the most common malignant tumors were lung cancer, colorectal cancer, breast cancer, stomach cancer and liver cancer. And the most common tumors in rural areas were correspondingly lung cancer, stomach cancer, liver cancer, esophagus cancer and colorectal cancer. The differences in tumor incidence between urban and rural areas and between sexes gradually narrowed in recent years [9]. The focus of cancer prevention and treatment should be adjusted regularly, taking into account urban and rural areas, and at the same time, the differences and changing trends of tumor incidence in urban and rural areas should be understood as a whole, and the prevention and treatment of cancer science can be strengthened with emphasis.

In this study, the proportion of patients with urban and rural malignant tumors varied with 25.969 of X2and 0.054 of P-value. In the case study of cervical cancer patients, the incidence of cervical cancer in rural areas (26 patients with 13.07%) appeared to be higher than that in urban areas (48 patients with 26.52%), as same as the cases in Chen's study [10]. The incidence of cervical cancer in rural areas is higher than that in urban areas, while the incidence in mountainous areas is higher than that in plain and coastal areas. Most women living in rural areas have low education level and poor compliance with examinations. They suffer from heavy family burden, poor diet quality and working environment, and are limited by the level of health care and the degree of disease awareness. Due to the differences in health resources between urban and rural areas due to economic and cultural levels, the development of cervical cancer screening programs is affected, and the incidence and death of cervical cancer are also different among different regions. The recent investigation [11] indicated that the incidence of cervical cancer decreased in urban areas, while it increased yearly in rural areas. Therefore, it is

Table 3: Comparison of nutritional indexes between urban and rural patients with malignant tumors.

Items	Urban group (n=199)	Rural group (n=181)	T value	P value
Body Mass Index (BMI)	22.11 ± 0.30	23.11 ± 0.29	-2.353	0.019*
Bone density SOS value	4042.53 ± 28.07	4019.63 ± 13.08	-1.533	0.126
Bone density T value	-0.99 ± 0.10	-0.79 ± 0.12	-1.234	0.218
Nutritional Risk Screening 2002 Assessment	1.73 ± 0.07	1.53 ± 0.05	2.04	0.042*
Serum potassium (mmol/L)	4.07 ± 0.03	4.06 ± 0.04	0.052	0.959
Serum sodium (mmol/L)	1.39 ± 0.35	1.38 ± 0.69	0.186	0.853
Serum chlorine (mmol/L)	1.08 ± 5.16	1.03 ± 0.34	0.858	0.391
Serum calcium (mmol/L)	2.25 ± 0.01	2.24 ± 0.01	0.316	0.752
Serum magnesium (mmol/L)	0.83 ± 0.01	0.86 ± 0.01	-2.146	0.33
Serum phosphorus (mmol/L)	1.20 ± 0.03	1.23 ± 0.05	-0.546	0.586
Serum iron (mmol/L)	14.03 ± 0.55	13.72 ± 0.57	0.382	0.703
Erythrocyte count (10^12/L)	7.23 ± 0.49	6.22 ± 0.28	1.725	0.085
Hemoglobin (g/L)	110.6 ± 1.45	109.03 ± 1.36	0.783	0.434
White blood cell count (10^9/L)	6.82 ± 0.24	6.03 ± 0.22	2.323	0.021*
Lymphocyte count (10^9/L)	1.54 ± 0.08	1.34 ± 0.11	1.457	0.146
Serum albumin (g/L)	39.13 ± 0.35	39.51 ± 0.34	-7.82	0.434
Total protein (g/L)	64.22 ± 0.49	66.05 ± 0.55	-2.448	0.015*
Prealbumin (g/L)	20.36 ± 0.52	21.43 ± 0.53	-1.444	0.15
Blood urea nitrogen (mmol/L)	4.96 ± 0.12	5.25 ± 0.12	-1.646	0.101
Serum creatinine (umol/L)	65.57 ± 1.35	68.42 ± 1.69	-1.325	0.186
Blood uric acid (umol/L)	284.64 ± 7.03	294.70 ± 6.05	-1.084	0.279
Prognostic nutritional index (PNI)	71.96 ± 0.72	72.75 ± 0.87	-0.707	0.48

Table 4: Comparison of nutritional indicators in patients with stage III and IV malignancies.

Items	Group in stage III (n=127)	Group in stage IV (n=139)	P value
Age (year-old)	54.36 ± 1.02	58.62 ± 1.07	0.011
BMI	22.32 ± 0.37	22.30 ± 0.34	0.973
Tumor progression (Months)	19.69 ± 2.72	27.79 ± 3.70	0.068
SOS value of bone density	4080.93 ± 35.30	4035.53 ± 26.33	0.237
T value of bone density	-0.66 ± 0.14	-1.11 ± 0.13	0.024*
Values of Nutritional Risk Screening 2002 Assessment	1.55 ± 0.07	1.78 ± 0.08	0.052
ADL Evaluation scores	92.41 ± 1.11	88.24 ± 1.32	0.005*
Serum potassium (mmol/L)	4.07 ± 0.37	4.08 ± 0.37	0.933
Serum sodium (mmol/L)	1.39 ± 0.49	1.38 ± 0.34	0.505
Serum chlorine (mmol/L)	1.03 ± 0.85	1.30 ± 0.38	0.968
Serum calcium (mmol/L)	2.27 ± 0.02	2.20 ± 0.01	0.002*
Serum magnesium (mmol/L)	0.83 ± 0.01	0.82 ± 0.01	0.546
Serum phosphorus (mmol/L)	1.31 ± 0.08	1.16 ± 0.01	0.036*
Serum iron (mmol/L)	13.93 ± 0.60	13.75 ± 0.67	0.848
Red blood cell count (10^12/L)	6.96 ± 0.73	6.85 ± 0.36	0.879
Hemoglobin (g/L)	110.57 ± 1.57	106.79 ± 1.65	0.113
White blood cell count (10^9/L)	6.31 ± 0.27	6.60 ± 0.29	0.461
Lymphocyte count (10^9/L)	1.30 ± 0.10	1.41 ± 0.09	0.498
Serum albumin (g/L)	39.44 ± 0.39	38.01 ± 0.41	0.012*
Total protein (g/L)	65.65 ± 0.62	64.44 ± 0.66	0.182
Prealbumin (g/L)	21.83 ± 0.64	20.12 ± 0.65	0.056
Blood urea nitrogen (mmol/L)	5.17 ± 0.16	5.16 ± 0.15	0.983
Serum creatinine (umol/L)	67.01 ± 1.61	68.04 ± 2.26	0.69
Blood uric acid (umol/L)	2.99 ± 7.82	2.82 ± 8.47	0.148
Prognostic nutritional index (PNI)	72.17 ± 0.84	81.54 ± 0.93	0.641

particularly important to comprehensively popularize the knowledge of cervical cancer and improve the screening frequency of cervical cancer, especially to strengthen the popularization of cervical cancer science screening in rural areas. The relatively high incidence of breast cancer in cities may be related to high mental stress at work caused by the education and occupation of urban people. The science popularization of breast cancer focuses on the role of the prevention and treatment of breast cancer by the high-level management.

Continuous treatment of rural malignant tumors concerned according to the nutritional indicators and tumor stage differences of urban and rural malignant tumor patients

Malnutrition is a common complication in cancer patients. It was reported that 57.88% of cancer patients are accompanied by malnutrition [12]. Malnutrition can prolong hospital stay, increase readmission rate, and increase mortality in cancer patients [13]. In the past thirty years, the dietary structure of Chinese residents undergone great changes and promoted the migration of the disease spectrum to chronic non-communicable diseases [14]. And the nutritional changes of urban residents and rural residents are not synchronized, and the two places show different characteristics [15-17]. The awareness rate of dietary guidelines of rural residents was significantly lower than that of urban residents in terms of the intake level of industrial nutrients, minerals and vitamins [18].

The nutritional indexes of cancer patients in urban and rural

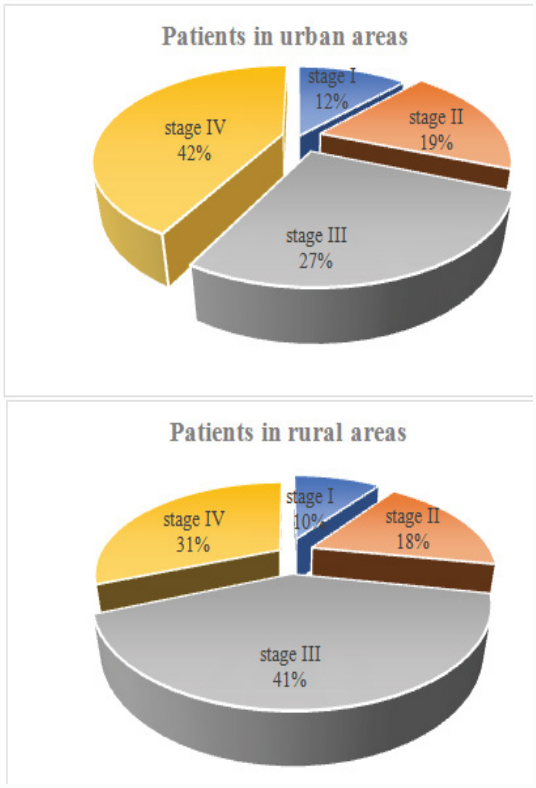

Figure 1: Proportion of malignant tumor stages in urban and rural inpatients.

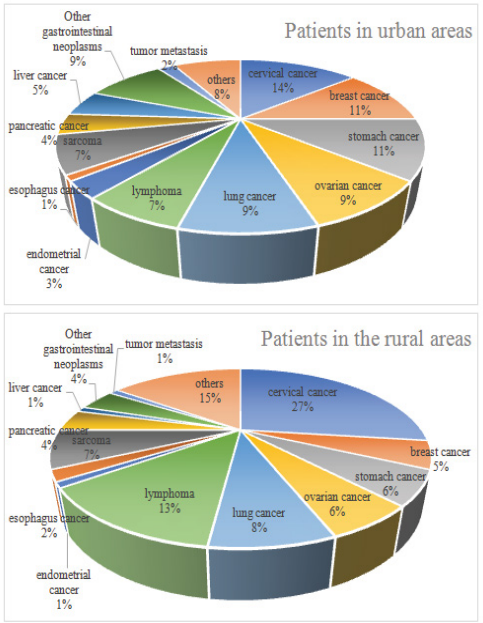

Figure 2: Proportion of in patients with malignant tumor in urban and rural groups.

areas were compared in this study, which results were stated clearly that BMI of urban group was lower than that of rural group (X2=-2.353, P=0.019), the assessment value of nutritional Risk Screening 2002 (NRS2002) in urban group was higher than that in rural group (t=2.040, P=0.042), and the total serum protein value in the urban group was lower than that in the rural group (t=-2.448, P=0.015). These results were not inconsistent with traditional urban-rural nutrition differences [18].

In this study the white blood cell count of malignant tumor patients in urban group was higher than that in rural group (t=2.323, P=0.021). Peripheral leukocyte increase was a poor prognostic factor for malignant tumors, and it was also negatively correlated with the time of death. Research revealed that leukocytes contributed to tumor growth and metastasis through a variety of mechanism [19] and the white blood cell count was positively correlated with the stage of malignant tumor [20]. In this study, the tumor staging of urban and rural malignant tumor patients was analyzed, and the results indicated that the number of patients with malignant tumors in urban areas in stage four were higher than that of patients in stage three, although that number of patients in stage three were higher than that in stage four in the rural areas (X2=8.529, P=0.005). Therefore, the white blood cell count of the urban group was higher than that of the rural group, but the white blood cell count of patients with terminal malignant tumors was higher.

Meanwhile, the dual structure of urban and rural areas in China led to imbalance in the utilization of medical services by urban and rural residents, and there was a mismatch between the utilization of health services and the demand for health services of urban and rural residents in some diseases, which further aggravates the health inequality of urban and rural residents [21,22]. A study showed that rural residents could not keep pace with urban residents in indicators of outpatient visits and preventive health services, which is consistent with the findings of the fifth National Health Services Survey [23]. Zhao investigated that the delay rate of rural female breast cancer patients was up to 61.5% [24], which was another evidence of the great differences in the choice of disease management between urban and rural areas. The number of stage 4 patients with malignant tumors in the urban group was higher than that of stage 3 patients in this study. In the rural group, most of the three stages may be related to the medical resources and medical behavior of urban and rural patients, which indicated that rural patients with malignant tumors had a higher survival period than the patients in stage four, while urban patients receive more standardized treatment, resulting in a higher survival period of stage four.

The results of the difference analysis of nutritional indicators and tumor stages in urban and rural cancer patients in this study suggested that cancer prevention and treatment workers need to pay attention to the continuous treatment of rural cancer patients, particularly to improve the accessibility and compliance of medical resources for patients in rural areas.

Focus on nutritional interventions in patients with advanced malignancy, especially bone mass, serum calcium and phosphorus, and serum albumin values in patients with stage 4 malignancies

This study, compared the results of various indicators between the stage 3 and 4 malignant tumor groups, exhibited that T values of bone density, serum calcium, serum albumin in stage four were all lower than that in stage three (P<0.005), similar to the results in current research [25,26]. The later stage the tumor developed, the higher the incidence of malnutrition might present. Bone metabolism may also be affected by the growth and spread of cancer cells. The disorder of calcium and phosphorus metabolism, coupled with the consumption of tumor, leads to the decrease of nutritional status of patients, resulting in malnutrition and bone diseases. Therefore, in clinical work, more attention should be paid to the nutritional status

of patients with late tumor staging, timely detection of malnutrition and nutritional support. Moreover, the health of their bones should be focused, and the risk of fall fractures could be reduced due to decreased bone quality.

Conclusion

The difference in the nutritional level between urban and rural areas in hospitalized cancer patients was mainly affected by the difference in the proportion of staging. Future care should focus on the nutritional support of protein and calcium and phosphorus during hospitalization in patients with advanced tumors and the intervention of mobility capacity, while paying attention to the sustainability and accessibility of post-stage 3 treatments in rural cancer patients.

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