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Contents

Thrice Monthly Volume 10 Number 2 January 14, 2022

EDITORIAL

- 397 New trends in treatment of muscle fatigue throughout rehabilitation of elderlies with motor neuron diseases
Mohamed A

MINIREVIEWS

- 401 What emotion dimensions can affect working memory performance in healthy adults? A review
Hou TY, Cai WP
- 412 Quadrilateral plate fractures of the acetabulum: Classification, approach, implant therapy and related research progress
Zhou XF, Gu SC, Zhu WB, Yang JZ, Xu L, Fang SY

ORIGINAL ARTICLE

Case Control Study

- 426 Methylprednisolone accelerate chest computed tomography absorption in COVID-19: A three-centered retrospective case control study from China
Lin L, Xue D, Chen JH, Wei QY, Huang ZH

Retrospective Study

- 437 Analysis of photostimulable phosphor image plate artifacts and their prevalence
Elkhateeb SM, Aloyouny AY, Omer MMS, Mansour SM
- 448 N6-methyladenine-modified DNA was decreased in Alzheimer's disease patients
Lv S, Zhou X, Li YM, Yang T, Zhang SJ, Wang Y, Jia SH, Peng DT
- 458 Inflammation-related indicators to distinguish between gastric stromal tumors and leiomyomas: A retrospective study
Zhai YH, Zheng Z, Deng W, Yin J, Bai ZG, Liu XY, Zhang J, Zhang ZT
- 469 Relationship between Ki-67 and CD44 expression and microvascular formation in gastric stromal tumor tissues
Ma B, Huang XT, Zou GJ, Hou WY, Du XH
- 477 Modified surgical method of supra- and infratentorial epidural hematoma and the related anatomical study of the squamous part of the occipital bone
Li RC, Guo SW, Liang C
- 485 Combined molybdenum target X-ray and magnetic resonance imaging examinations improve breast cancer diagnostic efficacy
Gu WQ, Cai SM, Liu WD, Zhang Q, Shi Y, Du LJ

- 492 Value of thyroglobulin combined with ultrasound-guided fine-needle aspiration cytology for diagnosis of lymph node metastasis of thyroid carcinoma

Zhang LY, Chen Y, Ao YZ

- 502 Locking compression plate + T-type steel plate for postoperative weight bearing and functional recovery in complex tibial plateau fractures

Li HF, Yu T, Zhu XF, Wang H, Zhang YQ

- 511 Effect of Mirena placement on reproductive hormone levels at different time intervals after artificial abortion

Jin XX, Sun L, Lai XL, Li J, Liang ML, Ma X

- 518 Diagnostic value of artificial intelligence automatic detection systems for breast BI-RADS 4 nodules

Lyu SY, Zhang Y, Zhang MW, Zhang BS, Gao LB, Bai LT, Wang J

Clinical Trials Study

- 528 Analysis of 20 patients with laparoscopic extended right colectomy

Zheng HD, Xu JH, Liu YR, Sun YF

Observational Study

- 538 Knowledge, attitude, practice and factors that influence the awareness of college students with regards to breast cancer

Zhang QN, Lu HX

- 547 Diagnosing early scar pregnancy in the lower uterine segment after cesarean section by intracavitary ultrasound

Cheng XL, Cao XY, Wang XQ, Lin HL, Fang JC, Wang L

- 554 Impact of failure mode and effects analysis-based emergency management on the effectiveness of craniocerebral injury treatment

Shao XL, Wang YZ, Chen XH, Ding WJ

- 563 Predictive value of alarm symptoms in Rome IV irritable bowel syndrome: A multicenter cross-sectional study

Yang Q, Wei ZC, Liu N, Pan YL, Jiang XS, Tantai XX, Yang Q, Yang J, Wang JJ, Shang L, Lin Q, Xiao CL, Wang JH

Prospective Study

- 576 5-min mindfulness audio induction alleviates psychological distress and sleep disorders in patients with COVID-19

Li J, Zhang YY, Cong XY, Ren SR, Tu XM, Wu JF

META-ANALYSIS

- 585 Efficacy and safety of argatroban in treatment of acute ischemic stroke: A meta-analysis

Ly B, Guo FF, Lin JC, Jing F

SCIENTOMETRICS

- 594 Biologic therapy for Crohn's disease over the last 3 decades
Shen JL, Zhou Z, Cao JS, Zhang B, Hu JH, Li JY, Liu XM, Juengpanich S, Li MS, Feng X

CASE REPORT

- 607 Novel compound heterozygous GPR56 gene mutation in a twin with lissencephaly: A case report
Lin WX, Chai YY, Huang TT, Zhang X, Zheng G, Zhang G, Peng F, Huang YJ
- 618 Patients with SERPINC1 rs2227589 polymorphism found to have multiple cerebral venous sinus thromboses despite a normal antithrombin level: A case report
Liao F, Zeng JL, Pan JG, Ma J, Zhang ZJ, Lin ZJ, Lin LF, Chen YS, Ma XT
- 625 Successful management of delirium with dexmedetomidine in a patient with haloperidol-induced neuroleptic malignant syndrome: A case report
Yang CJ, Chiu CT, Yeh YC, Chao A
- 631 Malignant solitary fibrous tumor in the central nervous system treated with surgery, radiotherapy and anlotinib: A case report
Zhang DY, Su L, Wang YW
- 643 Anesthesia and perioperative management for giant adrenal Ewing's sarcoma with inferior vena cava and right atrium tumor thrombus: A case report
Wang JL, Xu CY, Geng CJ, Liu L, Zhang MZ, Wang H, Xiao RT, Liu L, Zhang G, Ni C, Guo XY
- 656 Full-endoscopic spine surgery treatment of lumbar foraminal stenosis after osteoporotic vertebral compression fractures: A case report
Zhao QL, Hou KP, Wu ZX, Xiao L, Xu HG
- 663 Ethambutol-induced optic neuropathy with rare bilateral asymmetry onset: A case report
Sheng WY, Wu SQ, Su LY, Zhu LW
- 671 Vitrectomy with residual internal limiting membrane covering and autologous blood for a secondary macular hole: A case report
Ying HF, Wu SQ, Hu WP, Ni LY, Zhang ZL, Xu YG
- 677 Intervertebral bridging ossification after kyphoplasty in a Parkinson's patient with Kummell's disease: A case report
Li J, Liu Y, Peng L, Liu J, Cao ZD, He M
- 685 Synovial chondromatosis of the hip joint in a 6 year-old child: A case report
Yi RB, Gong HL, Arthur DT, Wen J, Xiao S, Tang ZW, Xiang F, Wang KJ, Song ZQ
- 691 Orthodontic retreatment of an adult woman with mandibular backward positioning and temporomandibular joint disorder: A case report
Yu LY, Xia K, Sun WT, Huang XQ, Chi JY, Wang LJ, Zhao ZH, Liu J

- 703** Autosomal recessive spinocerebellar ataxia type 4 with a *VPS13D* mutation: A case report
Huang X, Fan DS
- 709** Primary adrenal diffuse large B-cell lymphoma with normal adrenal cortex function: A case report
Fan ZN, Shi HJ, Xiong BB, Zhang JS, Wang HF, Wang JS
- 717** Varicella-zoster virus-associated meningitis, encephalitis, and myelitis with sporadic skin blisters: A case report
Takami K, Kenzaka T, Kumabe A, Fukuzawa M, Eto Y, Nakata S, Shinohara K, Endo K
- 725** Tension pneumocephalus following endoscopic resection of a mediastinal thoracic spinal tumor: A case report
Chang CY, Hung CC, Liu JM, Chiu CD
- 733** Accelerated Infliximab Induction for Severe Lower Gastrointestinal Bleeding in a Young Patient with Crohn's Disease: A Case Report
Zeng J, Shen F, Fan JG, Ge WS
- 741** Occupational fibrotic hypersensitivity pneumonia in a halogen dishes manufacturer: A case report
Wang M, Fang HH, Jiang ZF, Ye W, Liu RY
- 747** Using a fretsaw in treating chronic penial incarceration: A case report
Zhao Y, Xue XQ, Huang HF, Xie Y, Ji ZG, Fan XR

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Observational Study

Knowledge, attitude, practice and factors that influence the awareness of college students with regards to breast cancer

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Abstract

BACKGROUND

Breast cancer has the highest incidence of all global cancers. Recent data show that breast cancer is becoming more prevalent in the younger population. Therefore, preventing breast cancer in young populations is a significant priority for public health. Relevant investigations of the incidence of breast cancer in young females have already been undertaken in China; however, none of these previous studies investigated the awareness of female college students with regards to breast cancer.

AIM

To investigate the knowledge, attitude, and practice (KAP) of female college students in Yunnan with regards to breast cancer and a series of influential factors.

METHODS

A random sample of 1387 female college students from two universities in Dali city were investigated by questionnaires.

RESULTS

The total KAP scores for breast cancer were 9.86 ± 2.50 , 3.19 ± 2.01 and 13.31 ± 2.49 , respectively. Multiple linear regression analysis showed that educational grade was the most significant influential factor underlying the level of knowledge female college students had with regards to the treatment of breast cancer ($P < 0.05$). Registered residence and educational grade were the most significant factors that influenced attitude ($P < 0.05$). Age, registered residence, grade and major, were the most significant factors that influenced behavior ($P < 0.05$). The KAP of female college students in western Yunnan with regards to

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breast cancer were low.

CONCLUSION

There is an urgent need to provide standardized publicity and educational strategies in China to improve the knowledge, attitude, and practice, of college students with regards to breast cancer.

Key Words: Breast cancer; Regression analysis; Rejuvenation; Western Yunnan; College students; Knowledge, attitude and practice

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Core Tip: By applying self-designed questionnaires that specifically targeted the knowledge, attitude, and practice of college students at two universities, we were able to ascertain that the knowledge levels of college students in Yunnan with regards to breast cancer were low. Collectively, our data indicated that we should strengthen publicity and educational strategies on university campuses with regards to breast cancer, particularly in terms of prevention, self-examination and examination methods. These strategies will reduce the incidence of breast cancer, specifically in the younger population.

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INTRODUCTION

In 2020, 2.26 million new cases of female breast cancer were diagnosed; consequently, breast cancer replaced lung cancer and became the most common form of cancer in the world. The early onset of breast cancer can be indicative of a familial case of breast cancer. According to the annual report of China cancer residence in 2017, there are 210000 new cases of breast cancer in China each year, with an annual growth rate of 2%[1]. By 2020, there were 420000 new cases; furthermore, data showed that patients were younger[2-5]. The screening guidelines for breast cancer recommended by the American Cancer Society indicate that the incidence rate of breast cancer is higher among women aged 20-39 years, and that the preventing the occurrence of breast cancer in younger age groups should be the key focus for the formulation of public health policies[6,7].

The knowledge, attitude, and practice (KAP) of young women is very important if we are to reduce the morbidity and mortality associated with breast cancer. If we can reduce the trend for breast cancer by primary prevention in the younger groups, then it will be possible to reduce the incidence rate significantly over the next 30 years[3-5]. China has already carried out a survey on young women with regards to understanding breast cancer and self-examination[8]. Research studies have also been published that describe regional differences and ethnic characteristics with regards to breast cancer awareness[9-11]. However, many female college students are not aware of breast cancer, thus resulting in a lower self-examination rate; this is because they do not feel that breast cancer is likely to affect them.

Yunnan is in the western borderland of China; this area is associated with more minorities and poorer medical conditions. Public health care should be provided first to college students, who would be the main force behind the transmission of health knowledge and behavior. However, the KAP of female college students about breast cancer in Yunnan was unknown. In this study, we aimed to investigate the KAP of female college students in Yunnan of breast cancer and investigate associated influential factors. Our findings should provide an appropriate foundation for the development of effective health education programs for young women in China with regard to breast cancer.



MATERIALS AND METHODS

Participants

Between October 2020 and February 2021, we randomly selected 1346 female college students from two university campuses in western Yunnan, including those studying different majors (medicine, non-medical science, non-medical arts) and those achieving different grades. All subjects provided informed consent and participated voluntarily. This study was approved by the Ethics Committee of the First Affiliated Hospital of Dali University (No. DFY20200712).

Research methods

Design of the questionnaire: Promoting our questionnaire included 5 items of basic information (age, nationality, registered residence, grade and major), 16 items related to preventative behaviors (including time, method, and motivation for breast self-examination), and eight items relating to the basic knowledge of breast cancer according to the KAP. "No", "Uncertain" and "Yes" were allocated scores of 0-2; "Oppose", "Uncertain", "Understand" and "Agree" were allocated scores of 0-3. The total score for the knowledge dimension (question numbers 1-2; question numbers 4-11) ranged from 0-20; the total scores for the attitude dimension (question numbers 14-18) ranged from 0-10; and the total scores for the practice dimension (question numbers 3, 12-13, and 19-20) ranged from 3-19. Forms were completed anonymously by the participants and then analyzed.

The content validity of the questionnaire was 0.780, the total Cronbach's alpha coefficient was 0.702, and the Cronbach's alpha coefficients for each dimension were 0.533, 0.697, and 0.563.

Quality control

The returned questionnaire was first coded and verified. Those that were missing > 10% of data were invalid. In total, 1390 questionnaire were sent out to students and 1346 valid questionnaire were returned. This represented an effective recovery rate of 96.83%.

Statistical analysis

Solutions SPSS version 25.0 software (IBM, Armonk, N.Y., United States) was used for real-time data entry and statistical analysis. A histogram was used to test the normality of raw data. Data were then described as means, standard deviations, standard errors, frequencies, and percentages. Statistical comparisons were carried out with the *t*-test and one-way analysis of variance. Multivariate linear regression analysis was also performed. Tests were two-way and $P < 0.05$ was statistically significant.

RESULTS

KAP scores for breast cancer in college students

The full marks of the three dimensions were different, in order to increase the reliability of the conclusion, the full marks for each dimension were standardized to 100 and then compared with the standardized mean. The scores for knowledge and practice for breast cancer in female college students in western Yunnan were significantly higher than the score for attitude ($P < 0.05$). As the age of the college students increased, the three items that make up the KAP score also increased significantly ($P < 0.05$). We also identified significant differences in the KAP scores when compared between students of different nationalities ($P > 0.05$). The KAP scores of senior students were significantly higher than those of junior students ($P < 0.05$). The scores for attitude and practice for urban students were significantly higher than those of rural students ($P < 0.05$); there was no significant difference with regards to knowledge score ($P > 0.05$). However, there was significant difference in terms of the attitude and practice scores between students with different majors ($P < 0.05$), although there were no significant differences in the knowledge scores ($P > 0.05$) (Tables 1 and 2).

An analysis of factors that influence KAP scores for breast cancer

When taking age as the measurement data and using multiple linear regression analysis, we found that the knowledge score could be predicted by the student's grade

Table 1 Knowledge, attitude, and practice scores for 1346 female college students with regards to breast cancer ($n = 1346$, mean \pm SD)

Dimension	Score	Lowest score	Highest score	Score	Standard score
Knowledge	0-20	0	20	9.86 \pm 2.50	49.28 \pm 12.48
Attitude	0-10	0	10	3.19 \pm 2.01	31.95 \pm 20.08
Practice	3-19	3	19	13.31 \pm 2.49	63.36 \pm 11.86

Table 2 A comparison of knowledge, attitude, and practice scores for breast cancer among 1346 female college students ($n = 1346$, mean \pm SD)

Project		Knowledge score	t/F	P value	Attitude score	t/F	P value	Practice score	t/F	P value
Age	≤ 20	9.72 \pm 2.42	11.548	0.000	3.07 \pm 1.93	10.460	0.014	13.14 \pm 2.44	16.987	0.000
	21-25	10.53 \pm 2.72			3.82 \pm 2.21			14.17 \pm 2.55		
	≥ 25	12.67 \pm 5.13			6.00 \pm 4.00			15.33 \pm 3.51		
Nationality	Han	9.89 \pm 2.45	1.131	0.335	3.18 \pm 2.02	0.485	0.901	13.31 \pm 2.51	0.916	0.522
	Yi	9.42 \pm 2.61			3.19 \pm 2.00			13.48 \pm 2.16		
	Bai	10.20 \pm 2.74			3.39 \pm 1.73			13.27 \pm 1.97		
	Hui	10.11 \pm 2.76			3.00 \pm 2.50			13.22 \pm 3.51		
	Zhuang	9.74 \pm 3.29			2.80 \pm 1.49			12.42 \pm 2.38		
	Ha Ni	9.63 \pm 2.11			3.74 \pm 1.99			13.26 \pm 2.09		
	Dai	10.82 \pm 2.46			3.31 \pm 2.06			13.59 \pm 2.58		
	Miao	8.93 \pm 2.25			3.47 \pm 2.00			13.07 \pm 1.62		
	Li Su	9.83 \pm 2.33			2.83 \pm 1.19			13.58 \pm 2.87		
	Na Xi	10.36 \pm 2.66			3.27 \pm 1.62			14.63 \pm 2.29		
	Others	9.67 \pm 2.47			3.31 \pm 2.19			13.10 \pm 2.68		
Grade	First	9.32 \pm 2.30	45.996	0.000	2.80 \pm 1.73	36.480	0.000	12.87 \pm 2.29	39.017	0.000
	Second	10.35 \pm 2.39			3.51 \pm 2.22			13.25 \pm 2.72		
	Third	10.69 \pm 2.64			3.84 \pm 2.22			14.21 \pm 2.53		
Registered residence	Urban	9.84 \pm 2.56	0.169	0.866	3.60 \pm 2.23	3.647	0.000	13.79 \pm 2.52	3.850	0.000
	Rural	9.86 \pm 2.48			3.08 \pm 1.93			13.17 \pm 2.46		
Major	Medicine	9.88 \pm 2.51	1.657	0.191	3.20 \pm 1.98	3.781	0.024	13.44 \pm 2.37	6.505	0.002
	Nonmedical science	9.53 \pm 2.27			2.85 \pm 1.79			12.60 \pm 2.79		
	Nonmedical arts	9.98 \pm 2.59			3.39 \pm 2.20			13.25 \pm 2.68		

($P < 0.05$) with a regression coefficient of 0.635. We also found that attitude score could be predicted according to the student's registered residence and grade ($P < 0.05$) with regression coefficients of -0.542 and 0.448 respectively. Practice score could be predicted according to the student's age, registered residence, grade and major ($P < 0.05$); the regression coefficients were 0.156, -0.691, 0.522, and -0.217, respectively (Table 3).

When taking age as the ranked data and using multiple linear regression analysis, we found that knowledge score could be predicted according to the student's grade ($P < 0.05$); the regression coefficient was 0.704. We also found that attitude score could be predicted according to the student's registered residence and grade ($P < 0.05$); the regression coefficients were -0.542 and 0.473, respectively. Practice score could be predicted according to the student's registered residence, grade and major ($P < 0.05$); the regression coefficients were -0.677, 0.583, and -0.193, respectively (Table 4).

Table 3 Multiple linear regression analysis of the factors that influence knowledge, attitude, and practice scores for breast cancer, age was included directly in this analysis as a form of measurement data

Project		<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>P</i> value
Knowledge	Constant term	7.335	1.228	-	5.976	0.000
	Grade	0.635	0.098	0.226	6.494	0.000
Attitude	Constant term	1.627	0.985	-	1.652	0.099
	Registered residence	-0.542	0.129	-0.112	-4.212	0.000
	Grade	0.448	0.079	0.198	5.713	0.000
Practice	Constant term	11.005	1.218	-	9.038	0.000
	Age	0.156	0.068	0.080	2.288	0.022
	Registered residence	-0.691	0.159	-0.115	-4.343	0.000
	Grade	0.522	0.097	0.186	5.376	0.000
	Major	-0.217	0.084	-0.068	-2.569	0.010

Table 4 Multiple linear regression analysis of the factors that influence knowledge, attitude, and practice scores for breast cancer, age was included directly in the analysis as ranked data

Project		<i>B</i>	<i>SE</i>	β	<i>t</i>	<i>P</i> value
Knowledge	Constant term	8.646	0.379	-	22.791	0.000
	Grade	0.704	0.087	0.250	8.096	0.000
Attitude	Constant term	2.977	0.304	-	9.788	0.000
	Registered residence	-0.537	0.128	-0.111	-4.180	0.000
	Grade	0.473	0.070	0.209	6.777	0.000
Practice	Constant term	13.407	0.376	-	35.622	0.000
	Registered residence	-0.677	0.159	-0.113	-4.260	0.000
	Grade	0.583	0.086	0.208	6.752	0.000
	Major	-0.193	0.084	-0.061	-2.292	0.002

Information related to the KAP questionnaire for breast cancer

Analysis showed that 29.7% of respondents were unwilling to communicate with their friends or family with regards to breast-related problems; 30.1% of respondents did not consider that the early onset of menstruation, or a later menopause, were associated with breast cancer; 19.8% did not consider that fertility or infertility was associated with breast cancer after 30 years of age, and 14.6% of respondents did not believe that breastfeeding could reduce the incidence of breast cancer. Analysis also showed that 54.5% of our respondents did not know about breast self-examination and that 76.3% of respondents did not examine their own breasts; 74.2% did not know the best time for self-examination; 72.8% respondents did not know the common technical examination for breast cancer; and 74.5% of respondents did not know how often adult women should undergo clinical examinations of their breasts. Furthermore, 56.3% of respondents did not know that mammography could detect early breast cancer that could not be detected by palpation and 50.0% of respondents had no access to healthcare knowledge related to breast cancer (Table 5).

DISCUSSION

The number of younger patients (≤ 35 year of age) accounts for 7% of patients with breast cancer. These younger patients with breast cancer are associated with high levels of malignancy, rapid progression, early metastasis, and a poor prognosis[12]. Screening and prevention strategies are known to exert a significant effect on reducing

Table 5 Statistics related to the knowledge, attitude, and practice questionnaire for the breast cancer

Subject	Number of people (%)			
	Yes	Uncertain	No	
Have a history of breast disease	15 (1.1)	200 (14.4)	1172 (84.5)	
Have had a breast mass	57 (4.1)	334 (24.1)	996 (71.8)	
Share breast-related issues with friends or family	682 (49.2)	293 (21.1)	412 (29.7)	
Have a family history of breast cancer (Female relatives in the family have or have had breast cancer)	53 (3.8)	204 (14.7)	1130 (81.5)	
Early menarche and late menopause associated with breast cancer	301 (21.7)	669 (48.2)	417 (30.1)	
Fertility or infertility after 30 years old related to breast cancer	279 (20.1)	833 (60.1)	275 (19.8)	
Breastfeeding reduce the incidence rate of breast cancer	369 (26.6)	816 (58.8)	202 (14.6)	
No mass in the breast but in the armpit be highly vigilant	1053 (75.9)	305 (22.0)	29 (2.1)	
Bloody secretions from the breast a bad sign of breast cancer	684 (49.3)	660 (47.6)	43 (3.1)	
If breast pain and/or breast skin changes is breast cancer performance	481 (34.7)	819 (59.0)	87 (6.3)	
If nipple invagination should remain vigilant	992 (71.5)	326 (23.5)	69 (5.0)	
Know about breast self-examination	183 (13.2)	448 (32.3)	756 (54.5)	
Have done breast self-examination	70 (5.0)	288 (20.8)	1029 (74.2)	
Know the common technical examination methods of breast	118 (8.5)	259 (18.7)	1010 (72.8)	
Know how often adult women do breast clinical examination at least	70 (5.0)	284 (20.5)	1033 (74.5)	
Accept genetic screening if genetic testing can predict breast cancer	1085 (78.2)	208 (15.0)	94 (6.8)	
Know mammography can detect early breast cancer but cannot be detected by palpation	187 (13.5)	419 (30.2)	781 (56.3)	
Willing to accept breast disease prevention guidance and take the initiative to carry out breast self-examination	1172 (84.5)	151 (10.9)	64 (4.6)	
Find breast abnormality or discomfort, take the initiative to seek medical treatment in time	1025 (73.9)	253 (18.2)	109 (7.9)	
A way to acquire breast health knowledge	413 (29.8)	281 (20.3)	693 (50.0)	
	Agree	Understand	Uncertain	Oppose
Women should receive health education on breast cancer	1279 (92.2)	85 (6.1)	19 (1.4)	4 (0.3)
Take the initiative to prevent breast cancer in daily life	1308 (94.3)	46 (3.3)	31 (2.2)	2 (0.1)
Accept breast resection to save life	820 (59.1)	227 (16.4)	288 (20.8)	52 (3.7)

the incidence rate of breast cancer[3-5]. Research studies have also focus on the prevention of breast cancer in younger women[13].

In the present study, we demonstrated that the main factor that influences breast cancer knowledge in female college students in western Yunnan was their grades. We identified a correlation between age and grade, as reported previously by Zhou *et al* [3]. Irrespective of whether age was included in our calculations as ranked data or measurement data, the influence of grade, as an independent variable, on the knowledge score was statistically significant. Therefore, the imbalance in breast cancer knowledge and education among female college students between different ages and grades is a critical factor that needs to be addressed. Other population characteristics should also be considered; female college students with a low age, low grade, and a low educational background, can be regarded as a key population for health education. In addition, we found that 14.4%-24.1% of respondents were not sure about their breast history and their family history of breast cancer. Familial cases of breast cancer can result in changes in the KAP values of women from affected families when compared to unaffected families; this was not considered in the present study.

Furthermore, 30.1% of respondents did not believe that the early onset of menstruation and a later menopause was associated with breast cancer. Analysis also showed that 19.8% of respondents did not consider that fertility or infertility was associated with breast cancer after 30 years of age, and 14.6% did not believe that breastfeeding could reduce the incidence rate of breast cancer. The total awareness rate of breast cancer among female college students was 54.66%; this was higher than the

rates that have been published previously (32.8%-51.38%)[14], but still demonstrated imbalance (20.1%-85.6%). In particular, the insufficient awareness of high-risk factors for breast cancer should represent a key aspect of primary prevention and needs to be addressed.

In this research study, we found that the main factors that influenced attitude scores were registered residence and grade. The attitude scores for senior and urban female college students were higher than those who were junior and rural; these findings were consistent with previous findings[9,15]. Female college students in western Yunnan are more considerate with regards to seeking health care for the precancerous signs of breast cancer, although 56.3%-74.5% of respondents lacked a positive attitude for common technical examination methods, examination times, and mammography examinations. With regards to the early screening of breast cancer, mammography is considered to be the only screening method that can reduce the mortality rate associated with breast cancer[16] as this method can accurately detect small lumps along with typical granular and tiny burry calcifications. However, mammography is highly sensitive to the location of pathological tissue and breast morphology, and is not unsuitable for Chinese women with dense glands and small breasts[17]. In a previous study, Guo *et al*[18] reported that breast ultrasound is an easy technique to carry out and is both safe and non-invasive; however, mammography is widely used due to its high levels of sensitivity and specificity. Both of these techniques have their own advantages and limitations. Therefore, we advocate that the combined application of mammography and ultrasound should be used to screen for early breast cancer. With regards to the female college students in western Yunnan, and especially for those with lower grades and who reside in rural areas, it is particularly important that we increase publicity relating to early breast cancer screening and introduce more rigorous preventive education strategies. For young women with a family history and the presence of a breast mass, we advocate the use of a combination of mammography and ultrasound as a routine physical examination.

In this research, we found that the main influencing factors for behavior included age, registered residence, grade and major. Therefore, the behavior of female college students in western Yunnan is both comprehensive and multifactorial. However, low age, a rural residence, a low grade, a non-medical major, and a reluctance to talk about breast cancer and self-examination are identified as key factors, particularly self-examination. Overall, 13.2% of our respondents knew more about breast self-examination; this was greater than the proportion reported by Wang *et al*[15] (12%) but less than that reported by Jiang *et al*[9] (41.10%). Analysis further showed that 14.8% of our respondents had examined their breasts; this was less than the proportion reported by Jiang *et al*[9]. Moreover, 5.0% of respondents knew the best time for breast self-examination; this was less than the proportion reported previously by Lei *et al*[19] (6.7%). We also found that 29.7% of respondents were unwilling to communicate with friends or family about breast-related problems.

It is evident, therefore, that female college students in western Yunnan were seriously lacking in the knowledge and skills required for breast examination. It is suggested that publicity should be strengthened through audio-visual media, classroom education, practical training, and other methods. These students should also be encouraged to overcome their shyness and carry out early self-examination.

Over recent years, breast cancer has become a very common form of tumor. Differences in culture, lifestyle, and social demography, are known to affect the biological expression of breast cancer, thus leading to different incidences and mortality rates. The responses to our questionnaire demonstrated that female college students in western Yunnan have low awareness of breast cancer, cognitive deficiencies and imbalances, and a low rate of breast self-examination. To improve the physical qualities of our female population of students, it is vital that we improve breast cancer knowledge on university campuses and develop more ways to improve the understanding of breast cancer among young female college students; this will reduce incidence rates in the younger population. It is also important that we use plain language and concise words to carry out health education strategies for female college students relating to breast cancer, symptoms, therapeutic methods, and how to prevent this condition.

Familial cases of breast cancer can result in changes in the KAP values of women from affected families when compared to unaffected families; this was not considered in the present study.

CONCLUSION

In conclusion, there is an urgently needs to provide standardized publicity and educational strategies in order to improve the knowledge levels of breast cancer of college students so as to reduce the incidence of breast cancer.

ARTICLE HIGHLIGHTS

Research background

Morbidity of breast cancer become younger, many female college students have insufficient awareness of breast health care and breast cancer.

Research motivation

It's not reported that knowledge of breast cancer and health care of female college students in western Yunnan.

Research objectives

We want to know about knowledge of breast cancer in female college students and take some measures.

Research methods

We designed the questionnaire and totally 1387 questionnaires were sent out.

Research results

Influence factor of breast cancer knowledge is grade, influence factors of breast cancer attitude are registered residence and grade, influence factors of breast cancer practice are registered residence, grade and major.

Research conclusions

The knowledge, attitude, and practice level of female college students in western Yunnan were low, health education and self-examination of breast cancer is necessary.

Research perspectives

Using specific questionnaires, we identified a low awareness for breast cancer in female college students in west Yunnan, along with cognitive loopholes and imbalance in different ages and different grades.

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