

# Breast Cancer Screening Practices and Related Health Beliefs among Taiwanese Nurses

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## ABSTRACT

**Objective:** Breast cancer is one of most common cancer types among women in Taiwan. Nurses are in an ideal position to promote breast cancer screening and educate individuals about breast health-related issues. This exploratory study aims to provide preliminary information on Taiwanese nurses' beliefs about breast cancer, breast cancer-related knowledge, and their cancer screening practices. **Methods:** In this cross-sectional study, a total of 96 nurses completed self-report questionnaires. **Results:** Participants were knowledgeable about the different breast cancer screening modalities and the risk factors for breast cancer, but various misconceptions about breast cancer were still

observed. Nevertheless, more than 50% of participants reported that they never had clinical breast examinations, ultrasound, and/or mammography screening in the past. **Conclusions:** Our study sample demonstrated greater knowledge on modalities of breast cancer screening modalities and the risk factors for breast cancers but lower screening practices. Future studies that examine the impact of demographics and the reinforcing and inhibiting factors related to nurses' screening uptake are warranted.

**Key words:** Breast cancer, breast health, knowledge, mammogram, ultrasound

## Introduction

Breast cancer continues to be the most common type of cancer and, in turn, the leading cause of cancer-related death among women worldwide. According to the latest Taiwanese cancer registry report, 10,056 women were diagnosed with breast cancer, and 1852 died of this disease.<sup>[1]</sup> Despite the relatively low incidence rate of 64 per 100,000, the number of newly diagnosed breast cancer

cases increases 2%–3% every year.<sup>[1]</sup> Not surprisingly, breast cancer was the leading cancer-related cause of death among Taiwanese women in 2011.<sup>[2]</sup>

The current breast cancer screening guidelines from the Ministry of Health and Welfare in Taiwan recommends that women at average risk need to perform biannual

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mammogram starting between the ages of 45 and 69 years.<sup>[1]</sup> Despite the documented benefits of timely mammograms, Taiwanese women still do not receive the recommended number of breast cancer screenings. Official statistics released revealed that only 12% of women aged 45–69 years received a mammogram during the past 2 years, and only 30% of breast cancer patients were diagnosed at the early Stages 0 and I.<sup>[3]</sup> This finding is particularly troubling as disease stage at diagnosis is a key prognostic factor in survival rates. Indeed, 90% of patients diagnosed with Stage I breast cancer typically survive at least 5 years and represents a significant improvement over the 20% survival rate associated with Stage IV diagnosis.<sup>[2]</sup>

In November 2009, the Health Promotion Administration in Taiwan sought to improve mammography-screening rates by providing a mammogram test every 2 years for women aged 45–69 years. By 2013, a total of 694,000 mammograms were provided to females of this age group, representing a coverage rate of 36% over the past 2 years.<sup>[4]</sup> Despite this initiative, along with the universal health insurance provided to all Taiwanese citizens, a recent study revealed that 50% of Taiwanese women reported never receiving any of the other recommended screening procedures (e.g., mammograms and ultrasound) during the past 5 years.<sup>[5]</sup>

Barriers to breast cancer screening include lack of knowledge, myths, and psychosocial and system barriers such as proximity of screening location and transportation issues.<sup>[6]</sup> In addition, another study reported the main reasons related to psychological barrier among women in Taiwan were not understanding the inspection process and feeling the shame. psychological barriers to timely breast cancer screening.<sup>[7]</sup> Wu *et al.*'s<sup>[5]</sup> study also revealed other barriers unique to Taiwanese women (compared to Western population) which include (1) an assumption that they do not need to receive the screening because they have no family history; (2) feeling better (or no other symptoms); and (3) belief that they are too young and/or too old. In addition, the participants reported a general lack of awareness on the importance of early detection. Taken together, these findings underscored the need for a comprehensive education campaign that promotes breast health awareness by debunking some of the more common misconceptions about breast cancer. Extant studies have shown that appropriate training among health-care professionals can increase early breast cancer diagnosis by improving breast cancer awareness and practice for both patients and health-care professionals.<sup>[8–10]</sup> However, despite extensive organizational and professional interests in this area, misconceptions about breast cancer and breast cancer screening still exist among health-care professionals.<sup>[11]</sup>

Nurses are the population of interest in this study as they are being on the frontline of patient care and assume an important role in educating and motivating patients

in cancer screening. In addition, nurses can also educate women about breast cancer risk factors (e.g., healthy lifestyles and reproductive health) and available breast cancer screening services and practices.

While health statistics from Taiwan health authorities have reported increasing incidence rate of breast cancer among Taiwanese women, there is still a paucity of data on Taiwanese nurses' knowledge toward breast cancer and their screening practices. Additional research is needed to identify nurses' knowledge and attitudes on breast cancer as it may influence their own practice of early breast cancer detection methods.

## Methods

An exploratory descriptive design was used to assess Taiwanese nurses' knowledge on breast cancer and their breast cancer screening practice by analyzing the barriers and facilitators related to their practice of breast cancer screening. Participants ( $n = 96$ ) were recruited from a nursing continuing education (CE) workshop with topics on women's health held at a university in Southern Taiwan and asked to complete self-report questionnaires that assessed breast cancer screening attitudes and behaviors before the CE workshop. The study protocol was reviewed and approved by the Institutional Review Board at Eastern Michigan University. Participation was voluntary, and all collected information was confidential. Each participant signed informed consent form and received a brief description of the study. The study instrument was divided into three parts: (a) demographics (10 items); (b) breast cancer screening practices (12 items); and (c) predisposing, reinforcing, and inhibiting factors (34 items); these were social cognitive factors that can be modified to affect changes in screening behaviors and identified as outcome expectancies (i.e., perceived benefits and barriers), perceived self-efficacy, and knowledge. The current study used the Precede–Proceed model<sup>[12]</sup> to organize study variables.

Measurement strategies for social cognitive factors (i.e., perceived benefits, perceived barriers, and perceived self-efficacy) and knowledge-related measures (i.e., misconception/knowledge about breast cancer risks and knowledge about recommendations for frequency of mammography screening) and their descriptive statistics of subscale scores are shown in Table 1. The perceived benefits and perceived subscales were tested in a previous study, and good internal consistency (Cronbach's alpha = 0.86–0.91) and construct and predictive validity were demonstrated.<sup>[13,14]</sup>

Data were analyzed with SPSS version 21.0 for Windows (SPSS Inc., Chicago, IL, USA) software. Descriptive statistics including percentages, means, and standard deviations were calculated and are reported in

Table 1: Measurement strategies and descriptive statistics for study measures

Psychosocial factor	Items description	Item response categories	Total score ranges	Mean (SD)/percentage correct	Internal consistency
Perceived benefits (number of items=5)	Positive aspects of regular mammography	1=strongly disagree 2=disagree 3=agree 4=strongly agree	5-20	3.11 (2.93)	0.86
Perceived barriers (number of items=15)	Negative aspects of receiving regular mammography	Same as above	15-60	2.24 (0.46)	0.91
Perceived risk (number of items=2)	Questions related to the perceptions of developing BC in lifetime and compared to other women similar to their age	1=no risk, 2=low risk, 3=medium risk, 4=high risk, 5=very high risk	1-5	2.93 (0.70)	N/A
		1=much less, 2=less, 3=about the same, 4=high	1-4	2.77 (0.88)	
Misconception/knowledge about breast cancer risks (number of items=8)	Questions related to the knowledge of which of the following conditions increases a woman's chance of getting BC Hitting, bumping, or fondling the breasts Doing something morally bad Immigrated to the USA Overweight Air pollution Large breasts Ovarian cancer	Responses included yes, no, and don't know. If participants correctly answered a question, they got 1, and if not, got 0	0-8	5.67 (1.63)	0.52
Knowledge of recommendations (number of items=5)	Questions related to the knowledge of the recommended frequency of having a mammogram for women with the following conditions Have no family history of BC Have no breast symptoms Feels healthy Had previously breastfed a child Older age Eats a healthy diet and exercises regularly	Responses included every year, every 2, 3-5 years, never, and other. If participants correctly answered a question (in this case, every year), they got 1, and if not, got 0	0-5	2.63 (2.05)	0.89

BC: Breast cancer, SD: Standard deviation, N/A: Not available

this paper. Missing data were treated as pairwise deletion whereas available case analysis was performed. *t*-tests were performed to examine the differences of social cognitive factors (i.e., perceived benefits and barriers), perceived self-efficacy, and knowledge. The *post hoc* power analysis was performed that with large effect size and power of 0.8, 25 cases are needed in each group.<sup>[15]</sup> In the current study, we have at least 25 participants in each of the two groups for *t*-tests.

## Results

### Participant demographics

Demographic data are presented in Table 2. A total of 104 attended the CE workshop, and 96 women completed a series of self-report questionnaires (yielding the 92% response rate). The age range for the women was 21–65 years (mean = 37; standard deviation = 11.20); the majority (61%) of participants were married. More than 80% of participants worked as nurses (88.3%) and 5.2% were teachers. More than 90% of participants reported having college or higher education, and the majority of respondents (41.9%) had a combined household income of \$15,000–\$30,000 with 35.5% reporting their combined household income as <\$15,000.

### Practice of breast cancer screening practice and intention

The vast majority of respondents (63%) reported having never received any type of breast cancer screening [Table 1]. This finding persisted even after controlling for screening modalities (mammogram vs. ultrasound) and respondent age (with age-specific nature of screening recommendations) with 62% and 57% of the respondents having never received a prior mammogram or ultrasound, respectively. Less than 10% of the nurses reported being screened within the past 2 years, and 61% of the respondents have never received a clinical breast examination (a screening modality recommended for women age 20 and older). Finally, 43% of the participants in the 45 years and older age group indicated “not planning to” or “not sure” in response to inquiries about their intent to receive a mammogram next year.

### Predisposing factors

Table 3 shows the levels of knowledge of participants had toward breast cancer risks, recommended screening intervals. Several misconceptions regarding the cause

Table 2: Demographic characteristics

Variable	mean (SD); range
Average age (years):	36.68 (11.20); 21-65
Marital status	% (frequency)
Currently married	61.1 (n=58)
Not married, living with a partner	9.5 (n=9)
Single and have never been married	25.3 (n=24)
Separated	4.2 (n=4)
Education	
High school	8.3 (n=8)
College	51 (n=49)
University	27.1 (n=26)
Master's degree	10.4 (n=10)
PhD	3.1 (n=3)
Occupation	
Teacher	5.2 (n=4)
Registered nurse	88.3 (n=68)
Retired	2.6 (n=2)
Housekeeper	2.6 (n=2)
Medical management	1.3 (n=1)
Household income (\$)	
<15,000	35.5 (n=33)
15,000–30,000	41.9 (n=39)
30,001–50,000	14.0 (n=13)
50,001–75,000	4.3 (n=4)
75,001–100,000	3.2 (n=3)
100,000 or more	1.1 (n=1)
Last BC screening	
Never	63 (n=55)
<13 months	9 (n=8)
13 months to 2 years	10 (n=9)
>2 years	14 (n=12)
Don't remember	3 (n=3)
Last mammogram* (years)	
Never	62 (n=21)
<2	6 (n=2)
2-4	18 (n=6)
>4	14 (n=5)
Last ultrasound* (years)	
Never	57 (n=17)
<2	3 (n=1)
2-4	30 (n=9)
>4	10 (n=3)
Last clinical breast exam	
Never	61 (n=56)
<2	16 (n=13)
2-5	11 (n=10)
>5	12 (n=12)
Intent to obtain mammogram next year*	
Definitely plan not to	17 (n=6)
Maybe	48 (n=17)
Definitely plan to	6 (n=2)
Not sure	29 (n=10)

The numbers do not add up to 96 due to missing data.\*The study only includes participants aged 45 years and older due to age-specific screening recommendation. BC: Breast cancer, SD: Standard deviation

of breast cancer were observed among this sample and included beliefs that immigration was not a significant factor

Table 3: Predisposing factors for breast cancer

Knowledge item	Correct (%)	Incorrect (%)
Heard of mammogram	Yes: 97	No: 3
Knowledge regarding BC		
Hitting, bumping, or fondling the breast	88.5	11.5
Doing something morally bad	86.5	13.5
Immigrating to the US	43.7	56.3
Twenty pounds overweight	72.9	27.1
Having large breasts	69.8	30.2
Ovarian cancer	65.6	34.4
Having a mammogram	94.8	5.2
Air pollution	44.8	55.2
Knowledge regarding BC screening		
When to start clinical breast examination	5.9	94.1
When to start mammogram	40.4	59.6
Knowledge regarding BC screening frequency		
No family history	54.3	45.7
No symptoms	53.8	46.2
Previous breastfeeding	52.2	47.8
Getting older	66.3	33.7
Eating a healthy diet and regular exercise	47.3	52.7

BC: Breast cancer

for developing breast cancer (56.3%) and that breast cancer was caused by large breast size (30.2%). Interestingly, more than half of the participants (52.7%) believed that if they are eating healthy and exercise regularly, they do not need regular breast cancer screening.

While the prevailing majority (96.8%) heard of mammograms, slightly fewer women (95.7%) were aware of breast self-examination and even fewer women (84.8%) knew that clinical breast examinations were a form of breast cancer screening. Moreover, more than half of the respondents did not know the recommended age to start mammography screening (59.6%) and even smaller percentage of participants (5.9%) know the starting age for clinical breast examinations. In the current sample, the majority of nurses perceived their risk of developing breast cancer as low (52.2%) or no risk (2.2%); about one-third of nurses perceived their risk as medium [Table 4].

### Reinforcing factors

Participants were more likely to practice breast cancer screening when encouraged by their husbands (51.4%), followed by recommendations from their children (48.4%) and doctors or nurses (46.8%). Other facilitating factors to regular breast cancer screening included reminders for their next mammogram appointment (40.9%); newsletter with information about breast cancer (40.4%); and encouragement by their relatives and friends (38.0%).

In terms of perceived positive outcomes toward breast cancer screening, more than 90% of participants recognized that timely screening helps find breast lumps early, detect



small breast lumps, and reduce the risk of dying from breast cancer [Table 3]. However, respondents fared worse when asked if mammograms can detect breast cancer that could not be detected by themselves [50.1%, Table 5].

For inhibiting factors to screening, the most commonly cited barrier to regular breast cancer screening was the reticence to being examined by strangers and/or male clinicians as well as the belief that the mammogram procedure would be painful. Other barriers included discomfort with taking off clothes in front of health professionals during the examination and the fear that the mammogram procedure will reveal cancer. A large number of participants (40.0%) also worried about unnecessary exposure to radiation during the mammogram. The mean and standard deviation on the barriers to mammography screening are reported in Table 5.

### Comparison of reinforcing and inhibiting factors by age and education

Next, *t*-tests were performed to examine whether demographic factors (e.g., age and education) contributed to differences in participants' knowledge, perceived benefits, barriers, and risk perceptions toward breast cancer screening. A significant difference by age was observed in perceived benefits whereas participants who are 41 years and older reported higher levels of perceived benefits than their counterparts [Table 6]. In terms of the comparison by education level, results showed that significant differences were observed between nurse participants with have bachelor degrees or higher whereas those with higher levels of education reported have higher levels of perceived benefits and greater knowledge related to breast cancer [Table 7].

## Discussion

The goal of this exploratory study was to provide preliminary information about Taiwanese nurses' beliefs about breast cancer, breast cancer-related knowledge, and their cancer screening practices; the results showed that although nurse participants were knowledgeable about the different breast cancer screening modalities and risk factors for breast cancer, various misconceptions about breast cancer still existed, and the screening practices for breast cancer (i.e., clinical breast examinations, ultrasound, and/or mammography screening) were low. Information from the current study can be used to further examine the determinants for adherence in screening and tailored to designing and implementing intervention and prevention strategies.

Breast cancer is the most common type of cancer for women in Taiwan. Despite its high prevalence, only 30% of breast cancer patients are diagnosed at Stage I which,

Table 4: Perceived risk

Risk perception	Frequency (%)
Rate your risk of developing BC	
No risk	2 (2.2)
Low risk	48 (52.2)
Medium risk	33 (35.9)
High risk	8 (8.7)
Very high risk	1 (1.1)
Chances of developing BC in 5 years compared to average woman	
Much less	14 (15.7)
Less	21 (23.6)
About the same	45 (50.6)
High	9 (10.1)

The numbers do not add up to 96 due to missing data. BC: Breast cancer

Table 5: Perceived benefits and top five barriers related to screening

Benefit & Barrier Item	Frequency (n)	Mean* (SD)
Benefits		
Having a mammogram will help me to find breast lumps early	95	3.53 (0.56)
Is the best way for me to find a very small breast lump	95	3.34 (0.63)
Will decrease my chances of dying from BC	94	3.43 (0.58)
Will allow me to detect BC I cannot find myself	94	2.64 (0.96)
Will allow me to detect BC that my doctor or nurse cannot detect in a physical examination	95	2.63 (0.88)
Barriers		
It is difficult for me to be examined by male or strange health professionals that I don't know	94	2.81 (0.92)
Having a mammogram would be painful	93	2.73 (0.74)
I feel uncomfortable taking off clothes in front of health professionals during this exam	95	2.47 (0.89)
I am afraid a mammogram will find cancer	95	2.45 (0.88)
If I have a mammogram and it's normal, I won't worry as much about BC	95	2.38 (0.83)

\*Based on a 4-point Likert scale; The numbers do not add up to 96 due to missing data. BC: Breast cancer, SD: Standard deviation

Table 6: Comparison of predisposing and inhibiting factors by age

Predisposing and Inhibiting Factor	n	Mean (SD)	t/df	p
Perceived barriers				
Younger	50	2.16 (0.45)	-1.78/93	NS
Older	45	2.33 (0.48)		
Perceived benefits				
Younger	50	2.98 (0.46)	-2.69/93	<0.01
Older	45	3.25 (0.53)		
Perceived risks				
Younger	50	2.49 (0.69)	-0.92/90	NS
Older	42	2.62 (0.65)		
Knowledge on BC				
Younger	51	5.57 (1.66)	-0.63/94	NS
Older	45	5.78 (1.59)		
Knowledge about BC screening recommendation				
Younger	51	2.84 (1.99)	1.11/94	NS
Older	45	2.38 (2.10)		

Younger: Age <41, Older: Age ≥41. BC: Breast cancer, NS: Not significant, SD: Standard deviation

**Table 7: Comparison of predisposing and inhibiting factors by education level**

Predisposing and Inhibiting Factor	n	Mean (SD)	t/df	p
Perceived barriers				
1	56	2.22 (0.45)	-0.46/93	NS
2	39	2.27 (0.50)		
Perceived benefits				
1	56	3.01 (0.45)	-2.11/68.61	<0.05
2	39	3.24 (0.57)		
Perceived risks				
1	54	2.56 (0.72)	-0.27/90	NS
2	38	2.53 (0.60)		
Knowledge on BC				
1	57	5.23 (1.78)	-3.36/94	<0.01
2	39	6.31 (1.10)		
Knowledge about BC screening recommendation				
1	57	2.65 (1.96)	-0.14/75.45	NS
2	39	2.59 (2.20)		

1: Highest education with college or less; 2: Highest education with bachelor degree or higher. BC: Breast cancer, NS: Not significant, SD: Standard deviation

in turn, leads to worse prognosis. Early detection remains the cornerstone of breast cancer control,<sup>[16]</sup> and several policies have been implemented in Taiwan to promote the early detection and treatment of breast cancer (e.g., biennial breast mammograms for women aged 50–60 years and/or individuals with a family history of breast cancer). However, the statistics from the Health Promotion Administration in Taiwan still demonstrate a troubling trend of Taiwanese women underutilizing mammogram screening. In the current study, more than 50% of nurse participants never had breast cancer screening (either mammography, ultrasound, or clinical breast examinations).

For breast cancer, nurses are in prime position to incorporate both primary prevention (which includes educating women on breast cancer risk factors and influencing behavior change) and secondary prevention efforts (which includes screening for and early detection of the disease) into their current practice. To advance cancer control through early detection, empowering nurses with information about early detection methods and its benefits may result in increased motivation to recommend and perform breast cancer screening (in addition to other types of screening behaviors) for their patients.

Our sample generally demonstrated greater knowledge on modalities of breast cancer screening modalities and the risk factors for breast cancers (e.g., obesity, ovarian cancer, and immigration) when compared with respondents from the previous studies.<sup>[9,17,18]</sup> However, misconceptions about breast cancer were still observed. For example, more than 30% of the participants believed that breast size is associated with breast cancer while 11% believed that

breast cancer may develop in response to hitting, bumping, or fondling of the breast and/or moral misconduct. In terms of breast cancer screening modalities, awareness of mammography and clinical breast examinations' screening methods was high, however, knowledge on the recommended screening frequency was lacking with more than 50% of nurse participants endorsing the belief that if one has a healthy diet and exercises on a regularly basis, mammography screening can be performed less frequently than recommended intervals.

The Taiwanese nurse participants also reported much lower compliance for mammography screening than nurses from other similar studies which include nurses in Lagos Nigeria (7.8%), Saudi Arabia (42.7%), and Singapore (35%).<sup>[9,17,18]</sup> This finding is particularly surprising in light of contrasting findings on mammography screening practices among healthy Taiwanese women.<sup>[5]</sup> This disparity was also observed in other breast cancer screening modalities (e.g. breast self-examinations and clinical breast examinations) among the current study respondents.

### Implication for practice

Lack of access issue is unlikely reasons for the low rate of breast cancer screenings in light of the universal health insurance and the increased focus on breast cancer screening by the Taiwanese Government. Thus, it may be more beneficial to focus on awareness of breast health and attitudes toward breast cancer screening among Taiwanese women and their health-care providers. In particular, working to address and disseminate the most frequently identified barriers to breast cancer screening in the current study (e.g., insufficient knowledge of and misconceptions about breast cancer and screening guidelines) may be beneficial. These findings can be disseminated in a number of ways: education programs at regional and/or national conferences, online modules, and community-based curriculum with CE credits that provide incentives for participation.

Despite the existence of universal health insurance, Taiwanese individuals do not have and/or see primary care providers often. Therefore, provider-oriented interventions in Western countries (e.g., recall and reminder systems or assessment and feedback systems) will need to be modified to effectively promote screening behavior in Taiwan. For example, local public health offices can coordinate efforts to mail letters to women who are due for breast cancer screening and remind them to schedule their next screening appointment. Moreover, participants in our study identified their husbands and health-care providers as the leading facilitators in timely breast cancer screening services. Taken together, these findings suggest that facilitating support networks and providing women with reminders and letter

notifications may be viable ways to increase screening for this group.

A systematic review<sup>[6]</sup> showed that barriers contributed to low mammography screening among immigrant and minority women, and these reported barriers are related cultural beliefs and norms, privacy/modesty, and languages. Similarly, two of top five barriers in the current study were related to cultural beliefs and modesty issues (i.e., not being comfortable taking clothes off or being examined by a male or an unfamiliar health professional) as well as the preemptive belief that associates screening with signs and/or symptoms of pain. These types of beliefs and barriers may be addressed through an educational curriculum that increases women's knowledge of breast cancer, its signs and symptoms, the importance of early detection, and mammogram procedure (to allay fears of pain) in a culturally and personally relevant manner. The barrier of modesty and embarrassment can be addressed by providing women with female mammogram technicians and/or making this option widely known to encourage future screenings.

## Limitations

Several limitations should be noted for the current study. First, the study used a small convenience sample, and participants were recruited from a CE workshop. Thus, generalizability of the results is limited. Future studies that include larger and more diverse sample are warranted to investigate correlates and determinants of breast cancer screening among Taiwanese women. Second, there may have been measurement errors as a result of using self-report as over reporting socially desirable behaviors (e.g., breast cancer screening behavior) is a well-documented phenomenon.

## Conclusion

Despite these limitations, this is the first study that examined knowledge, attitudes, and beliefs of nurses in Taiwan related to breast cancer and screening practices. Nurses have a vital role in engendering increased breast health awareness (including screening behaviors) among their patients. Consequently, understanding how nurses perceive breast cancer and related issues (e.g., breast cancer screening) in Taiwan is important to promote breast cancer screening among health professions and for general public. Future studies can further examine the impact of demographics and the reinforcing and inhibiting factors which may impact nurses' awareness of breast cancer and their screening uptake. While most of the nurses obtained their information and knowledge from nursing school and workplace, our findings suggest that it is imperative to keep nurses up-to-date on important breast health issues. This

will encourage nurses to take an active role in promoting breast cancer screening among their patients, families, and friends.

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## Conflicts of interest

There are no conflicts of interest.

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