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A Study on Women's Practice of Breast Self-Examination in Taiwan[1]

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Methods. A questionnaire interview was conducted on a sample of 3,040 women ages 30–59 years in the Taipei area through multistage sampling with probability proportional to size. Excluding mistakes in household registration, there were 2,311 qualified subjects, 1,749 of whom (75.7%) completed the interview. The study framework was set up according to Green's PRECEDE model.

Results. In the results of this study only 8.4% of the subjects performed breast self-examinations monthly, and no single step of the breast self-examination procedure had a correct rate above 30%. The most remarkable associative factor for the correctness of breast self-examination was "source of instruction," a variable of "enabling factors"; other variables with strong associations were "newspaper contact" (contact with health reports in newspapers), which also belongs to the enabling factors category and "knowledge of breast cancer," a "predisposing factor." Demographic factors such as "educational level" and "urbanizational level" were only indirectly related.

Conclusion. The authors suggested using all possible routes of health education, such as mass media, hospitals and clinics, and distribution of information in the workplace, to instruct and encourage breast self-examination, especially among women from rural communities and those with less education.

INTRODUCTION

The incidence of breast cancer is increasing in Taiwan, from 5.94 per 100,000 in 1979 to 11.61 per 100,000 in 1986. Breast cancer mortality increased from 3.54 per 100,000 in 1978 to 5.42 per 100,000 in 1988. It is now the second leading cancer among females in incidence and sixth leading cancer among females in mortality in Taiwan (1). Although the incidence and mortality are much lower than those in Western countries (only about one-eighth compared with U.S. incidence and mortality rates), and slightly lower than those in developed countries in Asia, e.g., Japan (2–4), prevention and early detection of breast cancer are of increasing importance. Primary prevention—avoidance of risk factors such as early menarche, late menopause, Western (fat-rich) diet, delayed birth, nulliparity, never breast feeding, and/or family history of breast cancer (2–8)—is not easy in a modernized society. As a result, secondary prevention—i.e., early detection—becomes the most important method of combating breast cancer.

The most widely used methods of early detection of breast cancer are breast self-examination (BSE), routine physical examination by a physician, and mam-

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mography (9). These three methods have been combined in periodic health examinations in Western countries for many years (10–14). Large-scale studies in the past focused primarily on physical examination and mammography (15–18). However, the effectiveness of BSE is still being studied by many authors. Foster *et al.* (19), in a study of 355 patients, found that patients who performed BSE were more likely to detect cancer in its early stages, had smaller tumors, and had less lymph node metastasis. Greenwald *et al.* (20), in a study of 293 patients, found that 53.8% of the cancers were detected by routine physical examination and 37.7% by self-examination and that 27.0% of the cancers found incidentally were of stage I. The findings of Huguley *et al.* (21), in a study of 2,092 patients, were similar to those of Foster *et al.* (19), but the results of breast self-examination and the stage of cancer were still worse than those found after using either of the other two methods (i.e., physical examination and mammography). Feldman *et al.* (22), in a study of 996 newly diagnosed patients, also had similar findings even after controlling for confounding by age and education. Foster *et al.* (23), in a study of 1,004 patients, found that, in addition to earlier stage, smaller tumors, and less lymph node metastasis, those who performed BSE regularly had a better survival rate. Mant *et al.* (24), in a study of 616 patients in the United Kingdom, and Ogawa *et al.* (25), in a study of 150 patients in Japan, also had similar findings. Community trials conducted in the United Kingdom (26, 27) also suggest a similar relationship between BSE and early detection of breast cancer. Despite some criticism (28–33), BSE is still considered an inexpensive and effective method of early breast cancer detection. As the lifestyle in Taiwan becomes more and more Westernized, it becomes increasingly important to initiate breast cancer prevention strategies and education emphasizing BSE. Currently, there is little scientifically sound evidence that BSE is more effective in detecting early stage breast cancer among women in Asian countries who, in general, have smaller breast than women in Western countries.

Encouraging the practice of BSE is an educational issue. All factors influencing health behaviors may affect it. Roberts *et al.* (34), in a study of 810 Scottish women ages 18 to 64, found that although 57% of the subjects had performed BSE, their knowledge of breast cancer and BSE was inadequate. The knowledge score was related to age, social class, history of breast disease, and other preventive health behavior. Professional and managerial personnel ages 30 to 49 had the highest knowledge score, and semiskilled and unskilled personnel age 50 and above had the lowest. Those who had a history breast disease and practiced other health behaviors also had higher scores. Leathar and Roberts (35), in a qualitative study of 136 subjects in a breast disease screening center, found that for elderly women, in addition to insufficiency of facilities and related knowledge, embarrassment and fear could prevent them from receiving a breast examination. Stillman (36), in a study of 122 community women, found that although 40% of them performed BSE monthly, this behavior was not related to their health beliefs, and 20% of those who had strong beliefs in its efficacy still did not perform BSE.

The aim of this study is to understand the practice and associative factors of BSE in Taiwan. For the purposes of health education planning and diagnosis, Green *et al.* (37) developed a six-phase model—the PRECEDE (*p*redisposing,

*r*einforcing, and *e*nabling *c*auses in *e*ducational *d*iagnosis and *e*ducation) framework model. The phase of educational diagnosis (phases 4–5) of this model is used in this study to aid in understanding the practice of BSE. Variables are defined according to this part of the model.

MATERIALS AND METHODS

A probability proportionate to size (PPS) sample of 3,040 subjects was selected from a population of 1,006,115 women ages 30 to 59 in the Taipei area. The Kish grid (38) was used to determine which member of each household would be interviewed. Home visits and questionnaire interviews were conducted for each subject by 1 of 20 well-trained interviewers from December 1990 to February 1991.

Ability to perform BSE correctly which was measured by asking the subjects to demonstrate to the interviewers, was used as a dependent variable. Demographic characteristics and predisposing, enabling, and reinforcing factors in the PRECEDE model (37) were used as independent variables. Classification and definitions of variables are given in Table 1. Since it is difficult and impolite to ask

TABLE 1
DEFINITIONS OF VARIABLES

Variable	Definition
	Demographic characteristics
Age and other demographic variables	As their original definition
Family economic status	Sum of 13 family appliances owned by the family—television, refrigerator, washing machine, water heater, piano, video camera, video recorder, audio hi-fi with compact disc player, automobile or motorcycle, air conditioner, microwave oven, DBS television, personal computer
	Predisposing factors
Risk factors of breast cancer	Sum of positive items of risk factors, including menarche before 12, never pregnant, first delivery after 35, never breast fed, breast cancer in relatives, had previous breast diseases, fat-rich meal or deep-fried food more than twice a week
Knowledge of breast cancer	Sum of correct answers of true or false questions adopted from pamphlets of S. Y. Dao's Foundation
Subjective threats of breast cancer	Scores (1–4) of fears and self-evaluated chance of getting breast cancer
	Enabling factors
Sources of instruction	Number of sources that provided information of breast self-examination, including hospital nurse, public health nurse, physician, mass media, and family members
Media contact	Contact with health programs on television and health reports in newpapers (0–2)
	Reinforcing factors
Encouragement from significant others	Sum of significant others (spouse, family members, and friends) who encouraged breast self-examination
	Dependent variables
Correctness	Sum of correct steps in practice demonstration

people about their income in Taiwan, a sum of 13 family appliances was used to estimate the economic status of the family. This proxy for income is often used in public health studies in Taiwan. Age at menopause was not included in the risk factors for breast cancer in this study because most women between 30 and 59 years old are not menopausal. One-way analysis of variance and stepwise multiple regression were used to evaluate the effects of the possible related factors.

RESULTS

Urbanization level and age distribution among respondents, actual residents, and the original sample are compared in Table 2. Compositions of these variables are similar among the three groups. Therefore, the representation of each group might not be affected. Of the original sample, 76.0% were actual residents. The response rate of actual residents was 75.7%.

The practice of BSE by the subjects is outlined in Table 3, 55.9% of the subjects never performed BSE, 26.5% performed it only when they thought of it, 9.2% performed it less than once a month, and only 8.4% performed it once a month. Technique was also very poor: only 13.4% faced a mirror; 10.3% changed positions, 21.6% pressed their breasts, 21.5% lay down; 4.4% put a pillow under their shoulder, 14.6% put their arm down; 20.8% raised their arms up; 27.7% used the flats of their fingers; 18.5% thoroughly examined their breast from margin to nipple; 13.2% examined axillary nodes. The mean and standard error for total correct steps were 1.66 ± 0.06.

TABLE 2
COMPARISON BETWEEN URBANIZATION LEVEL AND AGE DISTRIBUTION AMONG RESPONDENTS, ACTUAL RESIDENTS, AND THE ORIGINAL SAMPLE

	Respondents (n = 1,749)	Actual residents (n = 2,311)	Original sample (n = 3,040)
Urbanization level			
Taipei City	868 (49.6%)	1136 (49.2%)	1560 (51.3%)
County Cities	622 (35.7%)	832 (36.0%)	1040 (34.2%)
Townships with population[a] over 10,000	142 (8.1%)	191 (8.3%)	240 (7.9%)
Townships with population[a] 4,000–9,999	83 (4.8%)	106 (4.6%)	140 (4.6%)
Townships with population[a] below 4,000	34 (1.9%)	46 (2.0%)	60 (2.0%)
Age distribution (years)			
30–39	915 (52.3%)	1211 (52.4%)	1567 (51.6%)
40–49	531 (30.4%)	694 (30.0%)	936 (30.8%)
50–59	303 (17.3%)	406 (17.6%)	537 (17.7%)

[a] Population: Total women 30–59 years old.

TABLE 3
PRACTICE OF BREAST SELF-EXAMINATION OF 1,749 SUBJECTS

Variables	No.	%
Frequency of practice		
Never	977	55.9
Irregularly	464	26.6
Less than once a month	161	9.2
Once a month	146	8.4
Correctness of each step		
1. Facing a mirror	234	13.4
2. Changing postures	180	10.3
3. Pressing the breast	377	21.6
4. Lying down	375	21.5
5. Putting A pillow under shoulder	77	4.4
6. Arm down	255	14.6
7. Arm up	363	20.8
8. Using flats of finger	484	27.7
9. Margin to nipple (completeness)	323	18.5
10. Examining axillary nodes	231	13.2

Note. Source: Pamphlet of breast cancer from S. Y. Dao's Memorial Foundation.

Table 4 shows the relationship between demographic characteristics and the BSE practice. All but marital status had significant associations with correct technique for performing BSE. Subjects from six county cities, subjects with higher educational attainment, subjects who worked nonsignificant, or were from nuclear families scored higher.

Table 5 shows the simple correlation analysis between age, family income, risk factors, predisposing, enabling, and reinforcing factors, and correctness of breast self-examination. With the exception of fear of having breast cancer, all other variables had significant associations. Only age showed negative correlations. The variable with the strongest association was "sources of instruction." The next two were those concerning contact with newspaper and television health programs.

Table 6 shows the stepwise multiple regression analysis for correctness of BSE. After controlling for all other variables, urbanizational level, family economic status, knowledge, sources of instruction, newspaper contact, and encouragement had significant associations. Sources of instruction had the highest standardized regression coefficient, 0.29; the next highest was news contact (contact with newspaper health reports), 0.21. Other variables and family income showed weaker associations. Educational level was excluded from the model during the stepwise process. The percentage of variance explained by the regression model was 30.7%.

DISCUSSION

The representativeness of the study sample is acceptable. However, the arbitrariness of scores given to each variable and an assumption of the linear relationship among variables may be major limitations of this study. Because the

TABLE 4
RELATIONSHIP BETWEEN DEMOGRAPHIC CHARACTERISTICS AND CORRECTNESS OF BREAST SELF-EXAMINATION

Variables	*n*	Correctness		
		Mean	SE	*F*
Urbanization level				
Taipei City	868	1.61	0.08	11.45**
County Cities	622	1.95	0.10	
Townships	259	1.14	0.12	
Highest educational level				
Illiterate	198	0.50	0.09	40.04**
Elementary school	607	1.32	0.09	
Junior high school	305	1.71	0.14	
Senior high school and above	639	2.31	0.10	
Occupation				
Home, agriculture	1181	1.52	0.06	11.25**
On job	568	1.92	0.11	
Marital status				
Currently married	1620	1.67	0.06	0.49
Other	129	1.51	0.21	(N.S.)
Family structure				
Nuclear	1390	1.73	0.06	6.11*
Extended	359	1.39	0.12	

* $P < 0.05$.
** $P < 0.001$.

measurement of breast cancer knowledge and correctness of BSE are based on an educational pamphlet, the criteria may require further review.

Both the frequency and the correctness of BSE technique among these subjects were poor by the criteria used for this study and compared with the performance of healthy women (34–46) and breast cancer patients (19–24) in other countries.

TABLE 5
SIMPLE CORRELATION ANALYSIS BETWEEN INDEPENDENT VARIABLES AND CORRECTNESS OF BREAST SELF-EXAMINATION

Variables	Correctness	
	Correlation coefficient	*F*
Age	−0.16	45.56*
Family economic status	0.24	107.81*
Risk factors	0.11	19.76*
Knowledge	0.24	110.32*
Fear	−0.01	0.34 (N.S.)
Self-evaluated chance	0.16	48.50*
Sources of instruction	0.52	637.24*
TV contact	0.31	184.94*
News contact	0.42	365.04*
Encouragement	0.26	129.12*

* $P < 0.001$.

TABLE 6
STEPWISE MULTIPLE REGRESSION ANALYSIS OF CORRECTNESS OF BREAST SELF-EXAMINATION

Variables	Method correctness	
	B	Beta
Constant	−1.54***	
Urbanization level (vs Taipei City)		
County Cities	0.45	0.09*
Townships	0.02	0.00 (N.S.)
Family economic status	0.35	0.10*
Knowledge	0.15	0.13*
Sources of instruction	1.10	0.29*
News contact	0.72	0.21*
Encouragement	0.28	0.10*
R^2		0.307*

Note. *B*, regression coefficient; Beta, standardized regression coefficient.
* $P < 0.001$.

Results in Tables 4 to 6 suggest that predisposing, enabling, and reinforcing factors have a stronger and more direct relation with the dependent variable—the correctness of BSE. Among them, the one with the strongest association is sources of instruction, an "enabling factor" in the PRECEDE model (37). Another enabling factor—newspaper contact—and one "predisposing factor"—knowledge of breast cancer—also had remarkable associations with the dependent variable. From these results, the associations between two main demographic characteristics (urbanizational level and educational level) and the practice of BSE seemed indirect, since after the predisposing, enabling, and reinforcing factors were controlled for, the original existing significant relations of these variables weakened or even disappeared.

The finding of a relation between demographic characteristics and breast cancer knowledge is similar to that in the study by Roberts *et al.* (34), but slightly different from two previous studies (35, 36), in which subjective feelings rather than knowledge have more remarkable associations. Furthermore, it could meet the predictions of the relations on urbanization level, educational level, knowledge, and enabling factors but not other factors in the PRECEDE model (37). Why are enabling factors, especially sources of instruction and knowledge, rather than other factors so important in Taiwan? The most plausible reason is the residents' lack of knowledge of breast cancer and the possibility for early detection. Only after the knowledge has been disseminated can other factors have an effect on this population's health behavior patterns. Among the variables having significant relationship to the dependent variable, enabling factors are the specific methods that "enable" people to perform BSE. Therefore, their associations with the practice of BSE are more important than those with general knowledge of breast cancer. Among the enabling factors studied, sources of instruction is the most direct measure of the sources available to instruct subjects in BSE, whereas media contact merely measures general contacts to all health topics provided by health programs on mass media. It is not surprising that sources of instruction had the

strongest association to the performance of BSE. This is the most important finding of this study. Compared with the related studies on the practice of BSE (34–36), the use of PRECEDE model and the emphasis on external factors (e.g., enabling factors) are the achievements of this study. Findings from this study can provide the basis for important BSE educational programs. Further improvement in measuring variables is necessary in future studies. Some culturally related concepts such as traditional view of body image and embarrassment during self-examination can be included in predisposing factors.

CONCLUSION

In conclusion, since women in Taiwan knew so little about BSE and its contribution to the early detection of breast cancer, sources of instruction and media contacts were the most important associative factors. Public health authorities should educate women, especially those living in rural areas or having lower educational level, about this issue. Every possible pathway, such as television, other mass media, hospitals, clinics, schools, community activities, and the workplace, can be used to spread this message. Since breast cancer is increasing but prevalence is still quite low in Taiwan, it is valuable to have follow-up surveys to check the progress of women's knowledge and practice of BSE after these programs have been conducted. It is also of great importance to study the effectiveness of BSE in detecting early-stage breast cancer and preventing breast cancer mortality in Taiwan.

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