

## Applying the Transtheoretical Model of Change and the Health Belief Model to Breast Self-Examination in Females Undergraduate Students in Faculty of Nursing Tanta University

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**Abstract:** Breast cancer is the most common cancer among women worldwide and it can be detected at an early stage through breast self-examination. Screening for early detection and diagnosis of diseases and health conditions is an important public health principle. The aim of this study was to apply the Transtheoretical Model of Change (TMC) to breast self-examination behavior in females undergraduate students to help in identifying their stage of readiness to perform BSE. This study also examined the relationship between stage adoption and Health Belief Model variables. The study is a descriptive correlative study. The sample was approximately 642 female students, their ages 18-24 years, those females enrolled in third and fourth year in Faculty of Nursing, Tanta University. Tools of the study included three parts; (1) Sociodemographic demographic characteristics of females students and basic clinical data. (2) Transtheoretical model of change items, this part consists of seven questions (3) Health Belief Model items, This part consists of 42- questions. The mean age of the females was  $\pm$  SD 19.977 $\pm$ 0.652 years (range was 18 to 24 years). (33.96%) reported that they were in preparation stage. As regarding to the HBM variables, (55.30%) of the females had poor score for perceive susceptibility to the breast cancer, (75.86%) had poor score for perceive severity, (43.46%) of them had good score for perceive benefits, and (55.76%) of them had poor score for perceive barriers, (83.49%) of them had poor score for perceive cues of action and (52.34%) of them had good score for perceive self efficacy. There was statistically significant relation between TMC Stages and student's mother who perform BSE monthly and also with female who performed BSE. Further research should include a population of non-college women to ascertain their stage readiness of BSE performance and determine if there are any differences between women enrolled in college and those who are not enrolled.

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### 1. Introduction

Cancers in all forms are responsible for about 12 per cent of deaths throughout the world<sup>(1)</sup>, globally breast cancer is the most common malignant neoplasm among women<sup>(2, 3)</sup>. Breast cancer causes 376,000 deaths a year worldwide; about 900,000 women are diagnosed every year with the disease. The National Cancer Institute, estimates that based on current rates, 12.2 percent of women born today will be diagnosed with breast cancer at some time in their lives<sup>(4)</sup>. It was estimated that breast cancer was the second leading cause of cancer death in women in the United States being surpassed only by lung cancer. The American Cancer Society's most recent estimates for breast cancer in the United States are for 2012: About 226,870 new cases of invasive breast cancer will be diagnosed in women. About 63,300 new cases of carcinoma in situ (CIS) will be diagnosed (CIS is non-invasive and is the earliest form of breast cancer) and about 39,510 women will die from breast cancer<sup>(5)</sup>.

In Egypt, breast cancer is the most common cancer among women, representing 18.9% of total cancer cases (35.1% in women and 2.2% in men)

among the Egypt National Cancer Institute (NCI) series of 10,556 patients during the year 2001<sup>(6)</sup>. Stage of breast cancer at diagnosis had an impact on survival rates from breast cancer. Women, whose breast cancer was diagnosed at a more advanced stage, had a lower 5-year survival rate<sup>(7)</sup>.

The knowledge and practice of breast self examination (BSE) is still very low. Breast self examination is simple and inexpensive procedure and is very important in early detection and treatment of breast lump and breast cancer. With focus on early diagnosis and prompt treatment which is one of the levels of prevention in community health, regular breast self examination will enhance early detection of breast cancer. This is because given the high cost of treatment, the poor outcome of treatment of advanced cases and economy situation in most of the developing countries, early detection of breast cancer is an alternative option<sup>(8, 9)</sup>. BSE will most likely be the only feasible approach to wide population coverage as it is a cheap and easy method. Health educators promoted breast self-examination (BSE) and anticipated that by encouraging women to perform BSE at a young age, women would maintain it as a life-long habit<sup>(1)</sup>.

In an effort to understand how people changed health behavior, the Transtheoretical Model of Change was proposed. The Transtheoretical Model is currently conceptualized in terms of several major dimensions. The core constructs, around which the other dimensions are organized, are the five stages of change. These represent ordered categories along a continuum of motivational readiness to change a problem behavior. Transitions between the stages of change are affected by a set of independent variables known as the processes of change<sup>(10)</sup>. Within this model, the structure of change was assessed through the use of five stages, including precontemplation, contemplation, preparation, action, and maintenance<sup>(11)</sup>.

The precontemplation stage included people who did not intend to change their behavior at any time in the future; the contemplation stage included people who were seriously thinking about changing their behavior within the next six months; the preparation stage included people who intended to change their behavior within the next month; the action stage included people who had changed their behavior during the past six months; and the maintenance stage included people who continued to work toward a healthy lifestyle and who actively used strategies to prevent relapse into prior stages. A sixth stage sometimes used was called termination. The termination stage included those who were able to maintain the acquisition of a new behavior and no longer risked relapsing into a prior stage. This stage was not always used because maintenance was considered a life-long process and struggle<sup>(12)</sup>.

The Transtheoretical Model of Change was applied successfully to the motivational and cognitive processes of behavioral change with respect to mammography screening to assist in the development of behavioral change strategies more appropriately matched to a woman's readiness to act. The Transtheoretical Model seems to describe women in terms of their breast self-examination behavior. This has implications for health care workers in terms of helping women acquire the behavior of breast self-examination<sup>(13)</sup>.

Although the structure of the TMC is significantly more complex than that of the other models, many authors have described it as a popular, intuitively plausible, model of health behavior change. Its strengths lie in its capacity to integrate a wide range of information and serve as an instrument for the design and management of both individual and community or population level health behavior change intervention programmes. The development of the Health Belief Model was of pioneering significance in the early 1950s. Systematic analyses using the full range of components that it today incorporates might cast light on the impact of social and other factors associated

with inequalities in health, and the reasons why individuals and groups may not take up health improvement or protection opportunities<sup>(14)</sup>.

The Health Belief Model (HBM) was designed by Hochbaum *et al.*,<sup>(15)</sup> Perceived sceptibility, perceived seriousness, perceived benefits, perceived barriers, and cues to action were the core components of the HBM. The self-efficacy component of the HBM was later added by Bandura in 1977. As the foundation of the HBM, value and expectancy are linked to health-related behaviors. The HBM has expanded to include preventative actions, illness behaviors, and sick-role behavior. Action for prevention, screening, and health management will occur if the individual perceives herself as susceptible to the condition, if potentially serious consequences are present, if a particular action is beneficial in decreasing susceptibility or severity of the condition, and if the benefits for the action outweigh the barriers<sup>(16)</sup>. HBM provides some description of the values, beliefs, and behaviors for breast cancer screening behaviors of middle-aged women, but the HBM does not appear to consistently predict breast cancer screening behaviors<sup>(15)</sup>.

#### *Aim of the study*

The aim of this study was to apply the Transtheoretical Model of Change (TMC) to breast self-examination behavior in female undergraduate students to help in identifying their stage of readiness to perform BSE. This study also examined the relationship between stage adoption and Health Belief Model variables.

#### **Research questions**

- 1- What stage of readiness does the study sample ready to perform BSE?
- 2-What is relationship between stage adoption and Health Belief Model variables?
- 3- What is there relation between family history of breast cancer and TMC Stages?
- 4- What is there relation between the residence of females students and TMC Stages?
- 5- What is there Relation between females students and students' mothers who performed BSE monthly and TMC Stages?
- 6- What is there Relation between HBM variables and females students and students' mothers who performed BSE monthly?
- 7- What is there relation between HBM variables and TMC stages?
- 6- What is there relation between HBM variables and times of performed BSE?

## **2. Materials and Methods**

### **Materials**

#### **Design:**

The study is descriptive correlative study.

**Setting:**

The study was carried out in Faculty of Nursing, Tanta University

**Subjects:**

The females who enrolled in third and fourth year in Faculty of Nursing, Tanta University. The two academic years were selected because they studied the breast self examination in the courses of medical and surgical, obstetrics, gynecology and community health nursing. The sample was approximately 642 female students, their ages 18-24. Those female students were selected because women at this age could benefit from performing BSE by recognizing changes in their breasts as they aged. In addition, women at this age were more likely to adopt a health behavior that would become habit-forming than women at an older age and were encouraged to begin BSE while they were young. The study was done during the academic year 2010-2011.

**Tools of the study:**

Interview questionnaire of the study included three parts:-

**Part I:****Socio-demographic characteristics of females students and basic clinical data**

Each participant was asked to complete –items of socio- demographics designed by Collins,( 2005). The females' age, family history of breast cancer, and mothers' BSE performance was assessed.

**Part II:****Transtheoretical model of change item);**

This part consists of seven questions based on the answers to these questions in this part; the participants were assigned a specific stage according to the Transtheoretical Model of Change (Rakowski *et al.*, 1992).

The definitions of the TMC stages adopted by the participants were based on categorical classifications developed by Prochaska and DiClementi (1992). The model used a 6 month time frame to define the stages since the authors of the model believed that 6 months was as far in the future as people could usually plan change. The stages were defined as follows: **precontemplation stage** - women in this stage responded that they were not currently performing BSE monthly and were not seriously considering performing BSE within the next 6 months; **contemplation stage** - women in this stage were not currently performing BSE monthly but were seriously considering initiating monthly BSE within the next 6 months; **preparation stage** - women in this stage were not currently performing BSE monthly but they intended to perform BSE as early as the next month; **action stage** - women

in this stage were currently performing BSE monthly; **maintenance stage** - women in this stage were currently performing BSE monthly and had been performing BSE for at least 6 months; and finally, **termination stage** - women in this stage were currently performing BSE monthly and had been performing BSE for over a year.

**Part III:****Health Belief Model item):**

This part consists of 42-item questions each participant was asked to complete this questionnaire that measured Health Belief Model variables of susceptibility, seriousness, benefits, barriers, health motivation, and confidence as they related to the performance of BSE (Champion, 1993). This questionnaire was based on an earlier instrument originally developed by Champion to measure general susceptibility, seriousness, benefits, barriers, health motivation (1984). Champion (1984) added a subscale labeled “confidence” to the refined questionnaire. The questionnaire contained 42 statements scored on a 5-point Likert response scale which ranged from 1=strongly disagree to 5=strongly agree.

The questionnaire also contained variables related to the performance and nonperformance of BSE (Champion, 1993). The correlations between each subscale of the instrument and BSE behavior were examined. The subscales were measured on a 5-point Likert scale ranging in responses from strongly agree (5) to strongly disagree (1) and were different in terms of number of items: susceptibility (5 items), seriousness (7 items), benefits (6 items), barriers (6 items), health motivation (7 items), and confidence (11 items). BSE behavior was determined by a score based on frequency of performing BSE (frequency in the past year, past three months, and past month) and proficiency in performing BSE (use of finger pads, systematic examination, position, and length of examination). A higher score indicated better practice of BSE. Bivariate correlations for each subscale of the instrument confirmed the predictive validity of each subscale. The correlations were reported as follows: Susceptibility ( $r = .14$ ), seriousness ( $r = .03$ ), benefits ( $r = .08$ ), barriers ( $r = -.28$ ), health motivation ( $r = .21$ ), and confidence ( $r = .40$ ). All correlations were positive except for the subscale of barriers which indicated that as barriers increased, behavior decreased. With the exception of two of the subscales (seriousness and benefits), the correlations were significant at  $p < .01$  (Champion, 1993). The test-retest reliability coefficients ranged from .45 to .70 despite the difference in data collection methods.

Internal consistency estimates were also calculated to determine whether questionnaire items consistently reflected the six subscales on the questionnaire. Cronbach's alpha estimates ranged from

.80 to .93 indicating that all items were appropriate to their respective scales (Champion, 1993).

Students were interviewed in eight sessions; four sessions for each academic year, during sessions objective of the study was explained and how to complete the sheet, each session elapsed one hour.

### Statistical Analysis

The obtained data were analyzed by SPSS software version 18, using statistical paired t-test ANOVA and one-way variance analysis at the significant level of  $\alpha = 0.05$ . Frequencies, percentages, and Pearson chi squares were calculated to determine the percentage of women in each stage of the TMC, as well as to examine the relationship between the demographic factors and the TMC. For Spearman rank-order correlations were computed to determine if there were any relationships between the demographic factors and HBM variables. Spearman correlations were also calculated to measure the relationship between stage adherence and responses to the HBM questionnaire.

### 3. Results

Table (1) reveals the socio-demographic characteristics of the study sample which consisted of 642 females undergraduate ranged from 18 years to 24 years, with Mean  $\pm$  SD 19.977 $\pm$ 0.652 years, more than three quarters of female students (76.32%) were living in rural areas. About (12.46%) had family history of breast cancer, (4.21%) of the student' mother performed breast self-examination monthly and more than half of them (54.05%) performed breast self-examination.

Table (2) shows the distribution of the studied sample according to TMC stages which represents that more than one third of the study participants (33.96%) reported that the preparation stage (intended to change their behavior within the next month) of the TMC best described their behavior, more than one quarter (28.35%) were in the contemplative stage (seriously thinking about changing their behavior within the next six months, with approximately (10.28%) in the action stage (changed their behavior during the previous six months), (9.19%) in the maintenance stage (continued to work toward a healthy lifestyle), and (8.26%) in the termination stage (maintaining the new behavior was no longer a difficulty) and (9.97%) were in the precontemplative stage (did not intend to change behavior at any time in the foreseeable future).

Table (3) demonstrates the distribution of the studied sample according to HBM items. As shown in the table, more than half (55.30%) of the study females had poor score for perceive susceptibility to the breast cancer, more than three quarters (75.86%) had poor score for perceive severity, nearly half (43.46%) of them had good score for perceive benefits, and more

than half (55.76%) of them had poor score for perceive barriers, the majority (83.49%) of them had poor score for perceive cues of action and more than half (52.34%) of them had good score for perceive self efficacy.

Table (4) illustrates the relation between TMC Stages and the residence. There was not significant statistical difference between TMC stages regarding to the residence of females students ( $P$ -value = 0.210).

Table (5) represents the relation between family history and TMC stages, there was not statistically significant relation between TMC stages and the family history of the breast cancer ( $P$ -value = 0.221).

Table (6) shows the relation between TMC stages and females students' mothers who performed BSE monthly. There was statistically significant relation between TMC stages and students' mothers who performed BSE monthly ( $P$ -value 0.000\*)

Table (7) represents the relation between TMC stages and the females students who performed BSE, which reveals that there was statistically significant relation between TMC stages and females who performed BSE ( $P$ -value 0.000\*)

Table (8) reveals the relation between HBM items and residence of the females. As regarding to the HBM variables, females students' belief of breast cancer as a sever health issue was the only HBM variable that was significantly associated difference with the residence as they live in rural or urban area ( $P$ -value 0.036).

Table (9) illustrates the relation between items of HBM variables and family history of the breast cancer. Based on the results of the study, there wasn't significantly associated difference between the all items of HBM variables and family history of breast cancer.

Table (10) reveals the relation between items of HBM variables and mothers of females students who perform BSE monthly, there was statistically significant difference relation between females who having a mother who performed BSE and items of HBM variables of susceptibility that perceiving it as a serious disease ( $P$ -value 0.017) and perceiving benefits to performing BSE ( $P$ -value 0.021).

Table (11) presents the relation between items of HBM variables and females students who performed BSE; there wasn't statistically significant difference relation between females who performed BSE and all items of HBM variables.

Table (12) shows the relation between items of HBM variables and TMC stages, there wasn't statistically significant difference relation between items of HBM variables and the degree of stage of change among the study females group.

**Table (1): Distribution of the studied sample according to their socio-demographic characteristics (n=624).**

Demographic characteristics	N	%
<b>Age</b>		
Range	18-24	
Mean±SD	19.977±0.652	
<b>Times of performed BSE</b>		
Range	1-28	
Mean±SD	5.293±7.792	
<b>Academic years</b>		
3	290	45.17
4	352	54.83
<b>Residence</b>		
Urban	152	23.68
Rural	490	76.32
<b>Family history of breast cancer</b>		
Yes	80	12.46
No	495	77.10
I don't know	67	10.44
<b>Student's mother who performed BSE</b>		
Yes	27	4.21
No	485	75.55
I don't know	130	20.25
<b>Females students who performed BSE</b>		
Yes	347	54.05
No	295	45.95

**Table (2): Distribution of the studied sample according to TMC Stages (n=642).**

TMC Stages	N	%
Precontemplation	64	9.97
Contemplation	182	28.35
Preparation	218	33.96
Action	66	10.28
Maintenance	59	9.19
Termination	53	8.26
<b>Total</b>	<b>642</b>	<b>100.00</b>

Table (13) represents the correlation between items of HBM variables and times of performed BSE. The items HBM variables of susceptibility, severity and self efficacy were insignificantly and negatively correlated with times of performed of BSE ( $r = -0.050$ ,  $P$ -value 0.363,  $r = -0.040$ ,  $P$ -value 0.467,  $r = -0.031$ ,  $P$ -value 0.572 respectively).

**Table (3) Distribution of the studied sample according to HBM item**

HBM	Poor (<50%)		Average (50-75%)		Good (>75%)	
	N	%	N	%	N	%
Susceptibility	355	55.30	270	42.06	17	2.65
Severity	487	75.86	155	24.14	0	0.00
Benefits	110	17.13	253	39.41	279	43.46
Barriers	358	55.76	255	39.72	29	4.52
Cues of action	536	83.49	106	16.51	0	0.00
Self efficacy	48	7.48	258	40.19	336	52.34
<b>Total</b>	<b>629</b>	<b>97.98</b>	<b>13</b>	<b>2.02</b>	<b>0</b>	<b>0.00</b>

**Table (4) Relation between TMC Stages and the residence (n=642).**

TMC Stages	Residence					
	Urban		Rural		Total	
	N	%	N	%	N	%
Precontemplation	22	14.47	42	8.57	64	9.97
Contemplation	44	28.95	138	28.16	182	28.35
Preparation	43	28.29	175	35.71	218	33.96
Action	13	8.55	53	10.82	66	10.28
Maintenance	16	10.53	43	8.78	59	9.19
Termination	14	9.21	39	7.96	53	8.26
<b>Total</b>	<b>152</b>	<b>100.00</b>	<b>490</b>	<b>100.00</b>	<b>642</b>	<b>100.00</b>
Chi-square	$X^2$		7.148			
	$P$ -value		0.210			

(\*)Statistically significant at  $p < 0.05$

**Table (5) Relation between family history and TMC Stages (n=642).**

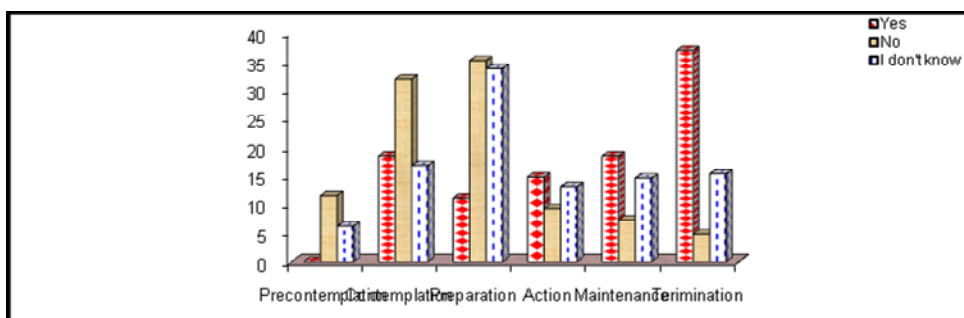
TMC Stages	family history							
	Yes		No		I don't know		Total	
	N	%	N	%	N	%	N	%
Precontemplation	4	5.00	51	10.30	9	13.43	64	9.97
Contemplation	21	26.25	144	29.09	17	25.37	182	28.35
Preparation	26	32.50	166	33.54	26	38.81	218	33.96
Action	14	17.50	49	9.90	3	4.48	66	10.28
Maintenance	5	6.25	47	9.49	7	10.45	59	9.19
Termination	10	12.50	38	7.68	5	7.46	53	8.26
<b>Total</b>	<b>80</b>	<b>100.00</b>	<b>495</b>	<b>100.00</b>	<b>67</b>	<b>100.00</b>	<b>642</b>	<b>100.00</b>
Chi-square	X <sup>2</sup>		13.049					
	P-value		0.221					

(\*)Statistically significant at p<0.05

**Table (6) Relation between TMC Stages and Student's mother perform BSE monthly (n=642).**

TMC Stages	The mother who perform BSE monthly							
	Yes		No		I don't know		Total	
	N	%	N	%	N	%	N	%
Precontemplation	0	0.00	56	11.55	8	6.15	64	9.97
Contemplation	5	18.52	155	31.96	22	16.92	182	28.35
Preparation	3	11.11	171	35.26	44	33.85	218	33.96
Action	4	14.81	45	9.28	17	13.08	66	10.28
Maintenance	5	18.52	35	7.22	19	14.62	59	9.19
Termination	10	37.04	23	4.74	20	15.38	53	8.26
<b>Total</b>	<b>27</b>	<b>100.00</b>	<b>485</b>	<b>100.00</b>	<b>130</b>	<b>100.00</b>	<b>642</b>	<b>100.00</b>
Chi-square	X <sup>2</sup>		72.455					
	P-value		0.000*					

(\*)Statistically significant at p<0.05



**Figure (1) Relation between TMC Stages and Student's mother perform BSE monthly**

**Table (7) Relation between TMC Stages and female student who performed BSE (n=642).**

TMC Stages	female student who perform BSE					
	Yes		No		Total	
	N	%	N	%	N	%
Precontemplation	22	6.34	42	14.24	64	9.97
Contemplation	74	21.33	108	36.61	182	28.35
Preparation	95	27.38	123	41.69	218	33.96
Action	59	17.00	7	2.37	66	10.28
Maintenance	49	14.12	10	3.39	59	9.19
Termination	48	13.83	5	1.69	53	8.26
<b>Total</b>	<b>347</b>	<b>100.00</b>	<b>295</b>	<b>100.00</b>	<b>642</b>	<b>100.00</b>
Chi-square	X <sup>2</sup>		114.373			
	P-value		0.000*			

(\*)Statistically significant at p<0.05

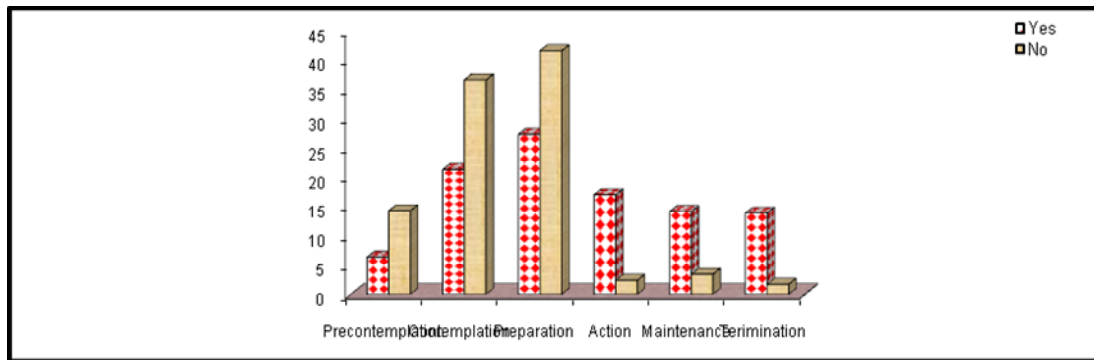


Figure (2) Relation between TMC Stages and female student who performed BSE

Table (8) Relation between HBM items and student Residence (n=642).

HBM items	Residence						T-test	
	urban			Rural			t	P-value
	Mean	±	SD	Mean	±	SD		
Susceptibility	10.164	±	3.180	10.663	±	3.125	0.087	0.091
Severity	42.092	±	9.620	44.018	±	10.471	0.044	0.036*
Benefits	12.776	±	3.852	13.149	±	4.328	0.342	0.313
Barriers	17.776	±	4.143	18.171	±	3.964	0.289	0.301
Cues of action	12.836	±	3.223	12.643	±	2.997	0.497	0.513
Self efficacy	28.743	±	7.904	28.241	±	7.561	0.479	0.490
Total	124.388	±	17.163	126.886	±	17.627	0.125	0.121

(\*)Statistically significant at  $p < 0.05$

Table (9) Relation between HBM variables and family history (n=642).

HBM variables	family history						T-test	
	Yes			No			t	P-value
	Mean	±	SD	Mean	±	SD		
Susceptibility	10.313	±	3.212	10.533	±	3.186	-0.575	0.566
Severity	43.225	±	10.644	43.651	±	10.450	-0.337	0.736
Benefits	13.388	±	4.027	13.184	±	4.303	0.396	0.692
Barriers	18.450	±	3.923	18.137	±	3.953	0.657	0.511
Cues of action	12.850	±	3.126	12.614	±	3.042	0.641	0.522
Self efficacy	27.400	±	7.191	28.588	±	7.824	-1.274	0.203
Total	125.625	±	17.523	126.707	±	17.887	-0.503	0.615

(\*)Statistically significant at  $p < 0.05$

Table (10) Relation between HBM variables and student 's mother who perform BSE monthly (n=642).

HBM variables	student 's mother perform BSE monthly						T-test	
	Yes			No			t	P-value
	Mean	±	SD	Mean	±	SD		
Susceptibility	9.000	±	3.497	10.507	±	3.155	-2.402	0.017*
Severity	40.481	±	10.825	43.548	±	10.440	-1.483	0.139
Benefits	15.037	±	4.670	13.095	±	4.228	2.310	0.021*
Barriers	18.000	±	4.368	18.159	±	4.049	-0.197	0.844
Cues of action	12.778	±	3.166	12.891	±	3.071	-0.186	0.853
Self efficacy	28.259	±	8.515	28.482	±	7.551	-0.148	0.882
Total	123.556	±	17.645	126.682	±	17.736	-0.892	0.373

(\*)Statistically significant at  $p < 0.05$

**Table (11) Relation between HBM variables and female who performed BSE (n=642).**

HBM variables	female who performed breast self-examination					T-test		
	Yes			No			t	P-value
	Mean	±	SD	Mean	±	SD		
Susceptibility	10.695	±	3.213	10.369	±	3.054	1.307	0.192
Severity	44.112	±	10.748	42.915	±	9.729	1.469	0.142
Benefits	13.153	±	4.246	12.953	±	4.194	0.599	0.550
Barriers	17.862	±	4.247	18.332	±	3.697	-1.484	0.138
Cues of action	12.729	±	3.237	12.641	±	2.821	0.366	0.715
Self efficacy	28.406	±	7.876	28.305	±	7.367	0.167	0.867
Total	126.957	±	18.412	125.515	±	16.446	1.038	0.300

(\*)Statistically significant at  $p < 0.05$ **Table (12) Relation between HBM variables and TMC stages (n=642).**

HBM variables								ANOVA	
		Precontemplation	Contemplation	Preparation	Action	Maintenance	Termination	F	P-value
Susceptibility	Mean	10.609	10.511	10.468	10.985	10.136	10.811	0.569	0.724
	±SD	3.160	3.229	3.053	3.091	3.267	3.175		
Severity	Mean	43.859	43.604	43.078	44.076	43.203	44.811	0.309	0.908
	±SD	10.400	10.264	9.631	10.008	11.890	11.715		
Benefits	Mean	13.641	13.214	13.174	12.106	12.695	12.962	1.092	0.363
	±SD	4.244	4.223	4.223	4.084	4.580	3.883		
Barriers	Mean	17.469	17.956	18.335	18.106	18.373	17.811	0.618	0.686
	±SD	4.663	4.115	3.582	3.864	4.638	3.937		
Cues of action	Mean	13.406	12.692	12.757	11.939	12.424	12.755	1.628	0.150
	±SD	3.279	2.856	2.981	2.997	2.884	3.777		
Self efficacy	Mean	27.813	28.626	29.115	27.470	25.797	28.962	2.127	0.061
	±SD	6.964	6.907	8.274	8.563	7.056	7.079		
Total	Mean	126.797	126.604	126.927	124.682	122.627	128.113	0.819	0.536
	±SD	20.047	16.197	16.340	18.262	21.619	17.734		

(\*)Statistically significant at  $p < 0.05$ **Table (13) Correlation between HBM variables and times of performed BSE (n=642).**

HBM variables	Times of performed BSE	
	r	P-value
Susceptibility	-0.050	0.363
Severity	-0.040	0.467
Benefits	0.010	0.859
Barriers	0.056	0.306
Cues of action	0.000	0.995
Self efficacy	-0.031	0.572

(\*)Statistically significant at  $p < 0.05$ 

#### 4. Discussion

Early detection is a key factor in reducing mortality from breast cancer. Early detection of breast cancer includes breast self-examination (BSE), mammography, and clinical breast examination methods. Breast self-examination is a safe, effective, and economical screening method for early detection of breast cancer. Women who practice BSE have a higher chance of early detection, increased survival rate, and better treatment options<sup>(17)</sup>.

The purpose of this study was to apply the Transtheoretical Model of Change (TMC) to breast

self-examination behavior in female undergraduate

students to help identify their stage of readiness to perform BSE. This study also examined the relationship between stage adoption and Health Belief Model variables.

Regarding demographic characteristics the study sample consisted of 642 the female undergraduate ranged from 18 - 24 years, with Mean  $19.977 \pm 0.652$  years, more than three quarters of female students (76.32%) were living in rural areas. More than three fourths of them (77.10 %) stated that they do not have family history of breast cancer and nearly the same



percentage (75.55%) of the Student's mother do not performed BSE this may be due to lack of knowledge and this agree with Seif and A. Azize (2000) who found that lack of knowledge affect breast self examination in 91.8% of their study cases. Only one quarter (25%) of the current study reported that they did not know whether or not their mother performed BSE; indicating that the college-age women had not discussed the issue of BSE performance with their mothers<sup>(18)</sup>.

Regarding Females students who performed BSE it was found that more than half of the study group (54.05%) performs BSE. This doesn't agree with Collins, (2005) who found that nearly three quarters (73%) of the 18-24 year-old participants in his study were not currently performing BSE. This may be due to the knowledge level of present study group about the breast cancer and the importance of BSE during their study<sup>(10)</sup>.

Regarding applying Transtheoretical Model of Change to the study group about one third of the study group (33.96%) were in the Preparation stage this is not agree with Collins, who found that only 15% in his study was in the preparation stage (intended to change their behavior within the next month); and only (8.26%) were in Termination phase in present study and this result agree with Collins, who found 10% in his study was in the termination stage (maintaining the new behavior was no longer a difficulty)<sup>(10)</sup>.

In relation to distribution of the studied sample according to HBM. the highest mean score was for the perceived Benefits and Self efficacy items while Yin *et al.*, who found that Chinese women had the highest mean score for the perceived susceptibility and seriousness subscales, while Asian-Indian women had the highest mean score for the perceived benefits and perceived barriers subscales<sup>(19)</sup>.

Regarding Relation between TMC Stages and mother performance of BSE monthly the difference was highly significant and a high percentage (37.04%) of the student who stated that their mother perform BSE was in the termination phase while there was nearly the same percentage (35.26%) from the student who stated that their mother did not perform BSE were in the Preparation phase this agree with Abdel-Fattah *et al.*, who stated that only 10.4% of Egyptian women had ever performed BSE<sup>(22)</sup>. And there are uncovered marked deficiencies in educating Egyptian women in regard to the need for mammography and BSE<sup>(23)</sup>.

Results also revealed that there is a significant difference between the study group who live in rural area and those in urban area regarding perceived severity item of the HBM as the mean was high in rural compared with the urban may be due to the availability, variety of media and high incidence of breast cancer in rural area. This finding was in contrast to Dey, who found in his study of urban-rural

differences of female cancers in Gharbiah, Egypt who found that urban incidence of breast cancer was three to four times higher than rural incidence and this make people in urban more familiar with the breast cancer<sup>(20)</sup>.

Regarding Relation between HBM variables and students whose mothers performed BSE monthly, there was a significant difference between the students who stated that their mother do not perform BSE and the students who stated that their mothers performed BSE in relation to susceptibility and benefits. While the mean of susceptibility among the students who stated that their mothers did not perform BSE more than the mean of students who stated that their mothers performed BSE and the mean of benefits among the students who stated that their mothers performed BSE more than the students who stated that their mothers do not perform BSE, this may be due to lack of knowledge and if founded it usually concentrated on benefits of BSE rather than susceptibility of breast cancer this agree with Seif and A. Azize, who found that only one fourth of the their study heard about BSE from many sources and only 9% of these sources was health care personal<sup>(18)</sup>.

Regarding Relation between HBM variables and females students who performed BSE there was not a significant difference between females students who performed BSE and those who did not perform with the HBM items while the mean of perceived severity was high among both of them, this may be due to perception of severity is based on the medical knowledge which is present in their study program, this agree with Gaber and Ahmed, who found that the majority of women in their study do not perform BSE and perceive the seriousness of the threat of breast cancer to themselves<sup>(21)</sup>.

The present study results revealed that there was negative correlation between times of performed BSE and HBM variables this may be reflect that the females students practiced BSE that they studied in their curriculums regardless the perception of these variables. This is in agreement with Frankenfield, who found in his study that the HBM components of perceived susceptibility, severity, benefits, barriers, cues to action, and self-efficacy were, in general, not related with breast cancer screening behaviors. Participants' perceived susceptibility of breast cancer did not positively nor negatively influence the performance of BSE or CBE of breast cancer screening behaviors<sup>(24)</sup>. Also Gaber and Ahmed, who found in their study that the attitudes toward BSE are generally positive. This also agree with Moodi *et al.*, who emphasized that there is a positive effects of education on increasing knowledge and attitude of university students about BSE, the efficacy of the HBM in BSE education for female students was confirmed<sup>(25)</sup>.

## Conclusion

It can be concluded from this study that more than half of the students who participated in this study were performed breast self-examination. Although they reported having performed BSE an average of 1 to 28 times in their lives, they did not engage in the behavior on a regular, monthly basis. About two thirds of the study participants reported that they intended to change their behavior within the next month and more than one quarter seriously thinking about changing their behavior within the next six months. The results of the study showed that there weren't relation between family history of breast cancer, the residence of females students and TMC Stages. There was statistically significant relation between TMC Stages and student's mother who perform BSE monthly and also with female who performed BSE.

As regarding to the HBM variables, the study findings also demonstrated that more than half of the females had poor score for perceive susceptibility to the breast cancer, about three quarters had poor score for perceive severity, nearly half of them had good score for perceive benefits, and more than half of them had poor score for perceive barriers, the majority of them had poor score for perceive cues of action and more than half of them had good score for perceive self efficacy.

There wasn't statistically significant difference relation between females who performed BSE and all items of HBM variables. There was statistically significant difference relation between females who having a mother who performed BSE and items of HBM variables of susceptibility that perceiving it as a serious disease. There wasn't statistically significant difference relation between items of HBM variables and the degree of stage of change among the study females group. There is a negative Correlation between HBM variables and times of performed BSE.

## Recommendations

Based on the results of this study, the following recommendations are suggested:

- Encourage student to engage in the behavior of BSE on a regular monthly basis.
- Perceive susceptibility to the breast cancer, and perceive severity need to be managed in the study sample.
- Health educators could then specifically target their interventions based on a woman's particular stage readiness to perform BSE, potentially resulting in more appropriate interventions according to the HBM variables that are most appropriate within a particular stage.
- Further research also should include a population of non-college women to ascertain their stage readiness of BSE performance and determine if

there are any differences between women enrolled in college and those who are not enrolled.

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