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# Cervical Cancer Screening Among Taiwanese Women: A Transtheoretical Approach

Wei-Chen Tung, PhD, RN, Minggen Lu, PhD, and Daniel Cook, PhD

**I**ncidence and mortality rates of cervical cancer worldwide have decreased markedly in the past decades, mainly because of the Papanicolaou (Pap) test, which detects the disease as well as precancerous lesions. American Cancer Society (ACS), 2008) guidelines recommend initial screening for cervical cancer with Pap testing three years after the onset of sexual activity and no later than age 21. All women who are or have been sexually active and still have a cervix should be screened every year with the regular Pap test or every two years with the newer liquid-based test until age 30, with intervals then extended to two to three years based on past screening results and risk factors (ACS, 2008).

Since the late 1990s, cervical cancer has been among the top five causes of death in Taiwanese women (Cancer Registry of Taiwan, 2007). Since 1996, the Bureau of National Health Insurance of Taiwan (NHI, 2006) has offered Pap screenings at no charge for women older than age 30 and screenings for a small copayment for women younger than age 30. Despite the reported health benefits and the availability of free or low-cost Pap screening, 30%–50% of adult Taiwanese women have never had a Pap test, a rate attributable to youth, lack of knowledge about cervical cancer and Pap tests, perception of fewer benefits from and greater barriers to a Pap test, low education levels, unemployment, and having never married (Chen et al., 2007; Hou, 2005; Hou, Fernandez, Baumler, Parcel, & Chen, 2003; Koong, Yen, & Chen, 2006; Liao, Wang, Lin, Hsieh, & Sung, 2006; Lin, Chen, Liu, & Lin, 2008; Wang & Lin, 1996; Wang, Huang, Chou, & Chang, 2006).

The complexity of women's decisions surrounding regular Pap test screening was the impetus for this theory-driven study. The transtheoretical model of change (TTM) (Prochaska, Redding, & Evers, 2002) was used as a guide for the study. The model was developed in the early 1980s and was applied primarily to smoking cessation (Prochaska & DiClemente, 1983). The TTM

**Purpose/Objectives:** To assess Papanicolaou (Pap) test screening behaviors of Taiwanese women, to explore factors affecting stages of change, and to determine whether constructs from the transtheoretical model are applicable to Taiwanese women with regard to Pap screening.

**Design:** Descriptive, cross-sectional.

**Setting:** A hospital in Taiwan.

**Sample:** 222 female hospital workers.

**Methods:** Data were collected with a questionnaire.

**Main Research Variables:** Cervical screening behavior, perceived barriers and benefits, self-efficacy, and stages of change.

**Findings:** Fifty-six percent of participants reported engaging in regular screening practice. The stage of respondents' cervical cancer screening was significantly associated with age, marital status, and history of human papilloma virus–positive and abnormal tests. Self-efficacy scores were significantly higher for women who were in action or maintenance than those in precontemplation or relapse ( $p < 0.0001$ ). Women in relapse reported significantly more perceived barriers than those in action-maintenance ( $p = 0.005$ ). No significant differences were found in the level of perceived benefits ( $p = 0.702$ ) to regular Pap screening among women in the various stages.

**Conclusions:** Pap screening was low among the entire sample and nonexistent among women younger than age 30. The transtheoretical model only was partially applicable to the Taiwanese women in this study.

**Implications for Nursing:** Reinforcement of self-efficacy was more important for women in the sample than emphasizing the benefits of or decreasing the barriers to regular Pap screening. Strategies for younger unmarried women might include education programs emphasizing the importance of routine annual screening and enhancing women's understanding of the relationship between Pap tests and cervical cancer.

notes that people differ in their readiness to adopt new behaviors, which can be best understood by using three key constructs: stages of change, self-efficacy, and decisional balance (perceived benefits and barriers).

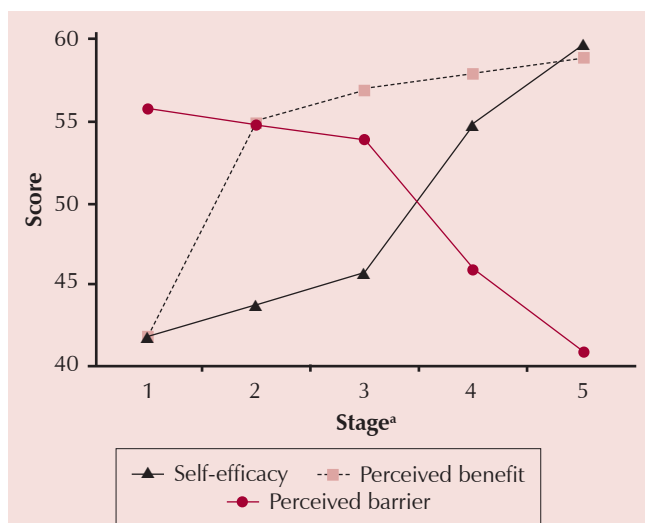
A woman can be described along a series of stages of readiness to practice regular Pap screening.

- Precontemplation: A woman has never had a Pap test and has no intention to have one within the next six months.
- Contemplation: A woman has never had a Pap test but intends to have one within the next six months.
- Preparation: A woman has never had a Pap test but intends to have one within the month.
- Action: A woman has had one Pap test in the past year and intends to continue getting regular Pap tests.
- Maintenance: A woman has had regular Pap tests and intends to continue to do so.
- Relapse risk: A woman is on schedule but has no intention to get a Pap test in the future.
- Relapse: A woman has had Pap tests but none during the past year and does not intend to get one.

Self-efficacy is defined as a judgment regarding one's ability to perform a behavior (e.g., regular Pap screening) required to achieve a certain outcome (Bandura, 1997). Decisional balance is defined as the pros (perceived benefits) and cons (perceived barriers) that an individual perceives with respect to engaging in a behavior (e.g., regular Pap screening) (Prochaska et al., 2002).

According to TTM, women who have higher levels of self-efficacy and report more perceived benefits and fewer perceived barriers are more likely to be in later stages of Pap screening adoption (e.g., action, maintenance) than women in earlier stages (e.g., precontemplation, contemplation) (see Figure 1). TTM studies assessing cervical cancer screening support the hypothesized relationships among stages of change and self-efficacy, perceived benefits, and perceived barriers in sheltered, low-income, and minority American women, female college students in England, and women in Australia (Eiser & Cole, 2002; Hogenmiller et al., 2007; Kelaher et al., 1999; Rimer et al., 1996). However, one TTM study reported that Vietnamese-American women in precontemplation scored a higher level of self-efficacy than those in maintenance (Tung, Nguyen, & Tran, 2008). No studies have researched the applicability of the TTM to Taiwanese women, which leads to the need to examine the transcultural validity of Pap testing along the TTM model. An understanding of the applicability of the TTM is required before development of successful theory-based programs that address the specific needs of this population in different stages of change for cervical screening. In addition, although many studies have addressed factors that influence Pap screening among Taiwanese women, little is known about the factors that affect their stage of readiness to change.

The objectives of this study were to assess the Pap screening behaviors of Taiwanese women, to explore factors that affect TTM stages of change for regular Pap screening in Taiwanese women, and to determine whether constructs from the TTM are applicable to



<sup>a</sup> 1 = precontemplation, 2 = contemplation, 3 = preparation, 4 = action, and 5 = maintenance

**Figure 1. Relationship Among Stage of Change, Self-Efficacy, and Decisional Balance**

Note. From "Smoking Cessation and Stress Management: Applications of the Transtheoretical Model of Behavior Change," by W.F. Velicer, J.O. Prochaska, J.L. Fava, G.J. Norman, & C.A. Redding, 1998, *Homeostasis*, 38, p. 216. Copyright 1998 by Activitas Nervosa Superior. Adapted with permission.

Taiwanese women with regard to Pap screening. The authors hypothesized that Taiwanese women in later stages (e.g., action, maintenance) of TTM would show a significantly higher level of self-efficacy for Pap screening and would perceive significantly more benefits and significantly fewer barriers to Pap screening than those in earlier stages (e.g., precontemplation, contemplation).

## Methods

### Design and Sample

The current study used a descriptive, cross-sectional design with a convenience sample. A self-reported questionnaire was used to obtain data from Taiwanese women currently working in a large public hospital in Taiwan. The setting was chosen because of the sufficiently large potential sample. Women workers of all professions were included if they were aged 20–65 years and were able to read Chinese. Women with a total hysterectomy were excluded because they do not need cervical cancer screening (ACS, 2008).

Power analysis with R-2.8.1 for Microsoft® Windows® was conducted to estimate the sample size. With a significance level set at 0.05 and a moderate effect size of 0.3, at least 152 participants were required on chi-square test with degree of freedom of 3 or 6 to achieve the power of 0.8. Using the recommended moderate effect size of 0.15, the required sample size was 117 for multiple linear

regression, with 14 independent variables (Cohen, 1977). The authors surveyed 222 women.

## Procedures

After obtaining approval from the institutional review board of Auburn University in Alabama and the hospital administration, a complete list of 295 potential participants' names and their work units was provided for the investigator. The investigator from the hospital distributed an informational letter and questionnaires to all 295 potential participants directly or in mailboxes. Participants were instructed in the letter to return the completed anonymous questionnaire in two weeks in a sealed envelope directly to the investigator's office or mailbox. Participants were assured that their responses would be confidential and that participation was voluntary. Completion of the questionnaire was taken as consent to participate.

## Instruments

All instruments were translated into Chinese by using two methods: translation by a committee and back-translation. A committee that included a nurse, a gynecologist, and the investigator produced Chinese versions of the instruments. After the translation, a bi-cultural and bilingual nurse back-translated the Chinese instruments into English. A panel of three experts read the Chinese version of the questionnaire to ensure face validity. The translated instruments were piloted in a sample of five Taiwanese women prior to data collection. The translated questionnaire was adjusted based on the responses from the pilot study.

**Demographic questionnaire:** The questionnaire gathered information on participants' age, marital status, education, health insurance coverage, disease history, health perceptions, human papillomavirus (HPV) history, history of abnormal Pap tests, and awareness of NHI's free coverage of Pap tests for women aged 30 years and older.

**Cervical cancer screening stage questionnaire:** TTM stages of change for the use of cervical cancer screening were identified by the **cervical cancer screening stage questionnaire**, a four-item algorithm modified and developed by using criteria from Hogenmiller et al. (2007) and Hou (2005) and incorporating the time descriptors from the TTM (Prochaska et al., 2002). Participants were first asked if they had Pap tests on a regular basis with the definition given. Women who received regular Pap tests then were asked if they planned to continue the tests on a regular schedule. Participants who had received one or more Pap tests but not on a regular basis were asked when they had received their most recent test and whether they planned to continue to have the tests on a regular schedule. Participants who had never received a Pap test were asked if they were considering

having a Pap test, with options of (a) yes, in the next month; (b) yes, in the next six months; or (c) no. Participants' answers then were classified into one of the seven TTM stages.

**Self-Efficacy Scale:** Self-efficacy for Pap tests was measured by the **Self-Efficacy Scale** (Lechner, de Vries, & Offermans, 1997), a seven-item measure of confidence in one's ability to acquire a Pap test under various circumstances (e.g., if the Pap test might be painful). Responses are based on a 100-point scale with 10-unit intervals ranging from 0 (cannot do at all) to intermediate degrees of assurance such as 50 (moderately certain can do) to complete assurance at 100 (certainly can do). The higher the score, the more confidence the woman has to engage in Pap testing. In the current sample, the scale had a high internal consistency of 0.92, as measured by Cronbach alpha.

**Benefits and barriers scale:** This scale consists of a three-item benefits subscale and a 12-item barriers subscale, adapted from Byrd, Peterson, Chavez, and Heckert (2004), which assesses women's perceived benefits of and barriers to obtaining a Pap test. Participants rated their perceived benefits and barriers in various situations on a four-point Likert scale (1 = strongly disagree to 4 = strongly agree). The higher the score, the greater the perceived benefits of and barriers to obtaining a Pap test. In the current study, Cronbach alpha was 0.88 for the benefits subscale and 0.077 for the barriers subscale.

## Data Analysis

Data were analyzed with SAS® version 9.1 for Microsoft Windows. Percentages, frequency distributions, means, and standard deviations were used to describe the demographic characteristics and Pap test

**Table 1. Demographic Characteristics**

Characteristic	n	%
<b>Education</b>		
High school or less	53	24
Some college	96	43
University or higher	73	33
<b>Have health insurance</b>		
Yes	214	96
No	8	4
<b>Have a disease</b>		
Yes	32	14
No	190	86
<b>Perception of personal health</b>		
Poor	12	5
Fair	144	65
Good	66	30
<b>Aware of free coverage for Pap testing</b>		
Yes	204	92
No	18	8

N = 222

use. Exact chi-square tests were used to ascertain the associations between stages of change and demographic variables. The average of the seven items from the Self-Efficacy Scale was computed to obtain the mean self-efficacy. The means of perceived benefits and barriers were the average scores across three items from the benefits subscale and 12 items from barriers subscale. To control for potential confounders, multiple linear regression was performed to compare means of self-efficacy and perceived benefits and barriers among TTM-stage groups. Multiple comparisons were applied to determine which specific pairs of stages of change differed significantly from each other in level of self-efficacy and perceived benefits and barriers. Level of significance was set at  $p < 0.05$ .

## Findings

Of the 295 invited participants, 222 women validly responded and returned the questionnaire to the investigator for a 75% response rate. Mean age of participants was 44.92 years (SD = 9.87, range = 19–65). Most women were married, had an educational level of at least some college, had health insurance, had no disease, had no HPV history, and had no abnormal Pap test in the past (see Table 1). About 92% were aware that NHI provided free coverage for Pap tests for women aged 30 years and older.

### Distribution of Participants Among Stages

Most (53%,  $n = 119$ ) respondents were in the maintenance stage, with 17% in the precontemplation stage ( $n =$

38) and 17% in the relapse stage ( $n = 37$ ). Most of the remaining participants were in the contemplation stage (10%,  $n = 22$ ), with a small proportion being in the action stage (3%,  $n = 6$ ). No participants were classified in the preparation and relapse risk stages. Because of the relatively small number of participants in the action stage, TTM stages were collapsed to make comparisons among stage groups more reliable. Women in the action and maintenance stages had had a Pap test in the past year and intended to have one in the future; therefore, the data in these two stages were combined. A four-stage structure was set forth based on participants' past behavior and intention for cervical screening test: precontemplation, contemplation, action-maintenance, and relapse.

### Factors Affecting Stages of Change for Regular Screening

Respondents' stages of cervical screening were significantly associated with demographic variables, including age, marital status, HPV history, and abnormal Pap testing history (see Table 2). The exact chi-square test showed that 77% of participants older than age 50 were in action-maintenance, whereas 56% of participants aged 30–50 years and no participants younger than age 30 were in that stage ( $\chi^2[6, N = 200] = 56.22, p < 0.0001$ ). Sixty-seven percent of unmarried participants were in precontemplation, whereas only 6% of married women were in that stage ( $\chi^2[3, N = 222] = 97, p < 0.001$ ). The stages of change also were significantly correlated with HPV history ( $\chi^2[3, N = 222] = 8.58, p = 0.035$ ). More women with a positive history of

**Table 2. Associations Among Stages of Cervical Cancer Screening and Demographic Characteristics**

Variable	Precontemplation		Contemplation		Action-Maintenance		Relapse		Total		$\chi^2$
	n	%	n	%	n	%	n	%	n	%	
<b>Age (years)</b>											56.22**
29 or younger	8	53	7	47	–	–	–	–	15	7	
30–50	21	17	13	10	69	56	21	17	124	62	
51 or older	3	5	1	2	47	77	10	16	61	31	
<b>Marital status</b>											97**
Married	12	6	14	8	120	66	37	20	183	82	
Never married	26	67	8	20	5	13	–	–	39	18	
<b>Human papillomavirus</b>											8.58*
Yes	5	13	5	13	28	72	1	2	39	18	
No	33	18	17	9	97	53	36	20	183	82	
<b>Abnormal Pap test</b>											205.29**
Yes	–	–	1	7	13	86	1	7	15	7	
No	1	1	–	–	110	75	36	24	147	66	
Never had a test	37	62	21	35	2	3	–	–	60	27	

N = 222

\*  $p < 0.05$ ; \*\*  $p < 0.01$

HPV were in action-maintenance than women without a positive history. In addition, more women with an abnormal Pap test in the past (86%) were in action-maintenance than women without abnormal Pap tests (75%) or women who had never had a Pap test (3%) ( $\chi^2[6, N = 222] = 205.29, p < 0.0001$ ). Stage of change for Pap screening was not significantly related to education, health insurance, disease history, or awareness that NHI provided free coverage for Pap tests for women aged 30 years and older.

## Relationships Among Constructs and Stages of Change

Multiple linear regressions indicated that mean levels of self-efficacy differed significantly by stages ( $p < 0.0001$ ) (see Table 3). Multiple comparisons revealed that participants in the action-maintenance stage had significantly higher self-efficacy than women in precontemplation and relapse. Women in different stages differed significantly in mean scores on perceived barriers ( $p = 0.005$ ). Multiple comparisons showed that participants in relapse scored significantly higher on perceptions of barriers than women in action-maintenance. No significant differences were found among women in other stages or in perceived benefits among women in different TTM stages ( $p = 0.702$ ).

## Discussion

Women in the sample reported more frequent Pap screening than in other studies in Taiwan (Chen et al., 2007; Hou, 2005; Hou et al., 2003; Liao et al., 2006; Wang et al., 2006). The percentage of women who were never tested (27%) may have been lower in the current study because participants were workers in a hospital where Pap smear services were available and accessible and where health risks were perhaps better understood. In addition, health education posters and information presented inside the hospital may have influenced participation in screening.

The rate of regular screening adherence found in the current study is low, considering that NHI has increased Pap test reimbursement to promote test-

ing. A reminder system by care providers is recommended once women have had a Pap test to prevent discontinued screening and to increase regular testing. Test behaviors are influenced by spousal support in Taiwanese society (Hou, 2006); therefore, health education messages should target women as well as their family members.

About 8% of participants were not aware that the NHI offered free Pap screenings for women older than age 30, which suggests a need for continued efforts to increase awareness of the free screening to increase Pap testing. Intervention programs such as mail communications and phone counseling have succeeded in raising awareness of Pap testing among Taiwanese women (Hou, 2005).

Self-efficacy was significantly higher for women in action-maintenance, which was consistent with the predictions of the TTM and with previous work (Hogenmiller et al., 2007). The finding suggests that increasing situation-specific confidence (e.g., by informing women that the procedure is not painful) may lead precontemplators and relapsers to arrive at the intention or continue to engage in regular cervical screening. In addition, interventions to encourage continued use for women in the action-maintenance stage should emphasize self-efficacy.

Participants in the relapse stage perceived more barriers than women in action-maintenance, but no significant differences were found among other stages. The finding conflicts with earlier TTM work, in which people in earlier stages of the TTM perceived more barriers to regular Pap screening than those in later stages (Eiser & Cole, 2002; Kelaher et al., 1999; Rimer et al., 1996; Tung et al., 2008). Although the TTM has been applied successfully to cervical screening in several populations, the findings may not be generalizable to this study population. Another explanation may be that the relapse stage was not included in the other studies. In the current study, the relapse stage was associated with an increased perception of barriers to care. The finding suggests that women in relapse have experienced some difficulties during a previous screening, which may have had a negative influence on their maintenance of regular screening.

**Table 3. Multiple Regression Results by Stage of Change for Self-Efficacy and Perceived Benefits and Barriers**

Variable	Precontemplation			Contemplation			Action-Maintenance			Relapse			F	p
	n	$\bar{X}$	SD	n	$\bar{X}$	SD	n	$\bar{X}$	SD	n	$\bar{X}$	SD		
Efficacy	30	40.45	25.24	20	53.2	17.43	119	55.98	18.92	34	37.06	19.26	9.02	< 0.0001
Benefit	38	3.37	0.65	22	3.45	0.49	125	3.57	0.48	37	3.78	0.42	0.47	0.702
Barrier	38	2.46	0.42	22	2.39	0.37	125	2.45	0.4	37	2.72	0.41	4.46	0.005

N = 222

Therefore, interventions for women in relapse should focus on decreasing barriers to prevent discontinued screening.

No significant differences were found in the level of perceived benefits of regular screening among women in different TTM stages. The finding conflicts with previous TTM research on Pap screening (Eiser & Cole, 2002; Kelaher et al., 1999; Rimer et al., 1996; Tung et al., 2008). The sample was from a different cultural background than participants in previous TTM studies; therefore, the results from other populations may not be applicable to the current study. The finding may be explained, in part, by the fact that health information was accessible to all participants, who all worked in the hospital; therefore, women from all stages may have had similar perceptions of the benefits of regular screening.

Women aged 30 years or older were more likely to participate in regular screening than women younger than 30. The finding is similar to that of a national survey (Liao et al., 2006), possibly because the NHI system provided free Pap tests only for women aged 30 years or older. However, a study from Taiwan found that women aged 21–30 years had the highest rate of HPV infection (Jeng et al., 2005), which is associated with cervical cancer. NHI coverage should be extended to all women in Taiwan, regardless of age, to increase the uptake of Pap tests for women aged 30 years or younger.

Unmarried women were more likely to have never had a Pap test than married participants, which is consistent with the findings of Hou et al. (2003), Liao et al. (2006), and Wang and Lin (1996). Some unmarried sexually active participants may not have reported being screened because premarital sex is stigmatized in Taiwanese culture, or they may believe that only married women need Pap smears (Hou et al., 2003). In Taiwanese culture, asking unmarried women whether they have been sexually active is considered to be inappropriate. Therefore, unmarried sexually active women may miss the opportunity for cervical screening advice. The finding suggests that healthcare providers should educate women about cervical cancer screening guidelines when they present for care for other reasons. Despite traditional cultural concerns, healthcare professionals and unmarried sexually active women should be more aware of the advantages of Pap testing.

Women with a history of being HPV-positive or having abnormal Pap tests were more likely to be in the action-maintenance stage, possibly because women with an abnormal history understand the importance of returning for follow-up. Another possible explanation may be good provider-patient communication among this group; a U.S. study found that provider-patient rapport is a critical component of patients' willingness to return for follow-up (Breitkopf, Catero, Jaccard, & Berenson, 2004).

## Limitations

The current study used a convenience sample of Taiwanese women, and the study results may have been biased by the self-selection of participants; therefore, the results may not be generalizable to other Taiwanese women. However, the women all worked in a healthcare setting, which may justify the assumption that other populations would be less likely to practice regular screening. The study also used self-reported data, which may have been subject to recall or social desirability bias. As a result, the level of overestimation or underestimation for participants who completed the instruments is unknown. Finally, one cannot assume that the variables were causally related because this was a cross-sectional study.

## Implications

Several aspects of the research have important implications for practice, education, and research. The study provides important information on rate of screening and factors related to cervical screening. Healthcare professionals who work with Taiwanese women could incorporate the information into intervention strategies. Strategies for younger unmarried women might include education programs emphasizing the importance of routine annual screening and enhancing women's understanding of the relationship between Pap testing and cervical cancer. The findings also indicate the importance of providing culturally specific intervention strategies. Healthcare professionals working with Taiwanese women should ensure that the provision of information considers local beliefs and traditions while explaining health risks so that the women can make informed choices about attendance for screening.

The similarity between the current study's findings on self-efficacy and those of earlier studies conducted outside Taiwan provides support for the applicability of the TTM across populations. However, the predictions of the TTM in relation to the decisional calculus of benefits and barriers were not supported in the current study. The findings indicate that reinforcing self-efficacy is more likely to be effective at promoting regular testing among this population than emphasizing benefits or decreasing barriers. In addition, significant differences in self-efficacy and barriers only were found among precontemplation, action-maintenance, and relapse; therefore, the TTM stages of change for Pap testing in Taiwan could be reduced from six to three stages.

The concept of an individual's motivational readiness still is new in Taiwan; most programs related to cancer screening are action oriented and, therefore, ignore individual differences in motivational readiness. Incorporation of the concept of motivational readiness

into curricula from basic healthcare training to doctoral levels should be encouraged to offer better quality care in the future.

Research on cervical cancer related to the TTM in Taiwanese women is scarce. Continued TTM research is needed to identify the most effective theory-based interventions for evidence-based practice in this population. Future studies that include larger samples randomly chosen from different cities in Taiwan would provide more representative data on Taiwanese women's cervical screening behavior. Such studies should pay special attention to women with the potential for relapse. In addition, future research should examine how cultural beliefs affect screening behaviors because culture may

affect the cervical screening of Taiwanese women. Future work also should include objective data on cervical screening, such as medical records, to ensure that participants are categorized properly by stage of change. Finally, longitudinal surveys should be conducted to track patterns in cervical screening practice.

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