

Mixed-Methods Evaluation



MIXED-METHODS EVALUATION



A Chinese Women Cancer Screening Program

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OVERVIEW

Using Visual Diagrams to Communicate Complex Mixed-Methods Research Design Procedures



Mixed Methods in Public Health Research in Taiwan:

Using Visual Diagrams to Communicate Complex Design Procedures

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Abstract

Scholars introduce modern mixed methods research (MMR) and its application in public health research in Taiwan. Specifically, they showcase a multi-phased Taiwan Cervical Cancer Screening mixed methods study using visual diagrams to communicate complex design procedures. While some previous researchers have incorporated quantitative and qualitative data in research, here we hope to provide significant clarity to guide those new to the MMR field. We have structured the paper in the following way. First, we provide a brief overview of mixed methods research. Second, we illustrate the compelling need for MMR from a public health perspective using cancer screenings as an example. Third, we introduce the Taiwan Cervical Cancer Screening Program as an exemplar of MMR application and the utility of visual diagrams. Study methodology can be applied to international researchers and scholars from interdisciplinary fields beyond public health.

Keywords: mixed methods research, Taiwan, public health, cervical cancer screening, visual diagram

Note

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Many public health problems are complex. To date, most researchers have attempted to solve these complex problems by using monomethod research approaches. Monomethod research approaches in essence use exclusively quantitative research approaches or exclusively qualitative approaches (Teddlie & Tashakkori, 2009). Over the past three decades, the mixed methods research paradigm has emerged as a third alternative to quantitative and qualitative research paradigms (Creswell & Clark, 2018). Although modern mixed methods research was established in the late 1980's and still has a relatively short history, researchers around the globe are embracing mixed methods research (Fetters, 2016). By integrating both qualitative and quantitative procedures, mixed methods research offers the power of numbers (quantitative) and stories (qualitative) for investigating complex social, behavioral and health sciences (Pluye & Hong, 2013). Researchers and scholars from public health fields and other social and behavioral science areas can learn the value of modern mixed methods methodology and its development, and how to use visual diagrams to communicate complex mixed methods design procedures.

By definition Mixed Methods Research (MMR) is “a research approach or methodology: (1) focusing on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences; (2) employing rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs; (3) utilizing multiple methods (e.g., intervention trials and in-depth interviews); (4) intentionally integrating or combining these methods to draw on the strengths of each; and (5) framing the investigation within philosophical and theoretical positions” (Creswell, Klassen, Plano Clark, & Clegg Smith, 2011). A hallmark of mixed methods research is a focus on integration. Fetters and Freshwater propose all mixed methods researchers should take the mixed methods challenge, that is, to consider how to integrate both the qualitative and quantitative data together to achieve a whole greater than the sum of the individual parts. They illustrate this concept numerically as $1 + 1 = 3$ (Fetters & Freshwater, 2015). Simply stated, this means the whole (3) is greater than the sum of the respective qualitative (1) and quantitative (1) parts. By integrating, researchers can gain new insights, and more robust conclusions. Ironically, while mixed methods seem strange to many researchers, there are many examples of mixed methods thinking outside of the research world. For example, consumers on their favorite shopping website leave and read reviews for the products they purchased using a five-star quality rating system as well as qualitative comments. By looking at both the star rating (quantitative) and the comments (qualitative), consumers can make informed decisions about purchases.

Mixed Methods Research Internationally and in Taiwan

International literature on mixed methods research

The modern field of mixed methods research was established in the late 1980's, and there are over 50 books published on this topic. A number of events signify the growth and vibrancy of the field. The Journal of Mixed Methods Research completed ten years of publication in 2016 (Fetters & Molina-Azorin, 2017), and the International Journal of Multiple Research Approaches re-launched in 2017 after

publication from 2007 to 2015. The Mixed Methods International Research Association (MMIRA) convened the first MMIRA conference in Boston, in 2014 (Mertens, et al., 2016). The Japan Society of Mixed Methods Research became the first affiliate of the MMIRA in 2016. In 2017, the first MMIRA Chapter, the Caribbean Chapter of MMIRA was announced. These developments underscore the growth of mixed methods research internationally.

Rationale for Using MMR in Taiwan

As a rapidly aging society, the population of people in Taiwan with cancers and chronic diseases has reached unprecedented levels that continue to grow (Chen, You, Lin, Hsu, & Yang, 2002). Cancer has continued to be the leading cause of death in Taiwan for more than 30 years. Trends of cancer incidence in Taiwan have shown a significant and persistent increase of 1.7% per year from 2002 to 2012 at rates higher than other countries (Chiang, et al., 2016).

While Taiwan has universal health coverage for regular preventive health services including cancer screenings among middle-aged adults age 40 years and older, cancer screening utilization is disappointingly low. Lessons learned from the few existing studies examining selected cancer-screening utilization among community and worksite groups in Taiwan reveal continued and general need to encourage preventive health services utilization (Hou & Chen, 2004; Hou & Chen, 2005; Hou, Fernandez, Baumler, & Parcel, 2002; Hou, Fernandez, Baumler, Parcel, & Chen, 2003; Hou, Hou, & Hou, 2014; Hou & Hou, 2014). Previous cancer screening studies in Taiwan show that only 62% of married women and 31% of single women from a community sample reported a Pap test in the preceding 3 years (Hou, et al., 2003), and less than 30% of a worksite sample had ever had a fecal occult blood test (FOBT) for colorectal cancer screening (Hou & Chen, 2004). Cancer education and screening programs are critical to relieve the cancer burden as many cancers are potentially preventable via modified behavioral lifestyles or early detection via regular screenings. Culturally tailored and innovative screening interventions have been demonstrated effective to significantly encourage more non-adherent women enrolled in the intervention group than in the control group to receive a pap test within 6 months (50% vs. 32%) (Hou, et al., 2002), and encouraged 74% of a midlife workplace sample to return a completed FOBT within 4 weeks (Hou & Chen, 2004; Hou & Chen, 2005).

Implementing effective cancer screening programs and public health services are complex and require interdisciplinary collaboration of many health professionals including nurses, health educators, physicians, social workers, care managers, as well as various community partners. Culturally tailored and innovative screening interventions require deeper understanding of the complex interplay of social, interpersonal, and individual factors influencing the adoption of preventive and screening behaviors. Evaluation and optimization of the delivery of public health programs requires sophisticated research procedures capable of adequately grasping the complexity of the public health enterprise. Mixed methods research which uses qualitative and quantitative data collection procedures, is particularly appropriate for addressing the complex research problems in the field of public health.

Despite the relevance of mixed methods research procedures for investigating complex public health issues, there are limited mixed methods research articles about public health in Taiwan. We conducted a literature search combining the key terms of “mix methods,” “public health,” and “Taiwan” using both the EBSCO host databases and “national library database” in Taiwan with no limitation on time period. This search failed to reveal a single article in the National Library Database in Taiwan when

using the terms “mix methods” and “public health”. We then just used “mix methods” as the key search term. The search revealed five articles from the National Library Database in Taiwan and only one article in the EBSCO host databases conducted in Taiwan using mixed methods.

Using “mixed methods research” as the sole search term may not return some studies that used mixed methods research procedures in cases when the authors did not use the language of mixed methods research (Molina-Azorin & Fetters, 2016). Thus, it is possible that additional studies could be identified if we had used a different search strategy. However, it is unlikely such studies would have used state-of-the-art mixed methods procedures if they did not include mixed methods in the paper. Thus, like Ivankova & Kawamura (2010), we chose “mixed methods” as our key term as we sought studies where the authors were aware of the mixed methods research paradigm and intentionally used “mixed methods” in their study titles or abstract. As a final step, we examined carefully the actual content of all articles identified in the search as “mixed methods studies,” to ensure that all the studies actually met criteria or discussed issues or trends related to mixed methods research.

Based on our literature search in Chinese and English, the few existing mixed methods research articles identified in Taiwan discussed either mixed methodology as a future trend in social and educational research (Hsieh, 2007), or the qualitative-quantitative debates and mixed methods as a new third paradigm (Kuo, 2011). Existing literature in Taiwan mostly pertains to applications in educational research (Tsai & Chauo, 2008; Sung & Pan, 2010). There were two articles identified applying mixed methods in the public health field. One evaluated a health screening program for migrant women to Taiwan (Huang, Mathers, Chia, Shiu, & Kao, 2016), and the other focused on exploring staff understanding and attitudes towards a hospital-balanced scorecard implementation (Ma, Hsu, Huang, Tsai, & Ying, 2011).

Researchers in Taiwan have shown the potential to produce quality mixed methods research. This could be enhanced by better understanding of mixed methods design procedures. Thus, the purpose of this illustration of mixed methods research in public health in Taiwan that follows is to enhance understanding of mixed methods research procedures and to demonstrate the potential for these procedures to be applied much more broadly in public health research. Lessons learned can also be applied to other countries across the world.

An application of mixed methods procedures in public health research

To provide an example of the application of MMR in public health research, here we introduce the Taiwan Cervical Cancer Screening Program, a sophisticated multi-phase mixed methods study, published via a series peer-reviewed articles in *Journal of Community Health*, *Healthcare for Women International*, *AWHONN Lifelines*, *Health Promotion Practices*, *California Journal of Health Promotion*, *Preventive Medicine*, *International Journal of Behavioral Medicine*, and a book chapter (Hou, et al., 2002; Hou, et al., 2003; Hou & Lessick, 2002; Hou, Fernandez, & Parcel, 2004; Hou & Luh, 2005; Hou, 2005; Hou, 2006a; Hou, 2006b). This study, “*Love Yourself before You Take Care of Your Family*”, was a hospital-based community outreach program implemented to increase cervical cancer screening among women in Taiwan. This program of research involved a comprehensive process for the development and evaluation of a theory- and evidence-based cancer screening intervention program for Chinese women. This program of mixed methods research involved three major phases: (1) Instrument development and needs assessment (Hou et al, 2003; Hou & Lessick, 2002; Hou & Luh, 2005); (2) Intervention development using

a framework called Intervention Mapping (Hou et al, 2004; Hou, 2006a; Hou, 2006b); and (3) Program evaluation using a randomized-controlled trial (Hou et al, 2002; Hou, 2005). The mixed methods design procedures are illustrated using visual diagrams in order to facilitate communication and understanding [Creswell & Clark, 2018]. The visual diagrams of Phase I to IV of the study help provide a new way to communicate and link the complex mixed methods research design phases, procedures, and products together for readers to better understand the methodological approaches (Figures 1-4).

Phase I Exploring Sequential Design for Instrument Item Development

Phase I explored, developed, and tested study instrument items using an exploratory sequential design. As illustrated in Figure 1, the study explored survey items by reviewing existing literature and theories, and then developing qualitative interview questions. The qualitative data collection involved one-on-one interviews with 14 never-been-tested Chinese women to identify key barriers to cervical cancer screenings. Four screening belief constructs (perceived benefits, barriers, norms, and perceived cancer risk), and screening-related knowledge were identified with corresponding items drafted. This quantitative measurement tool was then preliminarily tested with a sample 125 women in Taiwan. The preliminarily quantitative results showed that measurement scales were reliable, and all four screening beliefs and knowledge were significantly related to cervical cancer screening history (Figure 1).

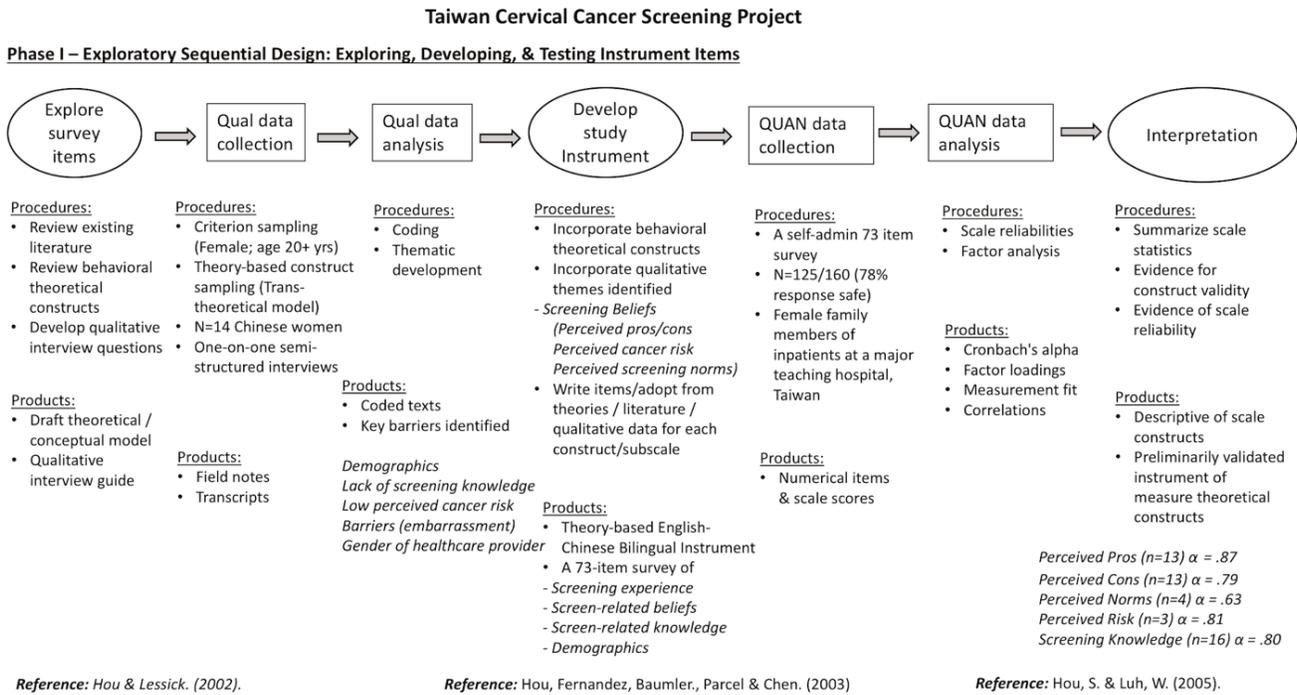


Figure 1 — Exploratory sequential design — Exploring, developing, & testing instrument items

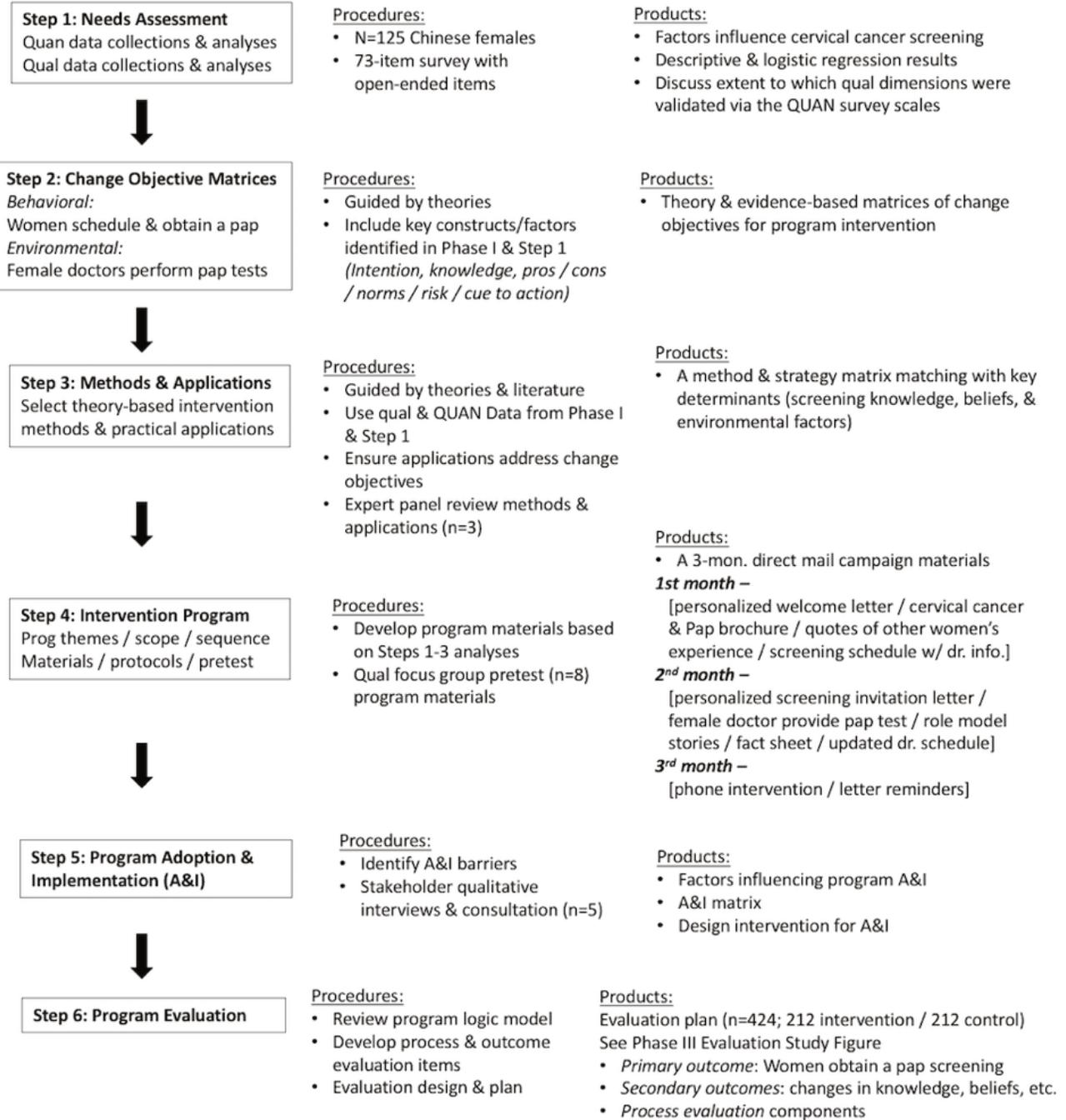
Phase II Intervention Development Using Intervention Mapping Framework

Phase II was designed with lessons learned from Phase I. Researchers produced a three-month direct-

mail campaign intervention program that was pretested in an 8-person focus group. As illustrated in Figure 2, this “*Love Yourself before You Take Care of Your Family*” cervical cancer screening project was developed using the Intervention Mapping framework (IM), an innovative process of designing theory- and evidence-based interventions. Intervention Mapping involves an inter-connected iterative six-step process to ensure that theory and evidence guiding (a) the identification of psychosocial and environmental determinants related to cancer screening behavior, and (b) the selection of the most appropriate methods and strategies to address the identified determinants (Figure 2).

Taiwan Cervical Cancer Screening Project
“Love Yourself before You Take Care of Your Family”

Phase II – Intervention Development & Pre-testing



Reference: Hou, Fernandez, & Parcel (2004); Hou (2006a); Hou (2006b).

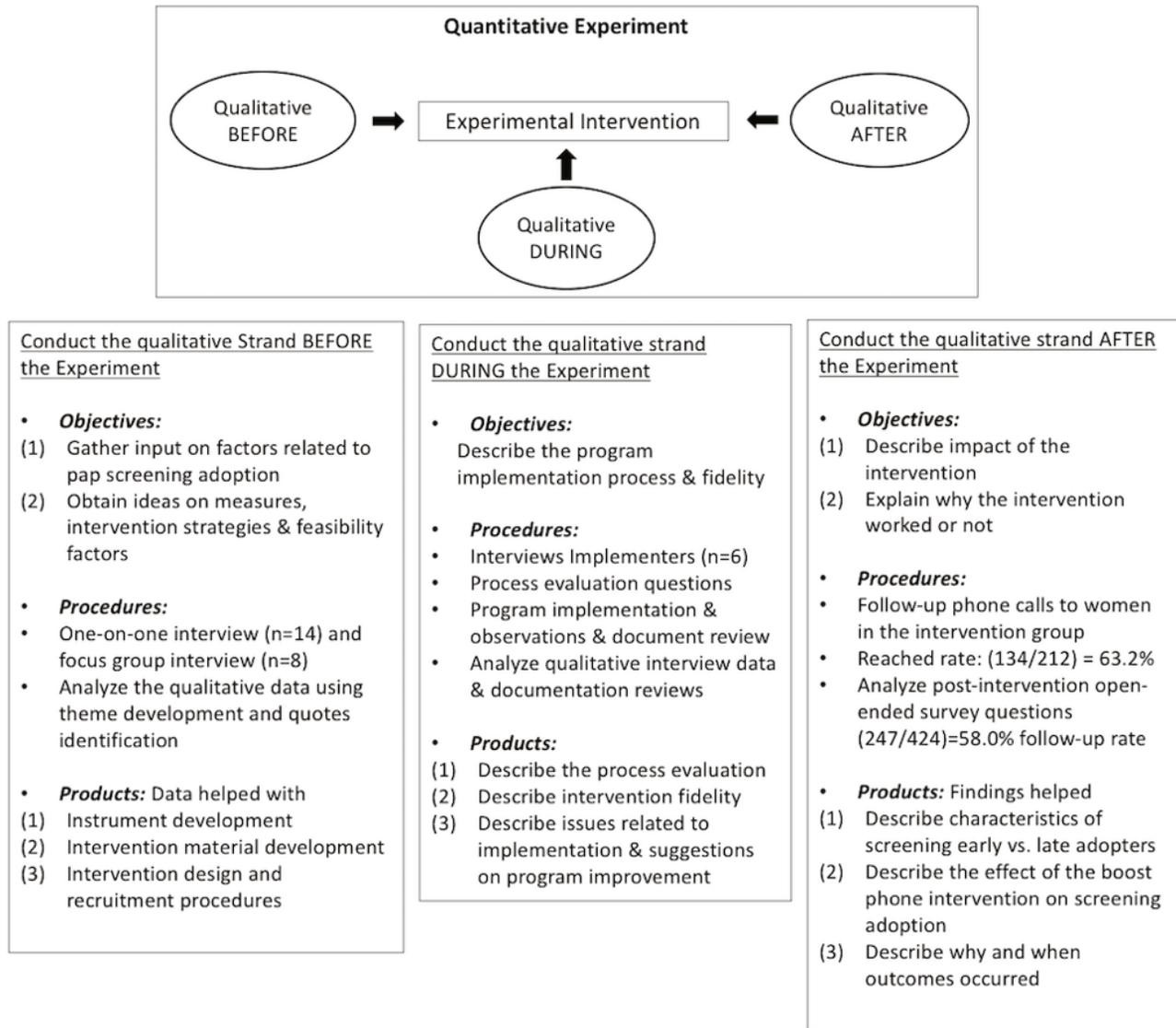
Figure 2 – Intervention Development & Pre-testing

Phase III Evaluation Study Using Embedded Mixed Methods Research Design

Phase III was a randomized controlled trial (RCT) to evaluate the effectiveness of the intervention developed in Phase II. The primary outcome of the RCT evaluation study was receiving a cervical cancer screening (Pap smear test) after the intervention. A secondary outcome was change knowledge and beliefs concerning cervical cancer screening. Female family members of inpatients who were admitted into a major teaching hospital in Taichung, Taiwan were asked about their cervical cancer screening history. Women who had not had a cervical cancer screening in the past 12 months were identified as non-adherent and thus they were eligible to participate in the randomized controlled intervention trial (total $n=424$; with 212 women in each group). As illustrated in Figure 3, this quantitative-dominant evaluation design embedded qualitative data collection (a) *before* the experiment to gather input on measures, as well as intervention ideas and feasibility; (d) *during* the experiment to document implementation process and fidelity; and (c) *after* the experiment to describe the impact (Figure 3).

Taiwan Cervical Cancer Screening Project
“Love Yourself before You Take Care of Your Family”

Phase III – MMR Evaluation Study (Randomized-Controlled Trial)



Reference: Hou, Fernandez, Baumler, & Parcel (2002); Hou & Lessick (2002); Hou, Fernandez, & Parcel (2004); Hou & Luh (2005); Hou (2005); & Hou (2006a).

Figure 3 — Evaluation Embedded Design (Randomized-Controlled Trial)

Results showed women in the intervention group reported a higher rate of receiving cervical cancer screening than women in the comparison group (50% vs. 32%; p=.002). Baseline data from the randomized controlled intervention trial was further used to confirm the final validated study instrument. Reliabilities showed good internal consistencies for the perceived pros, cons, and susceptibilities scales

(alpha ranged from .78 to .87). Factor analysis showed good construct validity revealing concordant patterns with the behavioral constructs used. This validated culturally sensitive and theory-based measurement tool was published with English-Chinese side-by-side to facilitate use by other researchers conducting similar studies (Hou & Luh, 2005). This multi-phase mixed-methods cervical cancer screening program among Chinese women was invited for inclusion in the CDC Chronic Disease Prevention Database to serve as a model to assist researchers and practitioners in planning, implementing, and evaluating health promotion programs in cancer screening (Figure 4).

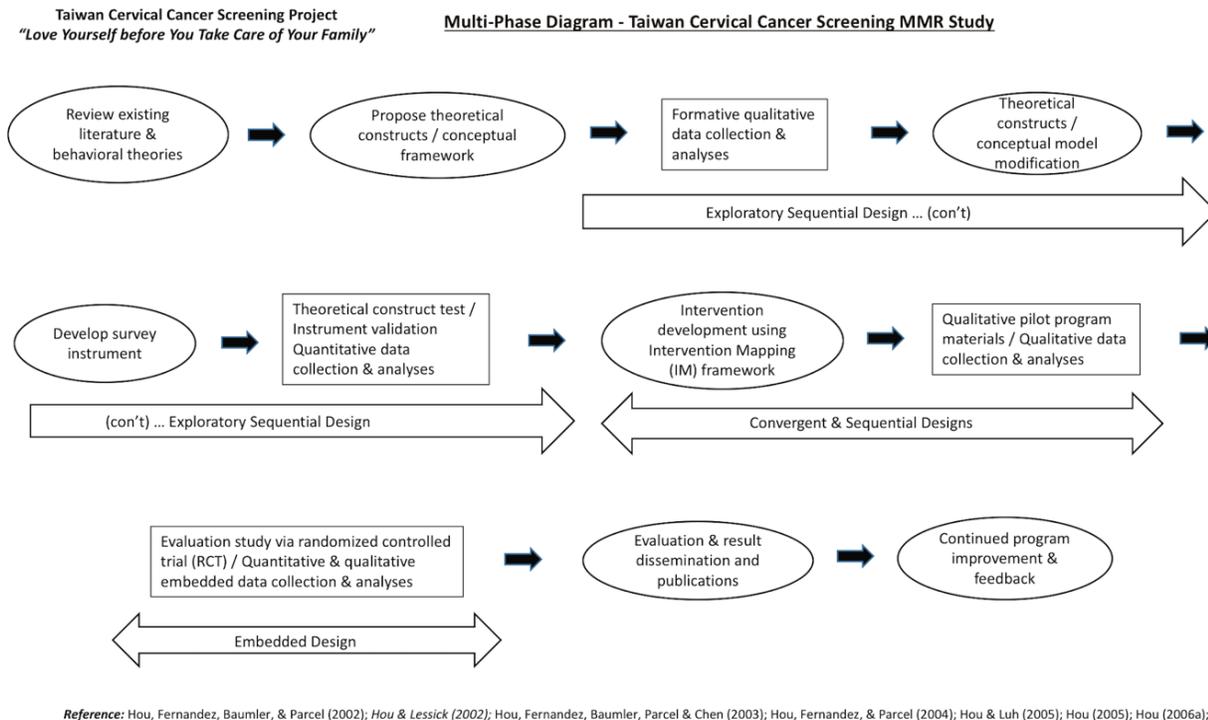


Figure 4 — Multi-Phase Mixed Methods Research Design

This Taiwan cervical cancer screening project was published using the concept of staged integration (Fetters, Curry, & Creswell, 2013) via a series of papers from the single multi-phased mixed methods study, including a qualitative paper (Hou & Lessick, 2002), two quantitative papers (Hou, et al., 2003; Hou, 2006a); an instrument development paper (Hou & Luh, 2005), a mixed methods intervention development paper using the Intervention Mapping framework to link all three major phases together (Hou, et al, 2004), two evaluation papers highlighting the project outcomes (Hou, et al., 2002; Hou, 2005), and book chapter used to introduce comprehensively the overall project through use of figures, tables, and intervention material samples (Hou, 2006b).

In this paper, we have introduced this sophisticated multi-phase project that illustrates the complexity, rigor, power, and synergy for publication resulting from using a mixed methods approach. The mixed-methods diagrams have been found to greatly facilitate understanding of various study phases and designs [Phase I, II, III, and the multi-phase figures], and showcase how a series of multiple papers, including a methodological paper, can be published from a program of mixed methods research and integration via the reporting dimension.

Conclusion

As illustrated by the example presented here, mixed methods research offers the power of numbers and stories for investigating complex social and health problems. Understanding the context for using MMR in Taiwan from a public health perspective underscores the opportunity for applications of mixed methods in public health research. While a concise overview of mixed methods research, this paper illustrates a sophisticated mixed methods cervical cancer screening program of research based in Taiwan as an exemplar of MMR application. Visual diagrams greatly facilitate communication of complex mixed methods design procedures. As illustrated, multiple papers can be published from a mixed method program of research, and this work illustrates mixed methods research integration through the reporting dimension. The methodology discussed can be applied to interdisciplinary fields of research and across the world.

- **Ethical approval:** “All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.”
- **Informed consent:** “Informed consent was obtained from all individual participants included in the study.”
- **Disclosure of potential conflicts of interest:** “The authors declare that they have no conflict of interest.”

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PHASE I — EXPLORATORY
SEQUENTIAL DESIGN —
EXPLORING, DEVELOPING,
AND TESTING INSTRUMENT
ITEMS.

Stage 1 – Qualitative Data Collection and Analyses



SU-I HOU AND MIRA LESSICK

Cervical Cancer Screening among Chinese Women: Exploring the Benefits and Barriers of Providing Care

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Note

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Introduction

According to the American Cancer Society(2002), 13,000 women were diagnosed with cervical cancer this year and some 4,100 women will die of it. Cervical cancer disproportionately affects Asian women.

Recent epidemiological data from the U.S. cancer registry (Ries et al., 2000) demonstrate that Asian women have a higher rate of cervical cancer (10.2/100,000) as compared to Caucasian women (8.4/100,000). Asian women also had a higher rate of death with cervical cancer (2.7/100,000) than whites (2.4/100,000).

However, cervical cancer is a highly preventable disease if detected early. In fact, as reported by the National Cancer Institute (1998), the incidence and mortality rates of cervical cancer had significantly decreased by more than 70 percent during the past few decades. Regular checkups and Pap screening have contributed greatly to this impressive reduction (CDC, 1998).

What health care providers may find is that it's extremely difficult to convince most Chinese women to accept a Pap test screening if they are not sexually active, even if they have reached age 18.

Benefits of Screening

Due to the typically long pre-clinical phase of cervical cancer, screening for early detection is critical. The primary purpose of the Pap smear is to identify women who have cellular changes that place them at risk for developing cervical cancer. The risk of developing cervical cancer is greater among women who have never been screened or those who have not had screening on a regular basis (Celentano et al., 1989).

Additionally, the survival data show that the prognosis is directly related to the stage of cancer at diagnosis. The chance of surviving cervical cancer for more than five years can be as high as 95 percent if the initial diagnosis is at the early stage. For those initially diagnosed with a terminal stage of cancer, the chance of surviving five years drops to less than 20 percent. Early detection via Pap is currently the most practical method of finding cervical cancer in the early stages for women at risk (CDC, 1998).

Screening Guidelines

The U.S. Preventive Services Task Force (USPSTF) is an independent panel of experts in primary care and disease prevention. Their responsibilities include systematic reviews of the evidence of effectiveness and development of recommendations for clinical preventive services. Currently, the task force recommends routine screening for cervical cancer (at least every three years) for all women who are or have been sexually active and who have a cervix (USPSTF, 1996). There is insufficient evidence to recommend for or against an upper age limit for Pap screening (CDC, 2002). In addition, there is insufficient evidence to recommend for or against routine screening with colposcopy, or screening for human papillomavirus (HPV) infection (National Cancer Institute, 2002). Nevertheless, recently published guidelines have suggested DNA HPV testing as a preferred approach for women with an abnormal Pap result if a liquid-based cytology method is used for screening (Wright, Cox, Massad, & Wilkinson, 2002) (see Box 1).

Box 1.

Following Up Abnormal Results

The Bethesda System for cervical cytological classification is the standard framework for laboratory reports. The recently released consensus guidelines, based on the new 2001 Bethesda System, continue the use of low-grade and high-grade squamous intraepithelial lesions (SILs) to refer to cervical cancer precursors (Solomon et al., 2002). Sometimes other terms are used to describe the abnormal cells, such as cervical intraepithelial neoplasia (CIN). Low-grade precursors are a common mild dysplasias condition, especially in young women.

The majority of low-grade precursors return to normal. Sometimes, low-grade precursors (LSIL or CIN 1), however, can progress to high-grade precursors (HSIL or CIN 2, 3). High-grade precursors are not cancerous, but they may eventually lead to cancer and should be treated.

When the Bethesda System was first drafted in 1988, clinical management was focused on identifying all SILs, including low-grade precursors (LSIL). However, there has been a shift in focus on detection and treatment of HSIL

because most LSIL (especially in young women) represent HPV infection (Ho, Bierman, Beardsley, Chang, & Burk, 1998). Therefore, it's logical to clarify the previous "atypical squamous cells of undetermined significance" (ASCUS) category. The new 2001 Bethesda System had encouraged pathologists to qualify atypical squamous cells (ASC) into two categories of either "undetermined significance" (ASC-US) or "cannot exclude HSIL" (ASC-H) (Solomon et al., 2002).

According to the new guidelines, women with ASC-US should undergo repeated cytology tests, colposcopy or DNA testing for high-risk types of HPV. However, if liquid-based cytology is used for screening, testing for HPV DNA is the preferred approach (Wright et al., 2002). The performance of HPV testing allows for a clear statement regarding ASC interpretation. Positive HPV tests among ASC-US patients have higher probability of an HSIL compared with those whose HPV status is unknown, and negative HPV results have less than 1 percent chance of HSIL (Solomon, Schiffman, & Tarone, 2001).

In most instances, women with ASC-H, LSIL or HSIL should be referred for colposcopy or biopsy of any abnormal areas (Wright et al., 2002). Colposcopy is a procedure to examine the vagina and cervix, using a lighted magnifying instrument called a colposcope. Biopsy is the removal of a small piece of tissue for diagnosis. Methods used to treat SILs include cryosurgery (freezing that destroys tissue), laser treatment (surgery using a high-intensity light), LEEP (loop electrosurgical excision procedure, the removal of tissue using a hot wire loop), as well as conventional surgery. Yet challenges to cervical cancer diagnostic tests have also been identified (Adams, 2002).

Many organizations, including the American Cancer Society, the National Cancer Institute, the American College of Obstetricians and Gynecologists, the American Medical Association and others, also recommend that annual Pap screening should begin when women reach age 18 and older, or younger if they are sexually active. Although most health organizations or providers today use this as a recommended cervical cancer screening guideline, it may not be as appropriate or relevant for Chinese women. What health care providers may find is that it's extremely difficult to convince most Chinese women to accept a Pap test screening if they aren't sexually active, even if they have reached age 18. Furthermore, most Chinese health care providers also have concerns of performing this routine screening if a woman is still a "virgin." Some Chinese parents may feel angry and even sue a health care provider if their daughter is given a Pap exam if she is not married.

Considering the conservative and traditional value of Chinese culture on sexuality and virginity, the screening guidelines recommended by USPSTF may be more appropriate and relevant for this population.

It's recommended that women who are past menopause still need to have regular Pap tests. However, women who have undergone a hysterectomy don't require Pap screening unless the hysterectomy was performed because of cervical cancer or its precursors.

Although vaginal smears are often done for follow-up of women who had a hysterectomy, some studies suggest little or no benefit of routine vaginal screening for women with a hysterectomy for benign conditions (Pearce et al., 1996). Prevalent recommendations on regular Pap screenings for women with hysterectomy even due to benign conditions indicate that many health care providers are either still not clear about the screening guidelines or do not keep up with recent research evidence. Although it

seems appropriate to be conservative, the adverse effect of these unnecessary screenings may result in increased health care dollars, resource abuse, and false alarms.

Screening Among Chinese Women

According to U.S. Census data (U.S. Census Bureau, 2000), Chinese compose the largest subgroup (25 percent) of the Asian American population. However, the cancer screening needs of women within this group have largely been ignored by the health care community.

Despite the proven efficacy of Pap testing, screening rates are low among Asian populations in the U.S. The percentage of Asian women living in the U.S., who have had at least one Pap test, ranges from 46 percent to 56 percent (Hiatt et al., 1996; Yi, 1994). In contrast, Hiatt et al. (1996) found that the prevalence of women having at least one Pap test was above 95 percent among whites, blacks, and Latinos. Although a more recent study on Chinese immigrants (Do et al., 2001) showed higher Pap screening prevalence (75 percent), only 60 percent had been screened recently.

According to the CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP), common barriers to Pap test screening reported among women in the U.S. include (CDC, 1998),

- Fear
- Embarrassment
- Cost
- Transportation
- Communication barriers
- Lack of health care provider referral
- Complications with child care
- Lack of time

Whether these reasons are true for Asian women may be unclear because Asians composed only 2 percent to 3 percent of the sample of the NBCCEDP report. In recent years, there have been only a few studies identifying factors hindering Asian women in the U.S. from obtaining a Pap test. While Asian women share some similar concerns as other women, such as access, communication and embarrassment, the few existing studies suggest other barriers are more prominent, such as (Hou, Fernandez, Baumler, & Parcel, 2002; Yi, 1994; Yu et al., 2001),

- Marital status
- Sexual behavior
- Perceived risk
- Gender of health care provider

Marital Status & Sexual Activity

Marital status has been shown to be strongly associated with cervical cancer screening among Asian women (Do et al., 2001; Hou, 2002; Yi, 1994). Compared with women who were never married, currently married women had higher Pap screening adherence. Yi (1994) suggested that unmarried Asian women are less sexually active than unmarried U.S.-born women and, therefore, may not perceive themselves at risk for cervical cancer.

The relationship between marital status and Pap screening may be confounded by women's sexual experience. In fact, qualitative results from Hou's study (2002) indicated a strong relationship between marital status and women's sexual experience (see Table 1). Sexual activity was typically mentioned along with marital status by more than 85 percent (12/14) of the Chinese participants in Hou's study.

Women said that they would get a Pap test after they were married, that is, after they started to engage in sexual activities. Values toward virginity may partially explain the low screening prevalence among unmarried Chinese women. Qualitative data from Hou's study showed common concerns from Chinese women in the pre-contemplation stage (women who had never had a Pap test, and who did not intend to have one in the coming year). For example, one woman said, "I think culturally I want to keep my body as a 'whole.'" In Chinese culture, virginity is an important value before marriage. Several study participants stated, "I feel bad to have a Pap screening if I am not sexually active," or, "Americans begin their sex earlier, and most of them are sexually active before marriage. Therefore, they may not have the same concern."

Study Information—Barriers to Pap Screening Among Chinese Women in Pre-Contemplation Stage—A Qualitative Approach

Purpose:

Identify factors that hinder Chinese women in the pre-contemplation (PC) stage from considering a Pap test (contemplation stage)

Study location:

One of the largest Chinese community churches in Houston, TX

Inclusion criteria:

Chinese women (age 20 years or older) who had never had a Pap test and no intention to obtain a screening in the coming year (pre-contemplation stage)

Sampling strategies:

Criterion sampling, snowball sampling, and theory-based construct sampling

Sample description:

All women who participated in the study were unmarried women, age range 28-36. The final sample consisted of 14 Chinese women. Only two of them reported previous sexual experience

Source. Hou (2002).

Low Perceived Risk

A low perceived risk of getting cervical cancer might also influence Chinese women's screening decisions. This could be due to feeling healthy, no family history or no symptoms. For example, some

women have said, “I don’t have any family history, I don’t feel it (cervical cancer) affects me ...I think that I do not fall into the risk category. I think I am still OK” (Hou, 2002).

Embarrassment

It’s common among women from all cultural and ethnic groups to dislike the supine, legs restrained position common during a vaginal exam and Pap test. Some Chinese women, however, hold a stereotype that American women are more comfortable being naked, and therefore may be less embarrassed by a vaginal exam and the submissive and exposed positions that it requires.

Gender of Physicians

In almost all research among Chinese women, a preference for female physicians for vaginal exams is expressed. Some Chinese women may forgo screening simply because a female provider is not available. This conservative attitude may also be influenced by acculturation. For example, an American-born Chinese girl stated that her mother (Chinese immigrant) would definitely need a female provider to perform the procedure.

This girl, raised in U.S. society, felt more comfortable about seeing a male health care provider, while her mother felt strongly that Pap screening was a very private procedure. Women who strongly identify with Chinese versus American culture have equally strong preferences for female health care providers (Hou, 2002) (See Table 2).

Screening Barriers—Barriers to Pap Screening Among Chinese Women in Pre-Contemplation Stage—A Qualitative Approach

- Low perceived risk
- Embarrassment
- Gender of physicians
- Lack of communication
- Lack of health care access

Source. Hou (2002).

Lack of Communication

Communication regarding Pap screening and sexually related issues is lacking among Chinese culture. “In Chinese culture ... we don’t talk about this at home. Parents would not raise this type of issue I am not comfortable with discussing my body,” one Chinese woman said, expressing very commonly held views. Chinese families seldom encourage female members to have a Pap screening. There is little or no communication about sensitive or embarrassing issues in Chinese society.

Health Care Access

Chinese, as well as other immigrant minorities, may have less access to health care in the U.S. due to language, literacy level and other socioeconomic challenges (Yu, 2001). Chinese women who immigrate to the U.S. are less likely to seek health care services. A lack of Chinese health care providers also limits accessibility for some women: “I was kind of lost in the health care system when I first came to the U.S. I was not familiar with the system or how my insurance would cover my health exams. In China, we can read magazines or newspapers, and from the media we can get health information very easily. While in America, I don’t know where to get health information. And it takes more time to read and understand” (Hou, 2002).

Clinical Implications and Recommendations

As the number of Chinese American women increases in American society, the importance of cancer screening will increase. However, a balance should be achieved between cancer screening promotion and minimization of unnecessary biopsies, false alarms and anxieties. The need to treat cancer early should also be weighed against the need to avoid overtreatment.

Cultural beliefs and attitudes toward cancer have been shown to have great influence on foreign-born women’s screening practices. Therefore, cancer control interventions targeting less acculturated immigrant groups should be based on a thorough understanding of the population. Intervention programs should also target health care providers who serve Chinese and other foreign-born communities.

Previous studies have suggested that health care provider interventions could focus on including information about strategies to help overcome patient-specific barriers, assistance with setting up reminder systems and the provision of linguistically appropriate educational materials (Lee et al., 1999; Yu et al., 2001).

Health care columns in local Chinese newspapers can also serve as an effective strategy for reaching Chinese women and their families. Knowledge of cultural beliefs and attitudes and an understanding of the characteristics of the population (age, distribution, the percentage of foreign-born adults, English fluency, and SES) are vital to the delivery of effective culturally competent nursing care in women’s health and cancer screening settings.

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Stage 2 – Study Instrument Development and Validation



Psychometric Properties of the Cervical Smear Belief Inventory (CSBI) for Chinese Women

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Abstract

This study examines the reliability and validity of the scores of Cervical Smear Belief Inventory (CSBI) among Chinese Women in Taiwan. Women who were non-adherent to cervical screening guidelines were recruited ($N=424$). Reliabilities showed good internal consistency for the perceived Pros, Cons, and Susceptibility scales (α ranged .78 ~ .87). Factor analysis showed good construct validity of the scores of CSBI that revealed concordant patterns with existing social and behavioral theories, except that the Norms scale was loaded with the Pros scale. Moreover, two items in the Cons scale appeared to be “cultural belief toward virginity.” Item-discrimination analysis showed that all items in the CSBI successfully discriminated women with favorable cervical smear beliefs from those with unfavorable beliefs ($p<.001$). In summary, many psychometric properties of the CSBI showed that the scores of the inventory were reliable and valid to assess belief towards cervical smear among Chinese women.

Keywords: Cervical Smear, Chinese Women, Construct Validity, Factor Analysis, Item Discrimination, Reliability

Note

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Introduction

Cervical cancer is the second most common cancer among women worldwide. Although cervical cancer mortality has decreased during the past decades, recent epidemiological data from the U.S. cancer registry (Ries et al., 2000) indicates that cervical cancer disproportionately affects Asian women. Asian women have a higher incidence of cervical cancer (10.2/100,000) as compared to Caucasian women (8.4/100,000). Asian women also have a higher mortality rate of cervical cancer (2.7/100,000) than whites (2.4/100,000).

Although cervical smear tests have been proven to be an effective screening method of detecting cervical cancer at early stage, existing data suggest that Asian women do not have regular screenings. The prevalence of cervical smear among Asian women in the United States ranges from 46% to 52%, as compared to over 90% in other groups (Pham, 1992; Yi, 1994).

Among Chinese women in Taiwan, the few existing studies reported similar low rates of cervical smear test utilization, ranging from 58% to 62% (Hou, Fernandez, Bumler, Parcel, & Chen, 2003; Lee, Kuo, & Chou, 1997; Wang & Lin, 1996). In Taiwan, the National Health Insurance Plan (NHIP, 1996) provides free health care coverage of an annual cervical smear test for women age 30 years and older. Married women under 30 are also entitled to this benefit with a small co-payment. The implementation of NHIP has significantly lowered the cost barrier. Screening utilization might therefore have been improved. However, a recent study on a cervical cancer screening promotion program in Taiwan showed that 70% of the women (656/969) reported not having a cervical smear in the past 12 months (Hou, Fernandez, Baumler, & Parcel, 2002).

Chinese is the largest population subgroup in the world. The world population profile, reported by the U.S. Census Bureau (1998), estimated that the Chinese population comprised one fourth of the world's population. It is important to understand factors influencing cervical smear utilization among this population in order to develop appropriate and effective screening promotion programs. It is also important to develop and validate a Chinese version of the screening instrument so that culturally and linguistically appropriate measurements of screening belief can be obtained.

To date, there are few published articles providing systematic efforts in developing and validating instruments used for measuring cervical smear related belief. Several studies have reported on scale development for mammography screening related belief (Champion & Scott, 1997; Champion, 1995; Rakowski, Fulton, & Feldam, 1993). Rakowski et al. (1997) tried to extend perceived pros and cons from decisional balance constructs to both mammography and cervical smear compliance. Even though some of those scale items may be modified to measure cervical smear related belief, those measures were mostly developed and tested among Western populations. It remains questionable whether they can be applied to a different cultural group such as Chinese.

Hou et al. (2003) recently developed a theory-based Cervical Smear Survey (CSS) in Chinese and pilot-tested the survey among a group of Chinese women in Taiwan (N=125). Although preliminary internal consistency of the scales in the CSS revealed an acceptable Cronbach's alpha range (.68-.88), further revisions and validation of the instrument should be established. Verification of the psychometric properties of the scales should be done in another Chinese population before any firm conclusion can be drawn.

The purpose of this study is to examine the psychometric properties of the Cervical Smear Belief Inventory (CSBI), a modified instrument based on the previous Cervical Smear Survey (CSS) developed by Hou et al. (2003). This report describes the reliability and validity of the scores of CSBI on assessing theory-based constructs related to belief towards cervical smear among Chinese women.

Method

Study Sample

This study was conducted at one of the major teaching hospitals in Taichung, Taiwan. Women, 30 years or older (or younger if married), who had not had a cervical smear in the previous 12 months were recruited in the study. Since most screening promotion programs target at-risk women (those who are not adherent to screening guidelines) when assessing program impact, evaluation of the instrument should be tested and confirmed with a similar population. Female family members of the patients admitted to the hospital during the study period in the fall of 1999 were approached by research staff because they were considered more similar to the general community population than the female patient population. A total of 424 women participated in the study and completed the inventory.

Instrument

The original Cervical Smear Survey (CSS) was designed to represent constructs derived from existing models of health behavior (Hou et al., 2003). Major constructs included the following: (1) positive and negative evaluative beliefs regarding taking part in cervical cancer screening (constructs from the perceived Pros/Cons from the Transtheoretical Model) (Prochaska, Norcross, & DeClemente, 1994), (2) the descriptive Norms which refers to a person's perceptions of other people's behavior and has been found to be an important determinant of health behavior in a number of domains (Sheeran & Orbell, 1999; White, Terry & Hogg, 1994), and (3) the Susceptibility (perceived risk) from the Health Belief Model (Rosenstock, 1974). Some of the CSS items were developed and adopted from existing literatures that provided theory-based measurements; other items were developed from focus groups (N=24) conducted before the pilot study among women in Taiwan (Hou et al., 2003). The CSS instrument consisted of 11 Pros scale items ($\alpha=.88$), 9 Cons scale items ($\alpha=.68$), 4 descriptive Norms scale items ($\alpha=.72$), and 2 Susceptibility items ($\alpha=.68$).

Based on the previous analysis on the CSS and recommendations about survey revisions from Hou et al. (2003), one additional item, "Comparing with other women, my chance of getting cervical cancer is high" was added to the Susceptibility scale. Other items in the survey, especially items in the Cons scale, were re-examined and re-worded by an expert panel to improve clarity and reliability. The modified instrument was then given to a small group of Chinese women to provide feedback on item clarity, reading level, and appropriateness. Comments and additional insights from these women were used to further refine the instrument. Three more items were added into each of the Pros and the Cons scales. The final revised instrument was then named the Cervical Smear Belief Inventory (CSBI).

The four scales of the Chinese CSBI consist of 33 items: (1) perceived Pros of cervical smear (14 items); (2) perceived Cons of cervical smear (12 items); (3) descriptive Norms of cervical smear (4 items); and (4) Susceptibility (perceived risk) to cervical cancer (3 items). These scale items were developed in Eng-

lish, translated into Chinese, and translated back to English. Items on the two English versions were checked for discrepancy of the meaning. For each item, response was rated on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Data analysis

Before data were analyzed using SPSS 11.0 software, the item (Q19) “Getting a cervical smear is not an important thing for me” was reverse-coded because it is a negative expression for the Pros scale. Descriptive statistics and Cronbach’s alpha coefficients were then calculated for each CSBI scale to evaluate these items and the internal consistency of scales.

Exploratory factor analysis was used to assess the construct validity. Scree plot was used to determine the number of factors with significant eigenvalues (Cattell, 1966). Extraction method of principal axis factoring was used, along with squared multiple correlation (SMC) as the initial communality estimate. The SMCs are lower bounds of the communalities (Harman, 1976, p.149). Finally, since the relationships between theoretical constructs were assumed to be independent, varimax rotation was applied to get a clearer structure between factors.

Item-discrimination analysis was conducted to examine whether the scores of inventory discriminated women with favorable belief towards cervical smear (i.e., higher perceived Pros, lower perceived Cons, and higher Susceptibility to cancer) from women with less favorable belief. The sample was divided into two groups based on the score of each scale. Women who scored in the top one third of each scale were compared with women who scored in the bottom one third of that scale. Independent t test was used to compare item means of these two groups for each scale. It should be noted that there were no significant differences between groups on the demographic variables including age, education, and marital status, with all of the p-values greater than .05.

Result

Demographics of the Sample

Table 1 summarized the demographic characteristics of the study sample. The mean age of the women was 33.87 (SD = 8.61), and most of them were married (90%). Forty percent of the women worked full time, and 28% had a college degree or higher.

TABLE 1: DEMOGRAPHIC BACKGROUND OF THE SAMPLE (N=424)

Variable	N (%)
Age	
<30	151 (35.6%)
30-39	180 (42.5%)
40-49	66 (15.6%)
>50	27 (6.4%)
Marital Status	
Single	46 (10.8%)
Married	378 (89.2%)
Employment	
Full-time	169 (39.9%)
Part-time	89 (21%)
Housewives	166 (39.2%)
Education	
<Elementary	48 (11.3%)
Junior high	71 (16.7%)
High school	188 (44.3%)
>College	117 (27.6%)
Prior Screening	
No	176 (41.5%)
Yes (more than 12 months ago)	248 (58.5%)
Intention of a Pap in the next year	
Yes	266 (62.7%)
No	158 (37.3%)

Internal Consistency

Item mean, standard deviations, corrected item-total correlations (CITC), and “Cronbach’s Alpha coefficients if deleted” for each item were presented in Table 2. For each scale, items with discrimination (corrected item-total correlation, or CITC) less than .20 were re-evaluated for their appropriateness. The analysis showed two items (Q₉ and Q₂₂) had low CITC (<.20): “My partner / husband would not want me to have a cervical smear” (Q₉), and “I would feel more comfortable to obtain a cervical smear if a female doctor performs the procedure” (Q₂₂). These two items also showed low item-total correlation with other items in the correlation matrix (data not shown). Moreover, Cronbach’s alpha coefficient increased from .78 to .81 after removing these two items from the Cons scale. Internal reliabilities (Cronbach’s alpha) for the perceived Pros, Cons, Norms, and Susceptibility scales were .87, .81, .63 and .80 respectively.

Descriptive Statistics of the Scales

Among all the scales, the perceived Pros (14 items) had the largest scale mean (58.22) and the smallest standard deviation (5.68). The data indicated that women's belief related to perceive Pros was not only very positive but also homogeneous among these women. However, the overall perceived barriers to a cervical smear were somewhat medium in the Cons scale (scale mean=27.65, SD=6.16, 10 items). Data of the Cons scale showed higher variations than the Pros scale among Chinese women who had not had a cervical smear in the past 12 months. The scale mean (SD) for descriptive Norms (4 items) and Susceptibility (3 items) were 15.69 (1.95) and 8.49 (2.11), respectively.

TABLE 2: ITEM MEANS, STANDARD DEVIATIONS, CORRECTED ITEM-TOTAL CORRELATION (CITC), AND ALPHA COEFFICIENTS IF ITEM DELETED FOR EACH CSBI SCALE (N=424)

Note: "Risk" means "susceptibility" scale.
 * Item was removed from factor analysis.

Item	Item Description	Mean (SD)	CITC	Alpha if item deleted
Pros				
Q2	A cervical smear can find a problem before it develops into cancer.	4.00 (0.70)	0.34	0.87
Q4	A cervical smear can find cancer at a point when it is likely to be cured.	4.02 (0.70)	0.31	0.87
Q6	The cervical smear procedure is very simple and quick.	4.04 (0.68)	0.50	0.86
Q7	Regular cervical smear test gives me peace of mind about my health.	4.21 (0.62)	0.59	0.86
Q8	Having a cervical smear every year gives me a feeling of control over my health.	4.21 (0.60)	0.63	0.86
Q10	My family will think that I take care of myself if I have annual cervical smears.	4.14 (0.68)	0.61	0.86
Q11	My partner/husband will support me if I want to have a cervical smear.	4.29 (0.73)	0.51	0.86
Q12	I am willing to obtain a cervical smear for health reason.	4.27 (0.59)	0.67	0.85
Q13	I can encourage my friends to have a cervical smear if I do it myself.	4.22 (0.61)	0.64	0.85
Q14	I feel having annual cervical smear is a way to show I take care of my family.	4.21 (0.67)	0.63	0.85
Q15	I want to have a cervical smear because I need to take care of my family.	4.17 (0.70)	0.54	0.86
Q16	Cervical cancer in the early stage has high chance to be cured.	4.11 (0.72)	0.42	0.87
Q19r	Getting a cervical smear is not an important thing for me (reverse coded).	4.03 (0.76)	0.47	0.86
Q21	The early a cervical cancer is detected, the higher chance of a cure.	4.31 (0.54)	0.64	0.86
Cons				
Q1	I feel cervical cancer smear hurts.	2.48 (0.90)	0.37	0.76
Q3	I feel embarrassed to have a cervical smear.	2.82 (1.13)	0.55	0.74
Q5	A cervical smear test makes me nervous.	3.24 (1.08)	0.51	0.75
Q9	My partner/husband would not want me to have a cervical smear.	2.48 (1.41)	0.17*	0.80
Q17	I do not have time for a cervical smear test.	2.41 (0.93)	0.43	0.76
Q18	It is too much trouble for me to obtain a cervical smear test.	2.31 (0.84)	0.61	0.74
Q20	I feel uncomfortable if a male doctor exam me.	3.06 (1.12)	0.50	0.75
Q22	I feel more comfortable to have a smear if a female doctor performs the procedure.	4.06 (0.85)	0.07*	0.79
Q23	I would only have cervical smears if I got reminders from my doctor.	2.70 (0.98)	0.59	0.74
Q24	I would not have a smear unless I had some vagina symptoms or discomfort.	2.57 (0.99)	0.58	0.74

Item	Item Description	Mean (SD)	CITC	Alpha if item deleted
Q25	I will not have a cervical smear if I am not sexually active.	3.06 (1.04)	0.33	0.77
Q26	I will not have a cervical smear if I am not married.	3.03 (1.03)	0.36	0.76
Norm				
Q27	Cervical smear is now a very routine medical test.	4.08 (0.62)	0.31	0.62
Q29	Other women in my age obtain a cervical smear regularly.	3.58 (0.82)	0.40	0.56
Q30	All women should have regular cervical smears.	4.25 (0.59)	0.48	0.51
Q32	People I know think cervical smear is very important.	3.78 (0.79)	0.46	0.51
Risk				
Q28	I feel my chance of getting cervical cancer is high.	2.72 (0.81)	0.62	0.76
Q21	I might get cervical cancer at some point during my life.	3.06 (0.89)	0.60	0.79
Q33	Comparing with other women, my chance of getting cervical cancer is high.	2.71 (0.78)	0.74	0.64

Construct Validity

After the internal consistency analysis, the data, without Q9 and Q22, were subjected to exploratory factor analysis. An examination of the Scree plot (Figure 1) for the eigenvalues of the correlation matrix, together with an inspection of the coefficients of the first four components, showed a four-factor solution. The first few eigenvalues dropped precipitously, and after the fourth, a gradual linear decline set in. Four factors extracted by the principle axis factoring method were then obtained. The resulting factor structure (not shown) indicated that the items corresponded very closely with the intended scales. All the factor loadings associated with the theoretical constructs were greater than .3, which were considered meaningful to the factor (Nunnally, 1994). The only discrepancy between the observed data and intended construct was revealed among four items (Q27, Q29, Q30, Q32). These four items, which were supposed to measure descriptive Norms, were all collapsed with Factor I.

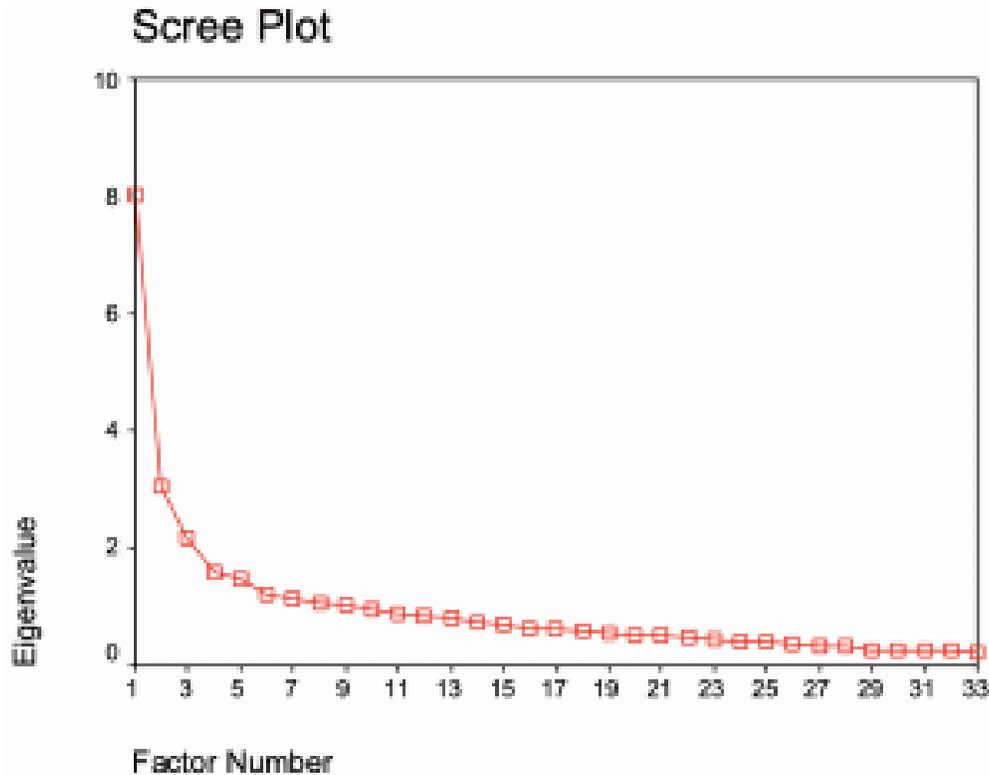


Figure 1: Scree Plot of the CSBI data

The result with a clearer structure was obtained using Varimax rotation (Table 3). The variances explained after rotation for Factor I to IV were 19%, 10%, 6% and 5%, respectively. Factor I was relatively a dominant factor to the other three factors. The 14 items in the perceived Pros scale were clustered as Factor I, along with Q₂₇, Q₂₉, Q₃₀, and Q₃₂. Eight out of ten items in the perceived Cons scale were clustered as Factor II. The four items of the Susceptibility scale were clustered as Factor III. Finally, Q₂₅ and Q₂₆, which were supposed to belong to the Cons scale, formed Factor IV. Based on the intended theoretical constructs designed in the inventory, Factor I was named as “perceived Pros”, Factor II “perceived Cons”, and Factor III “Susceptibility.” These three factors consisted of the intended structure of respective scales. It should be noted that Q₂₅ (“I will not have a cervical smear if I am not sexually active”) and Q₂₆ (“I will not have a cervical smear if I am not married”) were developed based on data from the focus group interview in the pilot study. Results showed that these two items were independent from other items. This was possibly due to the cultural value towards virginity among the Chinese female population. Therefore, the two items, loaded in Factor IV, were labeled as “cultural belief towards virginity.”

It should also be noted that the results obtained after the Varimax rotation showed some items were loaded on both Factor I and Factor II (Q₁₂, Q₁₇, Q₁₈, and Q₂₄). Data showed if these items were loaded to Factor I with positive values, it would also have a negative loading on Factor II, and vice versa. Women who agreed highly on Q₁₂ (“willing to obtain a cervical smear for health reasons”) may also perceive less barriers of obtaining a screening. On the other hand, those who perceive no time (Q₁₇) or too much trouble of getting a cervical smear (Q₁₈) may perceive less benefits of a screening. In addition, if women experienced vaginal discomfort (Q₂₄), they tended to perceive more benefit of getting a

cervical smear.

TABLE 3. ROTATED FACTOR STRUCTURE FOR THE CSBI SCALE ITEMS (N=424)

Note: The loadings less than 0.30 were not shown in the table.

Scale	Item #	Factor I	Factor II	Factor III	Factor IV
Pros	Q2	0.37			
	Q4	0.36			
	Q6	0.52			
	Q7	0.60			
	Q8	0.66			
	Q10	0.67			
	Q11	0.51			
	Q12	0.67		-0.31	
	Q13	0.67			
	Q14	0.67			
	Q15	0.58			
	Q16	0.44			
	Q19r	0.48			
	Q21	0.67			
	Norms	Q27	0.43		
Q29		0.37			
Q30		0.67			
Q32		0.38			
Cons	Q1		0.46		
	Q3		0.67		
	Q5		0.66		
	Q17	-0.38	0.41		
	Q18	-0.41	0.63		
	Q20		0.62		
	Q23		0.51		
	Q24	-0.30	0.47		
(Cultural belief)	Q25				0.76
	Q26				0.82
Susceptibility	Q28			0.72	
	Q31			0.68	
	Q33			0.88	
Eigenvalues		6.03	3.18	1.83	1.6
Variance explained (%)		19.44%	10.26%	5.9%	5.2%

Discriminate Validity

Item-discrimination analysis was examined by comparing item means between women who scored in the top one third and those who scored in the bottom one third in each scale. Table 4 shows that all of the items in the Pros, Cons, and Susceptibility scales had significant discriminate validity ($p < .001$), which indicated that the CSBI successfully discriminated women with favorable belief towards cervical smear from those with less favorable belief. A previous pilot study using CSS found that women reporting previous cervical smear(s) scored higher on perceived Pros, lower on perceived Cons, as well as higher on perceived Norms about cervical smear than women who reported never had a cervical smear. Therefore, previous study results had provided good indications that the instrument discriminated those who have had a screen from those who have not.

TABLE 4: ITEM-DISCRIMINATION ANALYSIS BETWEEN WOMEN WHO SCORED IN THE TOP ONE THIRD (HIGH) AND THOSE IN THE BOTTOM ONE THIRD (LOW) OF EACH SCALE (PROS, CONS, AND SUSCEPTIBILITY)

Pros Scale					
Item	High Pros group (n=158) (scale mean >60)		Low Pros group (n=130) (scale mean <55)		t score
	Item Mean	Item SD	Item Mean	Item SD	
Q2	4.56	0.72	3.62	0.67	-7.35*
Q4	4.27	0.82	3.65	0.62	-7.29*
Q6	4.46	0.61	3.67	0.69	-10.26*
Q7	4.63	0.55	3.76	0.51	-13.98*
Q8	4.67	0.51	3.79	0.57	-13.83*
Q10	4.62	0.58	3.67	0.66	-12.95*
Q11	4.81	0.68	3.76	0.54	-14.29*
Q12	4.78	0.43	3.85	0.45	-17.73*
Q13	4.66	0.54	3.79	0.55	-13.54*
Q14	4.71	0.48	3.72	0.66	-14.76*
Q15	4.63	0.69	3.71	0.64	-11.70*
Q16	4.54	0.73	3.68	0.60	-11.09*
Q19r	4.47	0.59	3.54	0.81	-10.92*
Q21	4.76	0.44	3.95	0.38	-16.76*

Cons Scale					
Item	Low Cons group (n=138) (scale mean <24)		High Cons group (n=158) (scale mean >30)		t score
	Item Mean	Item SD	Item Mean	Item SD	
Q1	1.93	0.73	2.92	0.86	-10.63*
Q3	1.92	0.67	3.61	0.94	-18.03*
Q5	2.36	0.95	3.92	0.73	-15.69*
Q17	1.86	0.67	3.00	0.93	-12.17*
Q18	1.75	0.50	2.92	0.92	-13.91*
Q20	2.31	0.89	3.79	0.88	-14.30*
Q23	1.98	0.66	3.43	0.83	-16.77*
Q24	1.88	0.69	3.32	0.85	-16.20*
Q25	2.46	0.97	3.54	0.89	-10.03*
Q26	2.41	0.99	3.54	0.84	-10.65*

*p<0.001

Susceptibility Scale					
Item	High Susceptibility (n=100) (scale mean >10)		Low Susceptibility (n=154) (scale mean <8)		t score
	Item Mean	Item SD	Item Mean	Item SD	
Q28	3.49	0.63	1.97	0.70	-18.05*
Q3	4.01	0.56	2.40	0.93	-17.16*
Q5	3.40	0.65	1.98	0.67	-16.66*

Discussion

This study showed that the scores of CSBI had good internal consistency for the Pros ($\alpha=0.87$), Cons ($\alpha=0.81$), and Susceptibility ($\alpha=0.80$) scales, and reasonable internal consistency for the Norm scale ($\alpha=0.63$).

To obtain a valid assessment, two items (Q9, Q22) with low CITC were not included in the construct validity assessment. Exploratory factor analysis for the remaining 31 items showed that the factor structure of the CSBI items was loaded in a way highly consistent with the intended conceptual theory constructs. Factors I, II, and III corresponded to perceived Pros, Cons, and Susceptibility constructs, respectively. The four items in the Norm scale, however, were collapsed into the Pros scale. Further-

more, Q₂₅ and Q₂₆ were clustered as Factor IV, which was then labeled as “cultural beliefs toward virginity.”

Regarding the perceived Cons scale in the CSBI, the current study suggested Q₉ and Q₂₂, which had low CITC, might need to be revisited in the future. Q₂₂ (preference of female doctor) seems to be the most significant Cons (barrier) that every woman endorsed (mean=4.06, SD=0.85), and Q₉ (“My partner / husband would not want me to have a cervical smear”) showed greatest variation (mean=2.48, SD=1.41). One possible explanation could be that Q₉ measured more of subjective norms of screening (i.e., what women think others think they should do) rather than perceived Cons of screening. Nevertheless, the researchers suspected that barriers were more complex. In Chinese culture, husband is the head of the family and decision maker. If the husband does not encourage or even ignore the importance of having a cervical smear, the wife just won’t do it (Hibbard & Pope, 1987). Thus, future intervention needs to put more efforts on developing effective intervention messages and strategies that address or reduce women’s concerns.

Two items, Q₂₅ (“I will not have a cervical smear if I am not sexually active”) and Q₂₆ (“I will not have a cervical smear if I am not married”) were originally considered part of the Cons scale; however, they were loaded into Factor IV (cultural belief towards virginity). Beliefs about virginity among the female Chinese population could be a cultural issue instead of regular health concerns. Other research also showed that shyness or shamefulness is another barrier women have regards having a smear (Yi, 1998). Therefore, the current study suggested that this factor should be formed as an independent scale to assess the uniqueness of cultural and social influence on women’s screening behavior. Some previous studies also indicated values about virginity might be associated with cervical smear behavior among young Asian women (Hou & Lessick, 2002; Yi, 1998). Since a reliable measure of a construct (Nunnally & Bernstein 1994) should consist of at least 3 items, additional items should be developed in the future to make this factor into a reliable scale.

The study showed that the Norms scale did not cluster as a separate factor. They were, however, loaded with the Pros scale. We suspect that in Chinese culture, people tend to conform to societal norms. Statements related to descriptive norms that describe beliefs about the behavior of the population as a whole, such as beliefs of cervical smear as a routine medical screening or other women like her receive a cervical smear (descriptive Norms), might appear to many Chinese women as an assessment of screening benefits (perceived Pros). Further research should investigate this construct among the Chinese population before any firm conclusion can be made.

In summary, consistent with the theoretical constructs, findings from this study indicated that the scores of the CSBI were reliable and valid for assessing psychosocial beliefs towards cervical smear among Chinese women. The current findings of the CSBI also shed light on the screening issues with respect to Chinese cultural beliefs. Public health programs that aim to address health disparity issues among different ethnic groups should understand how cultural values and beliefs influence the screening practice, and therefore, develop programs using culturally appropriate messages and strategies. This study not only demonstrated the success of developing a theory- and evidence-based tool to assess cervical smear beliefs among Chinese women, but also showed reliable and valid results on the scores of Cervical Smear Belief Inventory (CSBI). In addition, its culturally sensitive measurements on belief towards cervical smear test can greatly raise awareness of specific public health concerns and enhance future program evaluations conducted for similar populations.

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Stage 3 – Quantitative Data Collection and Analyses



Correlates of Cervical Cancer Screening among Women in Taiwan

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Abstract

This study assessed correlates of cervical cancer screening behavior among Chinese women in Taiwan (N=125). Results showed that 30% of the sampled women had never received a Pap test, and that only 58% were adherent to the recommended screening guidelines. Intention to have a Pap test in the coming year was higher among women reporting a recent Pap test (90%) than women reporting no Pap test in last three years (58%). Multiple logistic regression analysis showed significant associations between screening adherence and women's knowledge, perceived pros, cons, and norms of a Pap test. Measurement instrument assessing these factors revealed Cronbach alpha as 0.70 for knowledge scale, 0.88 for pros scale, 0.68 for cons scale, and 0.72 for perceived norms scale. In addition to identify several psychosocial factors associated with Pap test screening, this study also provided a basis for measuring these factors among Chinese women.

Keywords: Pap test screening, psychosocial factors, instrument development, Chinese women

Note

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Background

According to National Institute of Health Consensus Development Panel (NIHCDP, 1996), cervical cancer is the second most common cancer among women worldwide, with approximately 471,000 new cases reported each year. Data obtained from the Cancer Registry in Taiwan (1995) showed that cervical cancer is the leading malignant neoplasm in Taiwan (incidence rate 32.49/100,000), followed by breast cancer (24.37/100,000) and colon cancer (17.22/100,000). About 40% of the women in Taiwan die from cancer and about 10% of all the cancer deaths are due to cervical cancer.

Due to the typically long pre-clinical phase of cervical cancer, screening for early detection is very important. Timely detection and treatment of precancerous cervical lesions identified by Papanicolaou (Pap) screening can reduce the possibility of developing cervical cancer, and is the best method for reducing the incidence and mortality of invasive cervical cancer (NIHCDP, 1996). In the US, regular check-ups and Pap screening have contributed greatly to the 70% decrease in the death rate over the past 50 years (CDC, 1998).

Since there have not been many studies conducted in Taiwan regards women's Pap screening behavior, other studies investigated Asian populations in the US could provide us some useful insights. Despite the proven efficacy of the Pap test, Pap test screening rates are low among Asian populations in the US. The percentage of Asian women living in the US, who having at least one Pap test, ranges from 46% to 56% (Yi, 1994; Pham & McPhee, 1992; Hiatt & Pasick, 1995). In contrast, Hiatt and Pasick found that the prevalence of women having at least one Pap test was 98% among whites and blacks, 97% among Latinos. Among women in Taiwan, the very few existing studies reported the similar low rates of Pap screening utilization as Asian women in the US ranged from 58% to 62% (Wang & Lin, 1996; Lee, Kuo, & Chou, 1997).

The reasons that women do not have regular Pap screening according to the CDC's National Breast and Cervical Cancer Early Detection Program (NBCCEDP), common barriers reported among women in the US including fear, embarrassment, cost, transportation, communication barriers, lack of physician referral, lack of child care, and lack of time. The reasons that Asian women do not go for a Pap screening might be a little bit different because even the Asian population constituted only about 2-3% in the sample of the study. Cultural differences could limit generalization of these barriers to Asian women. In recent years, there have been only a few studies that have identified factors that hinder Asian women in the US from obtaining a Pap test. These studies showed that some of the factors including the same concerns as other women in the US like fear and embarrassment, but others were different which included marital status, age, knowledge, perceived risk, discomfort, and the gender of physicians (Pham & McPhee, 1992; Kelly *et al.*, 1996; Seow *et al.*, 1995; Yi, 1998).

In Taiwan, National Health Insurance Plan (1996) provides free health care coverage for Pap screening to women aged 30 and over. Despite universal coverage for these women, most women do not obtain regular Pap smears. Wang and Lin (1996) examined Pap screening service utilization among women aged 20 and older in Taiwan in 1993. Their data indicated that 40% of the sampled women in Taipei had never had a Pap test. Given the high incidence and mortality rate of cervical cancer in Taiwan, the low screening prevalence, and the availability of an inexpensive screening method, it is important to understand the psychosocial factors that influence women's Pap screening behavior. This paper describes the results from a pilot study conducted in spring, 1999 in Taichung, Taiwan. This study was conducted

to: (a) identify factors associated with Pap test screening behavior, and (b) test the scale reliabilities and refine the preliminary survey instrument.

Materials and Methods

Sample

The study population consisted of a convenience sample of female family members of inpatients who were admitted to one of the major teaching hospitals in Taichung, Taiwan in spring, 1999 (N=125). A self-administered questionnaire, consisting of 73 items, was distributed to 160 women. Female family members of inpatients were asked to return the questionnaire to the nurse's station after they completed the survey. The response rate was 78% (125/160). Those who declined participation gave reasons such as they were not interested or had low literacy level.

Measurement

The survey consisted of items in six major categories: (1) prior screening experience; (2) perceived pros and cons of a Pap test; (3) perceived norms; (4) perceived risk (susceptibility) to cervical cancer; (5) knowledge related to cervical cancer and Pap screening; and (6) demographic variables. The categories described above represent constructs derived from existing models of health behavior. These included perceived pros/cons from the Transtheoretical Model (Prochaska, Norcross, & DeClemente, 1994), perceived norms from the Theory of Planned Behavior (Ajzen & Fishbein, 1980), and perceived risk (susceptibility) from the Health Belief Model (Rosenstock, 1974). Some pros/cons items were adapted from previous studies (Pearlman *et al.*, 97; Rakowski *et al.*, '92, '93, '97), with additional items developed from the focus groups conducted among women in Taiwan. Some of the knowledge items were adapted and translated from unpublished thesis by Huang (1996) from National Taiwan University. The remainder knowledge items, susceptibility and perceived norms items were developed by the principal investigator, based on theories as well as focus group findings obtained from Chinese women. Scale items were developed in English, translated into Chinese, and back translated. Items on the two English versions were checked for discrepancies of meaning.

Methods

Prior to administer the pilot survey, three focus groups were conducted to ensure the appropriateness of the content as well as to validate the specific constructs selected in the preliminary questionnaire. Participants of the focus groups were recruited from churches and community centers in Taichung, Taiwan through local community contact persons (N=24). A semi-structured focus group protocol with open-ended and probing questions was used to explore potential behavior and environmental factors that might influence Pap screening behavior in this particular population. Potential intervention ideas were also collected. Focus groups were used because of the method's unique advantage of generating data from group interaction rather than obtaining information produced merely from individual interviews (Krueger, 1994). Appropriate revisions of the survey items were made, and four new items of perceived pros and two new items of perceived cons were added in the questionnaire based on the feedback from the focus group before the pilot survey was conducted. The final version

of the pilot survey instrument consisted of 11 pros scale items, 11 cons scale items, 4 perceived norms scale items, 2 perceived risk items, and 17 knowledge scale items.

Scoring of the scales

The items making up the perceived pros/cons, perceived norms, and susceptibility scales were 5-point Likert scale items. Item responses ranged from 1 (strongly disagree) to 5 (strongly agree). The total score calculated for each particular scale was the sum of the item scores in that scale. Knowledge scale items were scored one (1) if answered correctly, and were scored zero (0) when answered wrong, or when the response was “do not know.” A total of 16 items were included in the final knowledge scale analysis. One knowledge item was excluded from the scale analysis because almost every woman answered it correctly. The possible range for the knowledge scale was from 0 to 16.

Data Analysis

Outcome of interest in the study was Pap test adherence, defined as women who had their Pap screenings within the past three years. Women who had never had a Pap test, had not had one in the past three years, or could not remember when their last Pap test was, were classified as non-adherent. Categorical variables were analyzed by cross-tabulations using chi-square statistics. Continuous variables were analyzed using t-tests in two-group comparisons. Univariate analyses were conducted to examine the effects of demographic variables on screening behavior. Variables with significant associations ($p < 0.05$) were included in the multivariate model. Logistic regression modeling was used to analyze the effect of each factor on screening participation, after adjusting for the confounding variables.

Results

Sample Characteristics

A total of 125 women completed the pilot survey. The mean age was 37.93 (SD=10.45). Most women in the sample were married (90%). About 62% of the women worked full time, and 32% of the women had college education level or higher. Table 1 describes demographics of women who participated in the study according to their screening adherence. There were no significant differences between adherent and non-adherent women in age, employment status, or education. Women in both groups showed similar distribution on most demographic characteristics. Marital status was the only variable that showed significant association with Pap screening adherence. A higher proportion of married women (62%) reported a Pap test within the preceding 3 years, as compared to non-married women (31%).

TABLE 1. DEMOGRAPHICS OF THE SAMPLED WOMEN

Age was analyzed by t test; marital status, employment, and education were analyzed by chi-square tests.

Variable	Adherent	Nonadherent	Total	P-value
Age				
<30	12 (16.44%)	14 (26.92%)	26 (20.80%)	0.627
30-39	30 (41.10%)	17 (32.69%)	47 (37.60%)	
40-49	22 (30.13%)	10 (19.23%)	32 (25.60%)	
≥50	9 (12.33%)	11 (21.16%)	20 (16.00%)	
Total	73 (100%)	52 (100%)	125 (100%)	
Marital				
Never been married	4 (5.48%)	9 (17.31%)	13 (10.4%)	0.033*
Ever been married	69 (94.52%)	43 (82.69%)	112 (89.6%)	
Total	73 (100%)	52 (100%)	125 (100%)	
Employment				
Full Time	47 (64.4%)	31 (59.6%)	78 (62.4%)	0.769
Part Time	7 (9.6%)	7 (13.5%)	14 (11.2%)	
Housewives	19 (26%)	14 (26.9%)	33 (26.4%)	
Total	73 (100%)	52 (100%)	125 (100%)	
Education				
Elementary or lower	14 (19.2%)	10 (19.2%)	24 (19.2%)	0.845
Junior high school	15 (12.3%)	4 (7.7%)	13 (10.4%)	
High School	28 (38.4%)	20 (38.5%)	48 (38.4%)	
College or higher	22 (30.1%)	18 (34.6%)	40 (32%)	
Total	73 (100%)	52 (100%)	125 (100%)	

Scale Reliability

Internal consistency reliability was calculated for the pros, cons, norms, and perceived risk scales. Items with discrimination (corrected-item-total correlation CITC) less than 0.2 were re-evaluated for their appropriateness. Items with low correlation within the scale and not considered crucial to the scale construct were removed from scale analysis. Both internal consistency and item difficulty (mean) were used to evaluate knowledge scale items. Item means that fell in the range of 0.3-0.7 were considered moderately difficult items (Nunnally & Bernstein, 1994). A summary of the reliabilities of the original and revised scales is presented in Table 2.

PROS SCALE

All the CITC of the 11 items in the pros scale fell between 0.3-0.7 indicating that all of the pros items

showed sufficient correlation with other items in the same scale. The Cronbach alpha for the pros scale indicated reliable internal consistency ($\alpha=0.8751$).

CONS SCALE

After the original cons scale was reviewed (11 items, Cronbach alpha=0.6604), two items, “cancer treatment is worse than the cancer itself” and “I would rather not know if I had cancer,” were dropped from the scale analysis. Data also showed both items had low CITC (<0.2), indicating these two items had low correlation with other cons items. It was determined that although these two items may represent barriers to screening, they were not specific “costs” or “cons” of a Pap test itself. Although the item “I would feel more comfortable to obtain a Pap if a female doctor does the procedure” had a low CITC and the internal consistency (α) would increase if this item were deleted, the question was considered an important aspect that could influence a woman’s Pap screening behavior, and was therefore retained. The revised cons scale included 9 items with Chronbach alpha as 0.6817.

NORMS SCALE

All the CITC of the items in the norms scale fell between 0.3-0.7. Analysis results indicated all the norm items were appropriate and showed high correlation within the scale. The Cronbach alpha for the norm scale was 0.7158 (Table 2).

SUSCEPTIBILITY ITEMS

Items in the survey related to perceive susceptibility included “I might get cervical cancer at some point during my life,” and “I feel that my chance of getting cervical cancer is high.” Although there were only two items measuring perceived susceptibility of cervical cancer, the Cronbach alpha was acceptable (0.6849).

KNOWLEDGE SCALE

The original knowledge scale contained 17 items ($\alpha=0.6971$). After the scale was re-evaluated, the item “Cervical cancer can be detected early with Pap screenings” was removed because it had a negative CITC. Additionally, since 99% of the women answered this item correctly (mean=0.99), it did not add to the scale’s ability to discriminate between low and high levels of knowledge. Items “Women who are post-menopausal still need a Pap test” and “A Pap test screening only finds problems when they are too far away to be treated” were re-visited because they had CITC less than 0.2. Although the former item was negatively correlated with five items, the strengths of the correlation were very small. Both of these items were considered important knowledge that could influence women’s Pap screening behavior. Keeping the two items in the scale did not compromise the internal consistency significantly. The remaining items showed sufficient correlation with other items in the knowledge scale (CITC >0.2). The final revision of the knowledge scale consisted of 16 items with one item removed from the original scale ($\alpha=0.7010$).

TABLE 2. RELIABILITY OF THE PROS, CONS, NORMS, PERCEIVED RISK, AND KNOWLEDGE SCALES

Scales	Number of items in original scale	Original scale Chronbach α	Number of items in revised scale	Revised scale Chronbach α
Pros	11	0.8751	No revision was made	
Cons	11	0.6604	9	0.6817
Norms	4	0.7158	No revision was made	
Perceived Risk	2	0.6849	Add more items in the future	
Knowledge	17	0.6971	16	0.7010

KNOWLEDGE SCALE ITEM DIFFICULTY ANALYSIS

Of the 17 knowledge items, 12 (70%) had a mean between 0.8-0.9, indicating that the sampled women answered the majority of the questions on the knowledge scale correctly. The remaining 5 items showed moderate difficulty, with item means between 0.4-0.6. Table 3 lists the item means (item difficulty) and standard deviation for each knowledge item. The knowledge scale was considered relatively easy for the sampled women in Taiwan because it mixed 70% easy and 30% moderately difficult items.

TABLE 3. ITEM DIFFICULTY ANALYSIS OF THE KNOWLEDGE SCALE

Item	Mean (% Correct)	SD
Q42. Cervical cancer is the most common cancer among women in Taiwan.	0.904	0.2958
Q43. People having sex without condoms have higher risk of getting cervical cancer.	0.504	0.502
Q44. Pap screening is done through drawing your blood sample.	0.888	0.3166
Q45. Women who are postmenopausal do not need Pap screenings.	0.88	0.3263
Q47. If you have early stage cervical cancer, you will feel pain.	0.536	0.5007
Q48. Women who do not have regular Pap screenings are more likely to have advanced cervical cancer when they were diagnosed.	0.624	0.4863
Q49. After women stop having children, they do not need Pap smears.	0.936	0.2457
Q50. A Pap is most helpful when you have one every year or two.	0.936	0.2457
Q51. Healthy adult women should have Pap screenings every year.	0.944	0.2308
Q52. A Pap is not important for a woman at my age.	0.936	0.2457
Q53. Only women who have had many sex partners need to get a Pap.	0.928	0.2595
Q54. A Pap screening only finds problems when they are too far along to be treated.	0.408	0.4934
Q55. A Pap screening is necessary even if there is no family history of cancer.	0.92	0.2724
Q56. Once I have a negative Pap, I do not need to have any more.	0.952	0.2146
Q57. I need a Pap smear only when I experience vaginal bleeding other than menstruation.	0.92	0.2724
Q58. A Pap smear exam is the same as a cervix biopsy.	0.592	0.4934

PRIOR PAP SCREENING BEHAVIOR AND INTENTION TO HAVE A PAP TEST IN THE COMING YEAR

Seventy percent of the women (88/125) in the sample reported they had previously had a Pap test in the last three years. Among these women, 60% (53/88) reported they had one Pap test in the last year, and 23% (20/88) reported they had one Pap test in the preceding 1-3 years. The mean number of prior Pap tests obtained was 2.42 among women had previous Pap tests. Fifty-eight percent of all the sampled women (73/125) were adherent to the Pap screening guidelines (women who had their Pap screenings within the past three years).

Intention to have a Pap test in the coming year was 76% (95/125) among all the women in the study (Table 4). A higher proportion of adherent women reported an intention to have a Pap test in the coming year compared with women in the non-adherent group. Almost 90% (65/73) of the adherent women reported that they intended to have a Pap, while only 58% (30/52) of the non-adherent women showed the intention ($p=0.000$).

TABLE 4. PRIOR PAP SCREENING BEHAVIOR

	N (%)		
Pap Screening			
Never	37 (29.6%)		
Ever	88 (70.4%)		
– Within 1 year	53 (60.2%)		
– Between 1-3 years	20 (22.7%)		
– More than 3 years ago	8 (9.1%)		
– Don't remember	7 (7.9%)		
Total	125 (100%)		
	Nonadherent	Adherent	Total
Intention of Pap in coming year			
Yes	30 (57.7%)	65 (89%)	95 (76%)
No	22 (42.3%)	8 (11%)	30 (24%)
Total	52 (100%)	73 (100%)	125 (100%)

UNIVARIATE ANALYSIS

The knowledge scale mean was 13.25 among adherent women and 12.19 among non-adherents. The mean score of each knowledge item was 0.83 (item mean = scale mean/scale item = 13.25/16) among adherent women and 0.76 among non-adherents. Adherent women had a significantly higher knowledge score than non-adherents ($p=0.025$) (Table 5).

TABLE 5. SUMMARY OF SCALE STATISTICS (N=125)

Scale	Number of Items	Scale Mean (SD)	Scale Min-Max	P-Value (t test)
Knowledge				
Adherent		13.25 (1.93)		
Nonadherent	16	12.19 (2.90)	3-16	0.025*
All Women		12.81 (2.43)		
Pros				
Adherent		47.37 (4.46)		
Nonadherent	11	45.44 (6.37)	30-55	0.069
All women		46.57 (5.39)		
Cons				
Adherent		25.65 (4.8)		
Nonadherent	9	28.76 (5.27)	17-38	0.001*
All women		26.96 (5.22)		
Norms				
Adherent		16.32 (2.15)		
Nonadherent	4	15.48 (2.16)	11-20	0.035*
All women		15.97 (2.18)		

The mean score on the Pros scale (positive aspects of a Pap test) was 46.57 (11 items) among all the sampled women, with scale range between 30-55. Women's average endorsement level of each pros item was 4.2. Although the difference was not significant between adherent and non-adherent women, it approached significance ($p=0.069$).

The mean score on the cons scale (negative aspects of a Pap test) was 25.65 (9 items) among adherents and 28.76 among non-adherents, with scale range between 17-38 ($p=0.001$). Women who were non-adherent to Pap test screening tended to perceive more negative aspects of obtaining a Pap test than adherent women.

The mean score on the norm scale (4 items) differed significantly between adherents (scale mean=16.32) and non-adherents (scale mean=15.48) as well ($p=0.035$). Women's average endorsement level of each norm item was 4.08 among the adherent group and 3.87 among the non-adherent group. Women who adhered to screening guidelines, on average, rated "agree" or "strongly agree" on norm items; while women who were non-adherent to Pap test screening often chose the responses of "not sure" or "agree".

LOGISTIC REGRESSION ANALYSIS

Multiple logistic regression models were used to assess the relationships between independent variables (constructs) and screening behavior (adherent versus non-adherent). The analysis included marital status as a covariable since it showed a significant association with Pap screening behavior in the

univariate analysis. The analysis revealed significant associations between knowledge, perceived pros, cons, and norms with women's Pap screening behavior (Table 6).

Although the univariate analysis of pros scale did not show a significant association with Pap screening behavior ($p=0.069$), after marital status was added to the regression model, the association became significant ($p=0.041$). The adjusted odds ratio (OR) was 1.0781 [95% CI (1.0031, 1.1588)].

The cons scale showed significant association with screening status in the univariate analysis. After adjusted for marital status, the association is even stronger ($p=0.0009$). The OR was 0.8713 [95% CI (0.8034, 0.9045)].

Both norms and knowledge scales were strongly associated with women's adherence in screening. After adjusted for marital status, the associations were even stronger. Adherent women tended to score higher on the norms scale than non-participants [OR (95%CI): 1.2465 (1.0376, 1.4975)]. They also had higher knowledge levels than non-adherent women ($p=0.017$); the adjusted OR was 1.1445 [95% CI (1.0354, 1.4246)].

TABLE 6. MULTIPLE LOGISTIC REGRESSION: EFFECT OF EACH FACTOR ON SCREENING ADHERENCE, ADJUSTED FOR MARITAL STATUS

P value: p value of Wald F test.			
Scales	Odds Ratio	95% Confidence Interval	P value
Pros	1.0781	(1.0031, 1.1588)	0.0410*
Cons	0.8713	(0.8034, 0.9450)	0.0009*
Norm	1.2465	(1.0376, 1.4975)	0.0186*
Knowledge	1.1445	(1.0102, 1.2967)	0.0340*

Discussion

All the scales used in this pilot study reveal acceptable reliability with Cronbach alpha 0.7 or greater. The cons scale had the lowest internal consistency. Additional items should be developed to strengthen the scale. Some of the existing items should be reworded. For example, the item "I would feel more comfortable to obtain a Pap if a female doctor does the procedure" should be revised so that it represents a con statement (i.e. I would not want a male doctor to examine me).

This pilot study showed that 30% of the women had never had a Pap. Wang and Lin (1996) surveyed women in Taipei in 1993, and found that 40% of the sampled women had never had a Pap. The prior study was conducted 6 years ago. The difference may be due to the increases in accessibility of the Pap test through universal coverage of health insurance in Taiwan since 1996. Still, 30% represents a large proportion of women who had not been screened regularly.

These pilot data indicated that screening adherent rate was 58%. Other studies have found lower rates (Lee & Chou, 1997). According to the recorded data of Health Department in Taiwan, the Pap test

adherent rate is expected to be 64% by year 2001. A larger study is required to determine the true rate of screening among a representative sample of women in Taiwan.

Our results indicated that women's intention to have a Pap test was strongly associated with their screening status. That was, intention to obtain a Pap in the coming year was significantly higher among women who adhered to screening guideline than women did not. This association is consistent with the Theory of Reasoned Action (Ajzen & Fishbein, 1980), which emphasizes the role of intention in health behavior. Although the direction of the relationship between intention and screening behavior was not explained, preliminary results indicated that future interventions designed to influence women's intention to have a Pap test could have an impact on screening behavior.

Marital status was the only demographic factor that was significantly associated with women's compliance with Pap screening. Similar findings were reported in Yi's (1998) study. Women who had never been married were less likely than currently and previously married women to have had a Pap. It is possible that Chinese women, regardless of their age, believe that Pap test screening is necessary or appropriate only if they are or have been married. A comment from one of the participants illustrates the feelings of a number of women who participated in the focus group: "... age was not an issue, if I got married, I would have a Pap".

Another possible explanation regarding the influence of marital status on screening behavior could be that most unmarried women may be less sexually active than married women, and thus less comfortable being exposed or physically touched by others, especially body areas considered private. Some of the unmarried women in the focus groups said, "I feel very uncomfortable.... I think the procedure intimidates me. It is invasive, it is private, and it is personal...". Many of the unmarried women thought they might feel more comfortable of being exposed after they get married or being sexually active. Although some of the married women expressed similar concerns about being exposed, most married women indicated lack of time or lack of reminder was their major barriers.

Most unmarried women thought Pap screening was only necessary for married or sexually active women. Some women from the focus groups stated the following: "I am not married, and I am not sexually active, so I don't think I need a Pap screening". "Pap screening is something that I would avoid till I get married. I won't obtain a Pap if I am not sexually active".

The results of the qualitative and quantitative analyses indicated that screening behavior might be influenced by women's marital status or the sexuality beliefs. Many of the unmarried women in the focus group made statements such as the following, "I want to keep my body as a whole. Especially in Chinese culture, we tend to view this as a very important thing ". Several women even brought up the issue that many doctors are usually unwilling to perform a Pap screening for women who are not sexually active because the doctors are afraid of being sued by women's parents. Similar culture values were found among Vietnamese women in the US (Yi, 1994). Within the Asian culture, virginity is highly valued and could influence a woman's social status as well as her own self-esteem. The results of this study underscore the importance of considering cultural beliefs when designing interventions for cervical cancer screening among this population.

Most women participating in this study had a high level of knowledge related to Pap screening. Nevertheless, knowledge levels were significantly higher among adherent women than non-adherents. A

significant association between knowledge and Pap screening was also found in a previous study conducted among Chinese women (Lee & Chou, 1997).

Women adhered to Pap screening guidelines tended to have higher endorsement on their perceptions of the benefits (pros) of Pap screening than non-adherent women. The result indicated that there is a relationship between endorsement of benefits of Pap test and screening compliance. This finding suggests that interventions should include approaches aim at increasing perception of benefits to Pap test screening.

Scores on the items representing “cons” (disadvantages) of a Pap test were lower for adherent women than non-adherents. Intervention efforts should focus on decreasing perceptions of disadvantages of Pap (such as embarrassment, discomfort, nervousness, culture belief of sexuality, gender of physician, lack of doctor’s reminder, and etc.), and increasing perceptions of benefits of a Pap test.

Perceived norms were also significantly associated with women’s adherence in screening. Perceived norms combines the normative belief concerned with approval or disapproval of a person’s behavior by a referent other, and motivation to comply with the referent’s idea for one’s behavior (Ajzen & Fishbein, 1980). Adherent women perceived higher norms of Pap screening compared with non-adherent women in this pilot study. The result also consisted with Gotay’s study (1998), suggesting that intervention should address women’s perceptions about other women’s behavior and attitudes regards Pap screening in order to improve screening adherence.

Limitations

One of the limitations in the study is the recruitment of the sample population as well as the small sample size. Since all the women voluntarily agreed to participate in the study, volunteer bias may exist. Study participants were recruited from female family members of inpatients who admitted to the hospital during the data collection period. Since women were obtained from a hospital setting, it is possible that these women were more familiar with the health care system than women in the general population. These women may be different in that they were more open to health related information or may be more likely to have ever been screened. The small number of the women in the sample could affects power to detect differences between groups, limits the sample representatives, and affects generalizability as well.

Similar to many other studies, this study relies on self-reported Pap test screening and might not reflect actual behavior. Since women could receive care from a wide variety of health care facilities in Taiwan, validation through medical record data of their self-reports of screening behavior was not feasible. Still, evidence suggests that self-report for Pap test is valid (Suarez, Goldman, & Weiss, 1995). It is possible that social desirability bias could exist in self-reported screening behavior (Hancock, Sanson-Fisher, & Kentish, 1998). Self-report measurement might result in classifying some non-adherent women incorrectly thus over estimating the numbers of women in adherent group. The possibility of classifying adherent women into non-adherent group was low. Previous research has shown that, when women reported they had not had a Pap test within a certain period, the majority was accurate (95%) (Walter *et al.*, 1988). Since women in the adherent group consisted of some non-adherents, the actual difference between the two-group comparisons should be larger than the study results showed.

This survey only contained two items that measured women's perceived risk of getting cervical cancer. Since a reliable measure of a construct, suggested by Nunnally and Bernstein (1994), should consist of at least 3 items. More items on measuring perceived risk should be developed to make perceived susceptibility into a more reliable scale.

Another limitation of this study is the design of the study. The cross-sectional survey design restricted the interpretations of the directionality of the relationships between the independent variables and the screening behavior. Screening may influence attitudes rather than via versa. For example, women who were recently screened (adherent women) might be more likely to report higher perceived norms or higher knowledge than those non-adherent women.

In summary, this pilot study provides an important foundation to measure psychosocial factors that may be associated with Pap screening behavior among Chinese women. Larger studies are required to further examining the relationships between Pap screening behavior and these factors. Findings from this study would help define the approach for further needs assessment, correlates measurement, as well as intervention development for women in this specific population.

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PHASE II — INTERVENTION
DEVELOPMENT AND
PRE-TESTING USING
INTERVENTION MAPPING
FRAMEWORK

Development of a cervical cancer educational program for Chinese women using Intervention Mapping



Development of a Cervical Cancer Educational Program for Chinese Women Using Intervention Mapping

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Abstract

This article describes the development of a program to increase Pap screening behavior among women in Taiwan. Intervention mapping, an innovative process of intervention design, guided the development of this program. The development process included a needs assessment identifying factors influencing Pap screening behavior relevant to Chinese women. The program used methods such as information transmission, modeling, persuasion, and facilitation. Strategies included direct mail communication, role-model stories and testimonials, and a telephone-counseling component. The delineation of specific plans for implementation and evaluation are also described.

Keywords: Pap screening behavior; intervention mapping; program development; Chinese women

Note

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Introduction

In Taiwan, the National Health Insurance Plan (implemented in 1996) provides free health care coverage for Pap screening for women aged 30 and older. Despite universal coverage, most women do not obtain regular Pap smears. A 1990 study that surveyed women in Taiwan found that about 70% (689 of 990) of women age 30 to 64 did not have regular Pap test screenings (Lee, Kuo, Chen, Chen, & Chou, 1997). A recent study in Taiwan showed that about 30% (37 of 125) of women had never received a Pap test and that 58% (72 of 125) were nonadherent to the recommended screening guidelines (Hou, Fernandez, Parcel, & Chen, 2003). There are a few studies that have applied constructs from various social and behavioral science theories to guide the needs assessment and development of an intervention for cervical cancer screening (Dignan, 1994; Earp, Altpeter, & Mayne, 1995). However, details were lacking pertaining to how the programs were designed and developed. There was also a lack of information regarding program linkage to specific intermediate outcomes that influence health behavior. Programs labeled *culturally sensitive*, for example, usually do not specify whether any formative research preceded program development or how the program addressed cultural needs. There is often no description of how the intervention methods were selected and why. A review of 65 cancer education programs for adult women across the United States showed that the target audience, the message being delivered, and the action being urged were often not clear in many materials they reviewed (Marcus & Crane, 1998).

This article describes the development of a program called “Love yourself before you take care of your family.” It was designed to increase Pap screening behavior specifically for Chinese women living in Taiwan. It was developed using intervention mapping, an innovative process of program intervention design (Bartholomew, Parcel, Kok, & Gottlieb, 2000). Intervention mapping is a detailed process that provides explicit step-by-step guidance for planning and designing theory- and evidence-based health education programs. It intends to integrate theory, empirical findings from literature, and new data collected from study participants in the design of an intervention.

Intervention Mapping

Intervention mapping provides the following five fundamental steps in the development of the intervention: (a) creating matrices of proximal program objectives, (b) selecting theory-based intervention methods and practical strategies, (c) designing and organizing a program, (d) specifying adoption and implementation plans, and (e) generating program evaluation plans (Bartholomew et al., 2000).

Needs Assessment

Intervention mapping depends on a thoroughly conducted needs assessment that specifies the problem of interest. To better design the program, we conducted a pilot study to assess factors that influence Pap screening behavior among Taiwanese women. The pilot study population was made up of a convenient sample of female family members of inpatients who were admitted to one of the major teaching hospitals in Taichung, Taiwan, during the spring of 1999 ($N = 125$). A self-administered questionnaire consisting of 73 items was distributed to 160 women. They were asked to return the questionnaire to the nurse station after they completed the survey. The response rate was 78% (125 of 160).

The pilot study provided information about salient factors influencing Pap screening behavior, such as

knowledge, perceived pros and cons, and perceived norms. The information guided the development of the intervention. The needs assessment phase of program development also included focus group interviews to provide direction for the design of the program intervention approaches, concepts, and messages. Three focus groups were conducted during the pilot study ($N = 24$). Women were recruited from churches and community centers in Taichung, Taiwan, through local community contact persons. A semistructured protocol with open-ended and probing questions was used to explore potential behavioral and environmental factors that might influence women's screening behavior in this particular population. Possible intervention ideas and strategies were also collected. The program theme "Love yourself before you take care of your family" was identified through the focus group discussions.

Creating Matrices of Proximal Program Objectives

This step provides the foundation for the program intervention by specifying who and what would change as a result of the intervention. The proximal program objectives are specific statements of what individuals need to learn or what must be changed in the environment related to the determinants in order for the performance objectives to be met. A series of the most proximal program objective matrices, which combine performance objectives for Pap screening behavior with selected personal and external determinants, are created as the final product of this step.

Writing Performance Objectives

After specifying the proximal program objectives, we created performance objectives that specified the health-promoting behaviors and environmental outcomes. The performance objectives break the behavior and environment condition down to their subcomponents and describe what an individual needs to do in order to perform the Pap screening behavior, what would change in the environment as a result of the program, and who would effect the change. Pap test screening has been proven to contribute greatly to the 70% decrease in the death rate during the past 50 years in the United States (Centers for Disease Control and Prevention, 1998). In this program, our goal was to increase the Pap screening adherence among women in Taiwan. Two performance objectives were delineated as follows:

- *Performance Objective 1:* Nonadherent women (women who have not had a Pap test in the previous 12 months) will schedule a Pap test within 3 months.
- *Performance Objective 2:* Nonadherent women will obtain a Pap test within 3 months.

The environment could have an impact on individuals' behavior as well. The needs assessment phase indicated that common environmental factors influencing Pap screening included cost, access (i.e., lack of physician referral), transportation, lack of child care, and gender of the physician (Centers for Disease Control and Prevention, 1998; Seow, Wong, Smith, & Lee, 1995; Yi, 1994). Issues regarding cost and access to Pap screening were not brought up by the focus group, probably because for women aged 30 and older in Taiwan, an annual Pap test is covered by universal insurance. A few women in the focus group of the pilot study mentioned transportation and lack of child care might be problems. Several women from the focus group expressed their preference to have a female provider perform the exam, although in Taiwan, most gynecologists are men. To address these environmental issues of problems with transportation and availability of female providers, the program included the following two performance objectives:

- *Performance Objective 3:* Hospital administrators will approve the provision of Pap tests by female physicians in the community.
- *Performance Objective 4:* Female physicians will commit to providing Pap tests in the community.

Specifying Determinants of Behavioral and Environmental Factors

The analysis from our pilot study revealed several significant factors associated with Pap screening behavior. These included knowledge, perceived pros and cons to screening, and perceived norms about Pap test screening (Hou, Fernandez, Parcel, & Chen, 2003). These results were consistent with previous research findings (Gotay & Wilson, 1998; Neilson & Jones, 1998; Rakowski, Dube, Marcus, & Abrams, 1992). Compared with nonadherent women, women adhering to Pap screening guidelines tended to perceive higher benefits for Pap tests and lower barriers to obtaining regular Pap tests. They were also more knowledgeable about cervical cancer and Pap tests and tended to perceive that other women obtain annual Pap tests. Some of the reasons women gave for nonattendances at cervical screening included the beliefs that the test was unnecessary and that they were not at risk (low perceived susceptibility). In our focus group discussion, some women said that Pap test reminders could help them take action (cues to action).

During the focus group discussion, many women expressed that they did not have the intention to obtain Pap tests. They expressed they did not think that Pap screening was necessary or relevant to their health. This data implied that intention as well as perceptions that Pap screening is necessary and relevant for their health could be important factors influencing women's decision to be tested.

The final list of determinants of the behavior and environmental conditions was compiled from previous studies, existing social and behavioral theories, and additional factors identified through the pilot study. To prioritize the hypothesized determinants, an expert panel also considered the degree to which hypothesized determinants were important and changeable. These determinants included knowledge, perceived pros and cons from the transtheoretical model (Prochaska, Norcross, & DiClemente, 1994), perceived norms and intention from the theory of planned behavior (Ajzen & Fishbein, 1980), and perceived susceptibility and cues to action from the health belief model (Rosenstock & Krischt, 1974).

We then identified factors influencing the environmental Performance Objectives 3 and 4. These factors included knowledge, outcome expectations, and rewards and/or compensation (see Table 1).

Differentiating the Target Population

When designing an intervention, it is important to consider any difference that may exist among population subgroups that would affect either the performance objectives or the determinants of the performance objectives among subgroups. If these subgroups are fundamentally different, the development process can result in the creation of different methods or strategies and program materials. Differentiating the population by demographic characteristics is the most common way of segmentation. However, the pilot study data suggested that the study participants were relatively homogeneous on all the demographic characteristics, with marital status being the only factor influencing screening status. This program decided not to differentiate women on demographic characteristics because the intervention program targets mostly married women.

A person's stage of change as described by the transtheoretical model can provide information regarding possible subgroups. The transtheoretical model suggests that behavior change is a process through which people progress along a series of stages. The stages of Pap screening adoption behavior include precontemplation, contemplation, action, and maintenance (Rakowski et al., 1992). All the women targeted in this intervention were nonadherent (women who had not had a Pap test in the previous 12 months). These nonadherent women could be further differentiated by their intention (Prochaska et al., 1994). That is, women who had not had a Pap test in the past 12 months and were not planning to have one in the coming year were classified as precontemplators. Women who did not have a Pap test in the previous months but expressed the intention to have one in the next 12 months were classified as contemplators. Data from our pilot study showed that 42% (22 of 52) of the nonadherent women were in the precontemplation stage, and 58% (30 of 52) of these women were in the contemplation stage.

We considered these differences during the selection of specific strategies for intervention. For example, for women in the precontemplation stage, our goal was to increase their awareness and intention, and move them into the contemplation stage and then the action stage. For women who have already considered having a Pap test, our intervention aimed at helping and enabling them to really take the action to schedule and obtain a Pap test. Although these considerations were important for the selection of specific strategies for the intervention, we did not differentiate the population into subgroups during the matrix development phase (described as follows). This decision was made because the subgroups did not differ substantially with regard to the behavior of interest (Pap test screening), the environmental conditions, or their determinants.

TABLE 1: MATRIX OF PROXIMAL PROGRAM OBJECTIVES

Performance Objectives	Personal Determinants						External Determinants
	Intention	Knowledge	Perceived Benefits (pros)	Perceived Barriers (cons)	Perceived Norms	Perceived Susceptibility	Cue to Action
Behavior: Nonadherent women will obtain a Pap test after 3 months of intervention							
Performance Objective 1: Schedule a Pap test		1a. Identify locations and schedules that a Pap test screening is offered.	1b. State benefits of having an annual Pap. 1c. Point out that scheduling an appointment is important to ensure that she will obtain a Pap.	1d. Set time aside to schedule a Pap. 1e. Obtain clinic's phone number.	1f. Express that other women like her call to schedule a Pap.	1g. Identify themselves at risk of getting cervical cancer.	1h. Increased reminders for women to have a Pap.
Performance Objective 2: Obtain a Pap test	2a. Express intention to obtain a Pap.	2b. Describe the Pap test procedure. 2c. List the "don'ts" before obtaining a Pap exam	2d. Identify a Pap test can detect cell changes before they become cancerous. 2e. Define that regular Pap screening can help women find cancer early.	2f. Predict less embarrassment about having a Pap screening. 2g. Recognize her right to ask for a female nurse to be present during the procedure.	2h. Indicate that other women like her obtain their annual Pap. 2i. Review Pap screening as a routine medical procedure.		
Environment: Increased availability of alternative service by female doctors							
Performance Objectives	Knowledge		Outcome Expectations		Reward and/or Compensation		
Performance Objective 3: Hospital administrators will approve to provide the service	Hospital administrators recognize the importance of providing the alternative service.		Hospital will receive good reputation in providing the outreach service. More community people will visit the hospital.		Hospital will receive positive feedback from the community.		
Performance Objective 4: Female physicians will sign up the duty to perform Pap exams in the community	Relate that women prefer female doctor to perform the Pap exam.		Women will show up in the outreach screening service. Community will appraise her, and more women and/or patients would choose her at the hospital.		Doctors will get compensation by signing up for the duty.		

TABLE 2: METHODS AND STRATEGIES

NOTE: LO = learning objective.

Learning and/or Change Objectives	Methods	Strategies	Program Component	Descriptions and/or Messages
Knowledge determinate (LO)	Information transmission (attention and comprehension)	Direct mail communication	Theory- and evidence based cervical cancer brochure “Do you know” fact sheet	See brochure Fact sheet about cervical cancer and Pap screening
Intention, perceived pros and cons, susceptibility, and perceived norms determinate (LO)	Modeling Persuasion	Modeling and persuasion through rolemodel stories Persuasive communication	Role-model stories Testimonials “Do you know” fact sheet Women’s quotes from focus groups	See role model stories and testimonials See fact sheet Women’s sharing regarding their Pap experience
Cue to action and availability of alternative screening service	Facilitation	Enabling services Increase service accessibility Increase availability of the screening	Screening invitation letter Doctor’s schedule Phone intervention Community screening service provided by female doctor	See screening invitation letter Telephone intervention to remind women to schedule a Pap test

Developing a Matrix of Proximal Program Objectives

To ensure that the supporting theoretical and empirical findings were appropriately applied in the intervention, we constructed an intervention matrix (see Table 1). This matrix was created by crossing the performance objectives with the selected determinants. The first row of the matrix lists critical behavioral determinants such as intention, knowledge, perceived susceptibility, perceived benefits and/or barriers (pros and cons), perceived norms, and cues to action. The performance objectives are presented in the left-hand column. Each cell in the matrix describes the learning objectives or change objectives for the cancer-screening program. For example, for the performance objective of “schedule a Pap test,” one of the learning objectives regarding knowledge is that women can identify locations and schedules where a Pap test screening is offered. A change objective regarding “cues to action” is that women will receive screening reminders about a Pap test. The matrix of the learning objectives and change objectives served as a guide for the program intervention development.

Selecting Theory-Based Intervention Methods and Practical Strategies

In this step, we created an inventory of theory-based intervention methods to address the proximal program objectives (developed in the previous step). The product of this step was a table of intervention methods and strategies that matched the proximal program objectives (learning objective and change objectives).

Methods and strategies for the cervical cancer screening project were selected based on findings of the pilot study, the objectives for the program, theory or findings from other studies, and the resources available. Methods selected for the program included information transmission, modeling, persuasion, and facilitation. Intervention strategies planned included direct mail communication, role-model stories and testimonies, and phone counseling. The following section describes how these methods were chosen and how they were translated into practical strategies according to the following three major categories of learning objectives: (a) knowledge-related learning objectives, (b) belief-related learning

objectives (i.e., intention, perceived pros and cons, norms, and susceptibility), and (c) environment-related change objectives (i.e., cues to action and availability). See Table 2 for more details.

Methods and Strategies Addressing Knowledge-Related Learning Objectives

To influence knowledge-related learning objectives, the primary method used was information transmission, which aimed at gaining attention as well as comprehension of factual messages (McGuire, 1984).

The direct-mail educational communication was chosen as the primary intervention strategy because it could reach all of the target women and allowed them to read the information at their leisure. Compared with other kinds of intervention strategies, the direct-mail newsletter campaign is relatively inexpensive both in production and in delivery. The direct-mail newsletter campaign is also typically more effective in recruiting high-risk women than are mass media campaigns and is less expensive than personal contact (Dignan, Michielutte, Jones-Lighty, & Bahnson, 1994).

Components included in the direct-mail campaign were newsletters, cancer fact sheets, educational brochures, and pamphlets. These components contained information on the benefits of Pap test screening, a description of the Pap test procedure, and recommendations about the frequency of Pap test screening. The prevalence, risk factors, and signs and/or symptoms of cervical cancer were also provided. All of the educational materials used plain language and were printed in colors with an attractive layout.

Methods and Strategies Addressing Belief-Related Learning Objectives

Modeling and persuasion were used to influence women's intention, perceived susceptibility, perceived pros and cons, and perceived norms about Pap tests. According to Bandura (1986), modeling is one of the most powerful ways to transmit values and beliefs. Because modeling is most effective if the target women can identify with the model (Bandura, 1986; McAlister, 1995), models were selected from the same demographic group as the target women in order to increase familiarity and similarity. Models that are similar to the target population may communicate their message more effectively than those who are not. Using the matrix of the learning objectives and change objectives as a guide (see Table 1), we searched focus group data for appropriate stories and themes.

Persuasion was another method used to influence women's beliefs about Pap test screening. Persuasive communication is a very powerful way of influencing people and bringing about behavior change and can be defined as a noncoercive influence on the perceived value of particular behaviors (McGuire, 1984). According to Bandura (1986), a very important part of persuasive communication is changing perceptions about how behaviors are viewed.

The program used role-model stories to convey positive values and persuasive messages related to annual Pap test screenings. For example, in one story, Ms. Liu expressed that she now realized how important and beneficial a Pap test was for her health. She said that she felt confident that she could set time aside for a Pap exam every year. Ms. Liu was a young working woman with two children. Although she was very busy with work, family, and kids, she made getting an annual Pap test her priority. Ms. Liu

understood the perceived benefits and of setting time aside for a Pap test and overcame her perceived lack of time to have a regular Pap test.

Another woman, Ms. Chuang, shared her experience of changing the way she thought about a Pap test:

I was shocked when one of my close friends told me that she got cervical cancer. Her experience made me feel that I could get cervical cancer too [perceived susceptibility]. I used to use laziness, no time for a Pap, or I won't be the one getting cancer as excuses from obtaining a Pap screening, but now I get a Pap test every year. I need to take care of myself so that I can take care of my family. Everyone has time to stay healthy. Cervical cancer is not a disease that is far away. You could get it as well.

Testimonials were also used as a strategy for both modeling and persuasion. One example was Ms. Chao, a cervical cancer survivor whose story included the following statements:

Pap test could detect cervical cancer in the early stage. I had cervical cancer and had a surgery about 1 year ago. Now I am cured. I think all women should obtain regular Pap tests. Anyone can get cancer, and cervical cancer can be cured if you find it early.

By focusing on specific determinants, the theoretically derived role-model stories and testimonials served as a powerful communication channel to influence women's cancer screening decisions.

Methods and Strategies Regards Environment-Related Change Objectives

The results of the needs assessment indicated that environmental factors also influenced screening. Facilitation was used as a method to change the environment condition. The program increased access to screening services by providing a screening day with a female doctor at one of the community churches. To inform women about this service, a personalized screening invitation letter was mailed out along with directions to the church. Consistent with the health belief model, the program provided "cues to action" (Rosenstock & Krischt, 1974). Women in the program would also receive a phone call to remind them to schedule Pap tests. Evening time slots were arranged for the screening to increase the accessibility for women.

Designing and Organizing Programs

Designing Program Materials

The theme of the program was "Love yourself before you take care of your family." This theme addresses the importance of women's health. In Chinese culture, women are usually the caregivers for the whole family. Chinese women tend to sacrifice and neglect their health and take care of other family members. The theme emphasizes and stresses the need for women to take care of themselves so that they can take care of their families. Detailed intervention components are listed in Table 2.

Pretest With the Target Group

One very important part of providing new information is to make sure that participants can understand

the information given. The information provided in the brochure and the fact sheets was designed to simplify complex issues. The material was pretested with a group of women to make sure they understood the messages. Pre-testing print materials with the target audience is essential to receive feedback on attraction, comprehension, acceptability, self-involvement, and persuasion (Rice, 1991). The pretest result showed that most women were satisfied with the intervention content as well as with the layouts. Some women expressed their lack of knowledge regarding the screening procedure so that information was added to the material.

Scope and Sequence of the Program

The program lasted 3 months. Female family members of inpatients admitted into one of the major teaching hospitals in Taichung, Taiwan, during fall of 1999 were interviewed about their screening status. Women who had not had a Pap test in the past 12 months were identified as nonadherent and were thus eligible to be recruited into the program. In the first month of the intervention program, women received a personalized welcome letter to the study, a theory- and evidence- based educational brochure, 14 quotes regarding other women's Pap screening experiences, and a screening schedule with information about the doctors. In the second month, they received a personalized screening invitation letter with screening services provided by a female doctor in one of the community churches. Other materials included four role-model stories from adherent women and cervical cancer survivors, fact sheets regarding cervical cancer and Pap tests, and an updated screening schedule. In the third month, the program provided a phone consultation to remind women about the Pap tests and to help them schedule screening appointments.

Program Delivery

This step aims to ensure an acceptable level of completeness and fidelity with program delivery. Planning can help identify dissemination strategies. In order to reach the aims, the intervention mapping suggests the need to develop an implementation plan, which includes adoption and implementation objectives, methods, strategies, and a training program to help create the workflow and documentation plans. This part was not fully carried out because dissemination of the intervention was beyond the scope of the study. After the effectiveness of the program intervention has been evaluated, we will develop the adoption and dissemination plan. Intervention mapping steps will again serve as a guide to the development of the dissemination program.

Program delivery tasks would include obtaining a group of non-adherent women, scheduling and mailing the program intervention materials, coordinating community screening services with female doctors, and conducting screening reminding calls to women in the program. The program would provide training sessions on how to recruit and identify non-adherent women. Program staffs would also be trained on how to schedule and send program materials, as well as how to conduct a telephone consultation.

Program Evaluation

Intervention mapping helps not only the design of an intervention program but also the specification of the evaluation measures. The purpose of this step is to determine whether decisions made about learn-

ing and changing objectives, methods, strategies, and implementation are correct at each mapping step through pro-gram monitoring and evaluation. This intervention pro-gram will be evaluated through a randomized trail study.

Through referring to the matrices of proximal pro-gram objectives, we developed items measuring the “effect” evaluation questions. For example, (a) did you schedule a Pap test during the past 3 months? If yes, where did you go? and (b) What were your reasons to obtain a Pap test? To assess the immediate effect of the intervention on the behavior, we also developed scales to measure determinants such as knowledge, perceived susceptibility, perceived pros and cons, and perceived norms (Hou, Fernandez, Baumler, & Parcel, 2002).

“Process” evaluation questions were also developed in the evaluation study. Previous steps of intervention mapping and needs assessment helped us in identifying aspects and variables of the measurement items. To evaluate the intervention, including participant expo- sure, women’s evaluation, and methods and strategies assumptions, we asked women the following questions: Did you receive our mailing information about cervical cancer and Pap screening in the past 3 months? Did you read the information? What did you think of the role- model stories in the newsletters? How often can you relate those role-model stories to yourself? Has a pro-gram staff member contacted you for a Pap test arrangement in the past month? Which program components were most effective in influencing your decision to have a Pap test? Other open-ended questions included (a) How do you feel about using direct mail to provide health information? (b) How can direct mail communication influence your health behavior? (c) How do you think other women’s experience can influence your Pap decision? And (d) How do you think a screening invitation letter or a reminding call can influence your Pap decision?

To assess the program delivery, we asked staff members several questions: (a) How many nonaherent women were you able to identify? (b) Did you schedule and mail program intervention material to women? (c) Did you organize a community screening service with a female doctor for women? (d) Did you offer a screening consultation call to women? (e) How were women’s responses to the program service? and (f) How many women were you not able to contact?

Information about any cervical cancer screening– related community activities or media events were gathered to better explain possible threats to the internal validity of the study.

The preliminary evaluation results showed that the baseline information between intervention and control groups are equivalent, indicating the successes of the randomization process. Women in the intervention group reported a higher rate of completing Pap test screening than did women in the comparison group after a 3-month intervention ($p = 0.002$). Intervention groups of women also had higher perceived pros of hav- ing Pap tests ($p = 0.031$) (Hou, Fernandez, Baumler, & Parcel, 2002).

Conclusion

By using the process of intervention mapping, the program developer was able to ensure systematical incorporation of empirical and new data and theories to guide the intervention design. The needs assessment provided an important foundation for this program by specifically identifying factors that influence Pap screening behavior and environment conditions relevant for the Chinese population. Incorporating input from the target population throughout the process was essential. The process

also helped the development of an evaluation plan, including the identification of specific research questions and the development of measures. The effectiveness of the intervention demonstrates that developing a program using a systematic process leads to the development of an effective program. Programs targeting other health-related behavior and using other methods or strategies can also be developed with this intervention mapping process.

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Perceived spousal support and beliefs towards cervical smear screening among Chinese women



Perceived Spousal Support and Beliefs Toward Cervical Smear Screening among Chinese Women

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Abstract

Objective: Family is a major part of the social support network in Chinese society. This study examines the role of Chinese women's perceived support from spouse on their cervical cancer screening beliefs and intention. **Design:** Participants were recruited from female family members of inpatients admitted to one of the major teaching hospitals in Taiwan (n=424). Screening intention, beliefs (perceived pros, cons, risk, and norms), and demographics were assessed via a self-administered survey. Women were classified into two groups based on their perceived spousal support towards having a cervical smear screening (low versus high). **Results:** Mean age of the sample was 34 years, 28% did not have high school education, 37% expressed no screening intention in the next 12 months, and 58% perceived their general health to be fair or poor. Women who perceived lower spousal support were more likely to be those without high school education (39% vs. 21%) or with lower perceived health status (65% vs. 54%). After adjusting for these demographic variables, multiple regression analyses revealed that women who perceived lower spousal support were associated with lower perceived benefits ($B=-.210$, $p<.001$), higher barriers ($B=.228$, $p<.001$), and lower norms towards cervical smear screening ($B=-.127$, $p=.012$). On the other hand, women who perceived higher spousal support were associated with positive intention to screening ($OR=1.94$; 95% C.I. = [1.28, 2.95]). **Conclusion:** The study shows that perceived spousal support could be an important factor that influences various beliefs towards cervical smear screening among Chinese women. Future research should consider examine factors associated with spousal support, as well as its impact on screening adoption among different ethnic groups. The current finding has implications on intervention programs targeting spouse or significant others on promoting gynecological cancer screenings among Asian women.

Keywords: spousal support; cervical smear; screening beliefs; Chinese

Note

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Introduction

Although cervical smear tests have been proven to be an effective screening method of detecting cervical cancer at an early stage, existing data suggest that Asian women do not have regular screenings. The prevalence of cervical smear among Asian women in the United States ranges from 40% to 56%, as compared to over 90% in other groups (Chen, et al., 2004; Hiatt, et al, 2001). Among Chinese women in Taiwan, the few existing studies reported similar low rates of cervical smear test utilization, ranging from 58% to 62% (Hou, Fernandez, Baumler, Parcel, & Chen, 2003; Lee, Kuo, & Chou, 1997; Wang & Lin, 1996).

Social support has been found to be important to cervical cancer screening. Social support at worksite has shown positive relationships to some health behaviors including cervical cancer screening among blue-collar women workers (Kelsey, et al., 2000). Recommendations from physicians were also associated with higher cervical smear screening adoption among women with diverse cultural background in Australia (Kelaher, et al, 1999). In addition, women who have close friends they could discuss health issues with reported higher prevalence of being screened for cervical cancer (Seow, Huang, & Straughan, 2000). Although the relationship of social support from various sources and cervical cancer screening behaviors has been examined in some studies, few have specifically discussed the influence of family or spousal support. Yang and colleagues (1994) were one of the few specifically examined family influences on cancer screening participation in seven communities in Taiwan. Study results showed that family's encouragement (OR=1.85) had a positive association on screening participation. Nevertheless, current knowledge on the influence of spousal support to gynecological screening such as cervical cancer is scarce.

Some existing qualitative studies have indicated the importance of family support among cancer survivors, and few have specifically examined support perceived by women with gynecologic cancers. In a qualitative study conducted by Chan and colleagues (2001), female cancer survivors indicated the importance of relationships with family while traveling through the cancer trajectory (Chan, Molassiotis, Yam, Chan, & Lam, 2001). Women who have gynecological cancers but with poor social support are more likely to have various psychological symptoms persist over a period of time (Petersen, et al., 2005). In a qualitative multiethnic study conducted in Los Angeles, researchers found that social support was identified as a key socio-ecological fact. However, perceptions of support from different source were different among Caucasian versus Asian cervical cancer survivors. Key informants who work with Caucasian survivors tend to view support from friends as most important, followed by family and spousal support. In addition, balancing social support with independence (i.e. not becoming too dependent on the family) is also viewed to be essential. In contrast, informants who work with Asian cancer survivors noted that these women view spousal support as essential, while support from other family members and friends is also important (Ashing-Giwa, Kagawa-Singer, Padilla, Tejero, Hsiao, Chhabra, Martinez, & Tucker, 2004). Another study examined Chinese patients undergoing cancer surgery and

concluded that spouse and family members represented the largest source of social support network among these Chinese (Chan CWH, 2004).

Most of the existing studies on cervical screening intervention program target individual variables such as personal background characteristics, beliefs, knowledge, or acculturations; and sometimes health care access issues such as transportation, language barriers, or provider's gender (Hou, Fernandez, & Guy, 2004; Jackson, Taylor, Chitnarong, Mahloch, Fischer, Sam, & Seng, 2000; Sohn & Harada, 2005). Much progress has been made to increase cervical smear screening among Asian women. Yet, screening adherence among this group is still far from satisfactory. More research is needed to explore the relationship of family's role, in particular, spousal support, to motivate and influence women's screening decision.

The purposes of the current study are to: (1) describe characteristics of women who tend to perceive lower spousal support towards having a cervical cancer screening; and (2) describe the relationships of perceived spousal support on Chinese women's cervical cancer screening beliefs and intention. Lessons learned from the study will help close our knowledge gap on the influence of perceived spousal support and women's gynecological cancer screenings, such as cervical cancer screening, among Chinese women. Findings will also help provide insight for promoting cancer screening among Asian women including Chinese.

Methods

Sample

Study participants were recruited from female family members of inpatients admitted to one of the major teaching hospitals in Taiwan during fall 1999. Participants were recruited for a controlled randomized trial study of a cervical smear screening program. Only screening non-adherent women were recruited in the study. According to the National Health Insurance Plan in Taiwan, annual cervical smear tests were provided free as part of the health care coverage to women aged over 30 years old, or younger if married. Thus, screening non-adherent women in the current study was defined as women who had not had a cervical smear screening in the past 12 months and who were over 30 years old, or younger if married. Details of the recruitment process is documented elsewhere (Hou, Fernandez, Baumler, & Guy, 2002). This research was conducted with the approval of Committee for the Protection of Human Subjects (CPHS) at The University of Texas Houston Health Science Center, School of Public Health (HSC-SPH-99-013).

Measures

This study examined the influence of perceived spousal (or partner) support towards women's cervical smear screening on women's screening beliefs and intention. Perceived spousal support towards screening was measured by asking women to rate the following item: "My husband (or partner) would not support me to have a cervical smear" on a five-point Likert scale, with response categories ranged from "strongly disagree" to "strongly agree". To facilitate more straight-forward interpretation of analysis, this item was reverse-coded so that a higher rating would indicate higher perceived spousal

support towards cervical smear screening. Since most women in the study were married (90%), “spousal support”, instead of “spousal or partner support”, was used in this article to facilitate reading.

A set of items were developed to measure the various screening beliefs. These included (1) fourteen items related to perceived benefits (pros) of cervical smear screening, (2) nine items on perceived barriers (cons) towards screening, (3) three items on perceived risk of getting cervical cancer, as well as (4) four items related to perceived norms of cervical smear screening behavior among women similar to their age. Similarly, for each item, responses were rated on five-point Likert scales, ranging from 1 (strongly disagree) to 5 (strongly agree). The scores of the various screening belief scales revealed overall reasonable internal consistency (Cronbach’s alpha ranged from .63 ~ .87) and consistent with the underlying theoretical constructs. The process of developing this Cervical Smear Belief Inventory (CSBI) as well as the validation of its psychometric properties is described elsewhere (Hou & Luh, 2005).

Data Analysis

Baseline data from the intervention trial were analyzed in the current study ($n=424$). For comparison purpose, women were classified into two groups based on their perception of spousal support towards having a cervical smear screening (low versus high), using the item median score as the cut-off point (item median =2). Demographic characteristics as well as screening beliefs and intentions among the two groups were then described and analyzed. Chi-square test was used for categorical variables and independent t test was used for continuous variables. In addition, multiple regressions were used to assess the relationships of perceived spousal support on women’s screening beliefs and intention, taking the demographic variables into consideration.

Results

Mean age of the sample was 34 years, 28% did not have high school education, 37% expressed no screening intention, and 58% perceived their general health to be fair or poor. About 40% of these “screening non-adherent” women perceived very low or low spousal support towards them having a cervical cancer screening. Women who perceived lower spousal support were more likely to be those without high school education (39% vs. 21%), perceived lower health levels (65% vs. 54%), or being pre-contemplators (having no screening intention) in the next 12 months (49% vs. 30%) (see Table 1).

TABLE 1: DEMOGRAPHIC CHARACTERISTICS AMONG CHINESE WOMEN WHO PERCEIVED HIGH VERSUS LOW SPOUSAL SUPPORT TOWARDS THEIR CERVICAL SMEAR SCREENING

Notes: * $p < .005$

Demographics	Perceived spousal support				Total		P-value [Chi-Squares]
	Low		High		(N=422)		
	n	%	n	%	N	%	
Age							
less than 30 yrs	53	31.4%	98	38.7%	151	35.8%	.102
30-39 years	71	42.0%	108	42.7%	179	42.4%	[$X^2(2)=4.563$]
40+ years	45	26.6%	47	18.6%	92	21.8%	
Education							
less than HS	66	39.1%	53	20.9%	119	28.2%	.000*
high school (HS)	80	47.3%	107	42.3%	187	44.3%	[$X^2(2)=32.112$]
college and above	23	13.6%	93	36.8%	116	27.5%	
Perceived health							
excellent/good	59	34.9%	116	45.8%	175	41.5%	0.025*
fair/poor	110	65.1%	137	54.2%	247	58.5%	[$X^2(1)=4.995$]
Screening intention							
no	82	48.5%	76	30.0%	158	37.4%	.000*
yes	87	51.5%	177	70.0%	264	62.6%	[$X^2(1)=14.775$]
Total	169	100.0%	253	100.0%	422	100.0%	

Univariate analyses on women's perceived spousal support and women's screening beliefs and intention showed significant relationships. Women who perceived lower spousal support were associated with lower perceived screening benefits, higher barriers, lower perceived norm, as well as lower screening intentions. The association between perceived spousal support and perceived risk of cervical cancer was, however, not significant (see Table 2).

TABLE 2: SCREENING BELIEFS AMONG CHINESE WOMEN WHO PERCEIVED HIGH VERSUS LOW SPOUSAL SUPPORT TOWARDS THEIR CERVICAL SMEAR SCREENING

Notes: * $p < .05$

Screening Beliefs	Perceived spousal support				95% CI of the mean difference	P-value [T Tests]
	Low		High			
	Mean	SD	Mean	SD		
Perceived Pros (14 items)	56.58	5.79	59.24	5.40	[1.47, 3.64]	.000* [$t_{(420)}=4.63$]
Perceived Cons (9 items)	27.51	5.24	24.39	5.23	[-4.15, -2.10]	.000* [$t_{(419)}=-5.99$]
Perceived Risk (3 items)	8.44	2.03	8.51	2.17	[-.34, .49]	.717 [$t_{(420)}=.36$]
Perceived Norm (4 items)	15.41	1.96	15.88	1.93	[.08, .84]	.017* [$t_{(420)}=2.40$]

The multiple regression analyses revealed similar findings after adjusting for background variables (age, education, and perceived health status). Results showed that women who perceived higher spousal support were associated with higher perceived screening benefits ($B=2.44$, $p<.001$), lower barriers ($B=-2.87$, $p<.001$), and higher norms towards cervical smear screening ($B=.51$, $p=.012$). In addition, women who perceived higher spousal support were more likely to be screening contemplators (having intention to screening in the next 12 months) ($OR=1.94$; 95% CI = [1.28, 2.95]). Again, the regression coefficient of spousal support on perceived cancer risk was not significant. Perceived health status, on the other hand, was the only factor that revealed significant coefficient in predicting women's perceived risk of cancer. Neither age nor education showed any significant relationships with screening intention or the various screening beliefs in the multiple regression models (see Table 3).

TABLE 3: MULTIPLE REGRESSION ANALYSES OF PERCEIVED SPOUSAL SUPPORT TOWARDS CERVICAL SMEAR SCREENING AND ITS INFLUENCE ON CHINESE WOMEN'S SCREENING BELIEFS AND INTENTION, TAKING DEMOGRAPHICS (AGE, EDUCATION, HEALTH STATUS) INTO CONSIDERATION.

^aMultiple linear regressions were used to assess spousal support towards screening on women's screening beliefs (perceived pros, cons, risk and norm);

^bMultiple logistic regression were used to assess spousal support towards screening on women's screening intention.

CI^c: 95% Confidence Interval (CI)

* $p < 0.5$

Dependent Variables	Spousal Support		Women's age		Education		Perceived Health	
	B	S.E.	B	S.E.	B	S.E.	B	S.E.
Perceived Pros ^a	2.44*	.58	-.61	.40	-.03	.41	-.37	.56
Perceived Cons ^a	-2.81*	.54	-.08	.37	-.52	.39	1.08	.52
Perceived Risk ^a	.12	.21	-.15	.15	.104	.15	.96*	.21
Perceived Norm ^a	.51*	.20	-.18	.14	.266	.14	-.36	.19
	OR	CI ^c	OR	CI ^c	OR	CI ^c	OR	CI ^c
Intention ^b	1.94*	[1.28, 2.95]	.92	[.69, 1.23]	1.27	[.94, 1.73]	.82	[.54, 1.24]

Discussion

These positive relationships between spousal support and screening beliefs and intention among Chinese women are important. Current results showed that women who perceived higher spousal support had more positive beliefs towards a cervical smear screening, including perceived higher benefits, lower barriers, and higher norms. Most of the existing studies which examined the influence of spousal support focused directly on screening acceptance or participation, without measuring related screening beliefs. Although not specifically on cervical cancer screening, Seow and colleagues (1997) examined factors contributing to the acceptance of mammography screening among women in Singapore. Their data showed that the strongest independent predictor of attendance was encouragement by her spouse (adjusted OR=35.1; 95% CI [18.8, 65.5]) compared with someone who had never been encouraged by another to have mammography. Similar findings regarding the influence of spouse on screening participation was also found in another study of colorectal cancers screening conducted in Australia (Forbes, Fritschi, Mendelson, Foster, & Edwards, 2004). Forbes and colleagues investigated influences on participation in a community-based colorectal cancer screening by colonoscopy. They found that among participants who discussed screening with another individual, the spouse was the most common (71%); and such discussion increased the likelihood of screening participation by 23%. The current study provided additional quantitative evidence on the influence of spousal support on gynecological cancer screening beliefs among Chinese women. Furthermore, current study also revealed that those who perceived higher spousal support were almost twice likely to express intention to screening in the next 12 months (OR=1.94). This relationship and magnitude was consistent with an earlier study conducted by Yang and colleagues (1994) concluding that family's encouragement was positively associated to cancer screening participation (OR=1.85) in seven communities in Taiwan.

Current study findings have implications on interventions that address women's health through the incorporation of spouses or significant others. Data suggested that at least for some younger Chinese women, the attitudes hold by spouse towards gynecological screening such as cervical smear might worth attention. Cancer screening among Asian or Asian American women have received increasing attention, yet none of the programs has specifically target family, spouse, or significant others. Some of the strategies used among the few existing interventions or programs specifically targeting Asian

women to encourage cancer screenings included: the use of media education (Jenkins, et al., 1999; Lam, et al., 2003), lay health workers (Bird, et al., 1998; Lam, et al., 2003), addressing organizational, economic, ethno-specific support such as the provision of services in their own language or by a female physician (Hiatt, et al., 2001; Hou, et al., 2004; Jackson, et al., 2000; Kelaher, et al., 1999; Kelly, et al., 1996; Taylor, et al., 2002). These interventions or combined strategies have demonstrated some significant screening participation compared with comparison groups. To further enhance the impact of screening interventions targeting Asian women, researchers or practitioners should pay more attention to the influence of spouse or significant others, and consider working with family members in addition to the targeted women.

Furthermore, current study suggested that women with lower education or health status tend to perceive lower spousal support. This in turn, might negatively influence their screening beliefs or intention. The current finding provides information on important characteristics of women who might be at higher risk of non-adherent to cancer screening recommendations. The finding could help researchers and practitioners identify women with higher vs. lower perceived spousal support for targeted intervention programs.

One limitation of the current study was the use of single item to assess spousal support. Although study results were consistent with theoretical assumptions and existing empirical data, single item measurement could be less reliable compared with multi-item or multi-dimension scales. The development and use of multi-item scale to measure spousal support might help validate the relationship. In addition, interpretation of the results needs to take into account the fact that women participated in the study were mostly young. Impact of spousal support on screening beliefs or adoption among older women might be different and would need to be further examined. Finally, current study did not investigate reasons or factors that might motivate or inhibit spousal support. Future studies that examine or explore potential determinants or factors can further shed light on appropriate intervention messages and strategies.

In conclusion, current study shows that women with lower education or lower perceived health status tend to perceive lower spousal support towards cancer screening, and higher spousal support is associated with more positive screening beliefs. Results suggest that screening interventions consider working with spouse, significant others, or family members might help maximize gynecological cancer screening participation among Chinese and other Asian women. Family members play a pivotal role in acceptance of screening. For Asian women to be persuaded effectively to participate in screening, it would then be important to help family members see the benefits and importance of the test as well. Continued studies are need to explore potential dimensions of spousal support to develop a reliable scale, that might influence spousal perceptions or support on cervical smear screenings, and examine the significance of spousal support on cancer screening across different ethnic groups. Current study has implication on intervention programs targeting spouse or significant others on promoting gynecological cancer screenings among Asian women.

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PHASE III — MIXED-METHOD
EVALUATION STUDY VIA A
RANDOMIZED-CONTROLLED
TRIAL

Effectiveness of an intervention to increase Pap test screening among Chinese women in Taiwan



Effectiveness of an Intervention to Increase Pap Test Screening among Chinese Women in Taiwan

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Abstract

This study assessed the effectiveness of a theory-based direct mail campaign in encouraging non-compliant women, aged 30 and older or younger if married, to obtain a Pap test. Participants were female family members of inpatients admitted to one of the major teaching hospitals in Taiwan during August–September 1999. A total of 424 women were recruited in the randomized intervention trial. Three months following implementation of the intervention, women in the intervention group reported a higher rate of Pap test screening than women in the comparison group (50% versus 32%) ($p = 0.002$). Women in the intervention group also showed higher perceived pros of a Pap test at follow-up ($p = 0.031$). Although women in both groups showed an increased knowledge and intention to obtain a Pap, only the intervention group had significantly higher follow-up scores on perceived pros and susceptibility. The results shows that the intervention was effective in increasing Pap test screening among Chinese women within three months. The results also support the use of Intervention Mapping, a systematic program development framework for planning effective interventions.

Keywords: Pap test screening; intervention mapping; program evaluation; Chinese women.

Note

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Introduction

Despite recent declines in cervical cancer incidence and mortality observed in developed countries, these indicators remain high in developing countries.¹ One study reported that the incidence and mortality of cervical cancer were higher in Asia than in the US and other parts of the world.² Cervical cancer is the most prevalent cancer among women in Taiwan. About forty percent of the female deaths in Taiwan were caused by cancer and about 10 percent of these deaths were due to cervical cancer.³

Pap test screening is the best available method for reducing the incidence and mortality of the invasive cervical cancer.⁴⁻⁵ Despite the proven efficacy of the Pap test, Asian populations still under-utilize Pap screening. The prevalence of Pap test screening among Asian women in the US ranges from forty-six percent to fifty-two percent, as compared to over ninety percent in other groups.⁶⁻⁷ The few published studies documenting Pap test screening among Chinese women indicate very low levels of utilization. Among women in Taiwan, existing studies report that regular Pap screening rates are between five percent to forty-two percent.⁸⁻¹⁰ Another study reported that about forty percent of women in Taipei had never had a Pap test.¹¹

Only a few studies have identified factors influencing Pap screening among Chinese women. These factors include marital status, age, lack of knowledge, low perceived risk, embarrassment, discomfort, and the gender of physicians.^{7,12-14} A pilot study was conducted among a sample of women in Taiwan (1999) as part of the formative evaluation activities for the current study. Analyses revealed factors that were significantly associated with Pap screening behavior. These included knowledge, perceived pros and cons of the Pap test, and perceived norms (reported elsewhere). The study found that lower knowledge level, lower perceived pros, higher perceived cons, and lower perceived norms were strongly associated with non-compliance to recommended Pap test guidelines.

Although there are many educational interventions designed to increase Pap test utilization, few have targeted women in Taiwan. Intervention studies designed to increase screening have provided some information about methods and strategies that have been shown to be effective in other populations. For example, several studies have shown increased screening in response to a written invitations.¹⁵⁻¹⁶ However, another study found the invitation letter alone was not sufficient to encourage women to have a Pap test.¹⁷ One study showed that mailed reminders combined with a telephone contact could significantly increase Pap test compliance.¹⁸

In a review article of cervical cancer screening intervention research, the authors suggested that direct mail may be especially effective in promoting screening when personalized letters or combined strategies were used.¹⁹ The effectiveness of such strategies to increase screening compliance in Taiwan had not been studied. Another gap in the literature is the lack of information about how information from

behavioral studies examining the determinants of screening behavior translating into actual intervention methods and strategies.

In Taiwan, the National Health Insurance Plan (1996) provides free health care coverage of annual Pap tests for women aged 30 and over. By paying a little co-payment, women younger than 30 are also entitled to this benefit if married. Removing the cost barrier alone, however, does not ensure screening. It is clear that in Taiwan, although all women have access to free or low cost Pap test screening services, many do not utilize them. This paper describes a study to assess the effectiveness of an innovative intervention that addressed psychosocial factors influencing screening among women in Taiwan. The intervention was built on existing theories, empirical evidence, as well as findings from both qualitative and quantitative research with the target population. Details of the intervention development process are reported elsewhere. The primary objective of this intervention trial is to assess the effectiveness of the intervention in encouraging non-compliant women (who had not had a Pap test within the preceding 12 months) to obtain a Pap test screening within 3 months. The secondary objectives are to assess the impact of the intervention on intermediate factors that might influence Pap screening behavior, including perceived pros/cons of the Pap test, perceived norms, perceived susceptibility, and knowledge of cervical cancer and early detection.

Methods

Sample Selections

This study was conducted at one of the major teaching hospitals in Taichung, Taiwan. Female family members of inpatients admitted to the hospital during August and September 1999 were approached by program staff. A brief enrollment survey was conducted to determine women's screening status and eligibility. Women who had not had a Pap test in the previous 12 months and were aged 30 and older (or younger if married), were eligible for the study. Women were not eligible if they had undergone a hysterectomy or had been diagnosed with cervical cancer.

A total of 990 women were approached during the study period. Among these, 21 women (0.02%) had a previous hysterectomy. Among the remaining women, sixty-eight percent (656/969) reported they had not had a Pap test in the previous 12 months. Sixty-five percent (424/656) of these non-compliant women agreed to participate in the study. Those who declined participation (N = 232) said that they were not interested or had low literacy level.

Study Design

This evaluation study used a true control group, pretest-posttest experiment design. Individual random assignment to study arm was conducted by assigning consecutive research identification number to each woman as she agreed to participate in the study. Women with even numbers were assigned to the intervention group, while women with odd numbers were assigned to the comparison group.

A total of 424 women were recruited into the study, with 212 women in each group at baseline. A follow-up survey was mailed to these women three months after recruitment. The overall response rate to the mailed follow-up survey was fifty-eight percent (N = 247). Although about forty percent of the women were lost to follow-up, the drop out rate was the same in both intervention and compari-

son groups. Additionally, there were no significant differences found in demographics between women who dropped-out and those who completed follow-up.

Intervention

Women in the intervention group received a three-month program utilizing direct mail communication as well as a phone-counseling component. In the first month, they received a personalized welcome letter to the study, an educational brochure with theory and evidence-based messages, fourteen quotes regarding other women's Pap screening experience, and a screening schedule that provided hours for Pap screening with health hotline numbers. In the second month, they received a personalized screening invitation letter, four role model stories with personal accounts from screening compliant women and women who had survived cervical cancer due to early detection, a knowledge-based fact sheet regarding cervical cancer and Pap test, and an updated screening schedule. In the third

month, these women received a telephone call from a health educator to offer barriers counseling and/or assistance with appointment scheduling. Women in the comparison group received a monthly newsletter with health information in general from the hospital.

Measurement

The measurement of the primary outcomes in the survey included items assessing women's screening behavior and screening intention in the coming year. Other variables of interests included constructs such as perceived pros/cons, perceived norms, perceived susceptibility, and knowledge related to cervical cancer and Pap test screening. Demographic information was also obtained. The items making up the perceived pros, perceived cons, perceived norms, and susceptibility scales used 5-point Likert scale with response categories that ranged from strongly disagree (1) to strongly agree (5). The mean score calculated for each scale was the sum of the item scores divided by total number of items in that scale. The knowledge scale consisted of a sum of correct responses. A pilot study was conducted to assess the psychometric properties of all scales. For each scale, items with discrimination (corrected-item-total correlation CITC) less than 0.2 were re-evaluated for their appropriateness. The internal consistency reliabilities (Chronbach α) resulting from the pilot study were 0.88 for the pros scale (11 items), 0.68 for the cons scale (9 items), 0.72 for the norms scale (4 items), and 0.70 for knowledge scale (16 items) (reference #10). Comments from the open-ended questions in the pilot survey were used to refine the measurement instrument. The final survey used in the current study consisted of thirteen pros items (Chronbach α = .87), thirteen cons items (Chronbach α = .79), four norms items (Chronbach α = .63), three susceptibility items (Chronbach α = .81), and sixteen knowledge items (Chronbach α = .80).

Data Analysis

Chi-square and t-test were used to assess group equivalency at baseline. There were no statistically significant differences found between groups at baseline.

Chi-square tests were used to assess differences between groups on screening completion rates and to assess changes in screening intention among women in the intervention and comparison groups at follow-up. Paired t-tests were used to compare scale differences between pre-test and post-test within each

group. Linear regression, including the pre-test scores and group effect as covariates, was used to compare the scale scores between groups at follow-up.

Results

Sample Characteristics and Group Comparisons at Baseline

Comparisons of the Demographics and Prior Screening Between Intervention and Comparison Groups at Baseline. The mean age of the women in the study was 33.87 (SD = 8.61). Most women in the sample were married (90%). Forty percent of the women worked full time and twenty-eight percent of the women had a college education or higher. Prior screening behavior was similar between these two groups. About forty percent of the sample had never had a Pap test. The overall intention to have a Pap test in the coming year was sixty-three percent at baseline and did not differ significantly between groups. There were no significant differences in age, marital status, employment status, or education between women in the intervention and comparison groups. There were no statistically significant differences between groups at baseline in prior screening or intention to have a Pap test in the coming year.

Scales Comparisons Between Groups at Baseline. Knowledge, perceived pros, perceived cons, perceived norms, and perceived susceptibility were also assessed using the scales described above. There were no significant differences on these scales between women in the intervention and comparison groups at baseline. Women in both groups answered about 76% of the knowledge items correctly at baseline. The overall mean scores on the 5-point Likert scale for the perceived pros and cons were 4.17 (SD = 0.41) and 2.78 (SD = 0.54), respectively. The overall means and standard deviations for the perceived norms and susceptibility scales were 3.92 (0.49) and 2.83 (0.70), respectively (Table 1).

TABLE 1: SUMMARY OF SCALE MEANS BETWEEN WOMEN IN INTERVENTION AND COMPARISON GROUPS (BASELINE)

Independent-samples t-tests were used for the baseline group comparisons.

Scales	Intervention (N=212)		Comparison (N = 212)		All (N = 424)		P-Value (t-test)
	Mean	SD	Mean	SD	Mean	SD	
Knowledge	0.77	(0.15)	0.74	(0.19)	0.76	(0.17)	0.103
Pros	4.17	(0.39)	4.17	(0.42)	4.17	(0.41)	0.978
Cons	2.77	(0.53)	2.79	(0.54)	2.78	(0.54)	0.748
Norms	3.90	(0.47)	3.95	(0.50)	3.92	(0.49)	0.320
Susceptibility	2.81	(0.68)	2.84	(0.73)	2.83	(0.70)	0.678

TABLE 2: PAP SCREENING BEHAVIOR (ALL WOMEN) AND INTENTIONS (PRE-CONTEMPLATORS ONLY) BETWEEN INTERVENTION AND COMPARISON GROUPS

Pearson chi-square tests were used to compare the differences between intervention and comparison groups.

	Intervention Group		Comparison Group		P-Value (χ^2) [between group]
	Pre-Test	Post-Test	Pre-Test	Post-Test	
Obtain a Pap in the past 3 months					
Yes	0 (0%)	63 (51.2%)	0 (0%)	39 (31.5%)	0.002*
No	212 (100%)	60 (48.8%)	212 (100%)	85 (68.5%)	
Total	212 (100%)	123 (100%)	212 (100%)	124 (100%)	
Intend of a Pap in the coming year					
Yes	0 (0%)	43 (86%)	0 (0%)	38 (92.7%)	0.310
No	83 (100%)	7 (14%)	75 (100%)	3 (7.3%)	
Total	83 (100%)	50 (100%)	75 (100%)	41 (100%)	

Group Comparisons at Post-Test on Screening Completion Rates, Intentions, and Factors Associated with Screening

The follow-up survey was conducted after three months of program implementation. At follow-up, women in the intervention group reported significantly higher rates of Pap screening completion than women in the comparison group (Table 2). Fifty-one percent of previously noncompliant women in the intervention group reported having had a Pap within three months following recruitment, while only thirty-two percent of the women in the comparison group reported receiving a Pap test ($p = 0.002$).

In this study, women who reported no intention of a Pap screening at baseline were classified as *pre-contemplators*, whereas women who reported an intention to obtain a Pap test at baseline were classified as *contemplators*. Changes in intent to obtain a screening between groups among *pre-contemplators* and the Pap completion rate between groups among *contemplators* were examined. Among *pre-contemplators*, the result showed no significant difference in intention change between women in the intervention and comparison groups at follow up ($p = 0.310$). However, among *contemplators*, there was a significant difference in Pap completion rate between groups at follow up. A higher the proportion of the contemplators in the intervention group (62%) reported completing a Pap test at followup than women in the comparison group (38%), $p = 0.008$.

Linear regression models were used to assess differences in scale scores at post-test between women in the intervention and comparison groups on the means of various scales. The analysis included pre-test scale scores and intervention condition as covariates. After adjusting for the pretest scale scores, there were no significant differences found at post-test between groups on the scales measuring knowledge, perceived norms, or perceived susceptibility. Among women in both groups at follow-up, the overall means for knowledge, perceived norms, and perceived susceptibility scales were 0.81, 3.90, and 2.94, respectively (Table 3).

At follow-up, women in the intervention group perceived higher benefits to Pap test compared to women in the comparison group ($p = 0.031$). The scale means at post-test was 4.26 for the intervention group and 4.16 for the comparison group. The intervention coefficient was 0.110 (95% CI [0.009, 0.181]) for the pros scale. Women in the intervention group perceived lower cons (scale mean = 2.65) of the Pap test than women in the comparison group (scale mean = 2.75). The difference was not that significant, however, the p -value indicated that the difference approaches significance ($p = 0.059$).

To further examine the relationships between perceived pros and screening behavior, logistic regression analysis was used. The results indicated that perceived pros could predict women's screening behavior. Women who perceived higher benefits (pros) of a Pap test at follow-up were more likely to have received a screening (OR = 2.45; 95% CI [1.330, 4.503]; $p = 0.004$), as compared with women who perceived lower benefits of a Pap test screening.

TABLE 3: SUMMARY OF SCALE MEANS BETWEEN WOMEN IN INTERVENTION AND COMPARISON GROUPS (FOLLOW-UP)

Linear regressions were used for the follow-up group comparisons to adjust the pre-test scale and intervention effects.

Scales	Intervention (N=123)		Comparison (N = 124)		All (N = 247)		Standardized Coefficient β	PValue Adjusted
	Mean	SD	Mean	SD	Mean	SD		
Knowledge	0.82	(0.16)	0.79	(0.17)	0.81	(0.17)	0.055	0.305
Pros	4.26	(0.45)	4.16	(0.42)	4.21	(0.43)	0.110	0.031*
Cons	2.65	(0.60)	2.75	(0.53)	2.70	(0.57)	-0.088	0.059
Norms	3.88	(0.47)	3.90	(0.48)	3.90	(0.47)	0.008	0.880
Susceptibility	2.96	(0.59)	2.92	(0.71)	2.94	(0.65)	0.048	0.447

Changes in Scales Scores Within Groups Over Time

We conducted further analysis of scales scores to assess changes over time within each group. Although there were no significant differences *between* intervention and comparison groups on women's knowledge, perceived norms, and perceived susceptibility, there were significant differences between pre- and post-test times among women within the intervention group on these variables. There were statistically significant differences between pre-test and post-test on knowledge 0.04 ($p = 0.016^*$), perceived pros 0.09 ($p = 0.008^*$), and perceived susceptibility 0.13 ($p = 0.011^*$) among women in the intervention group. For women in the comparison group, knowledge was the only factor that showed significant changes over time. The mean difference was 0.03 ($p = 0.02^*$) (Table 4).

TABLE 4: WITHIN GROUP COMPARISONS OF SCALES BETWEEN PRE-TEST AND POST-TEST WITHIN GROUP COMPARISONS

Paired t-tests were used to compare the changes of scale means within intervention and control groups.

Scales	Intervention	PValue	Control	PValue
	Δ Mean	(Paired t-test)	Δ Mean	(Paired t-test)
Knowledge	0.04	0.016*	0.03	0.020*
Pros	0.09	0.008*	-0.01	0.838
Cons	-0.08	0.076	0.03	0.472
Norms	0.00	0.961	-0.03	0.470
Susceptibility	0.13	0.011*	0.08	0.101

Discussion

Although there are few studies documenting screening rates among women in Taiwan, our findings seem to coincide with what has been reported by other authors. About forty percent of the participants in this study had never had a Pap test. A similar rate of 'never been screened' (38%) among non-compliant women in Kinmen, Taiwan was also found in Lee and Chou's study.⁹

The primary purpose of the intervention described was to increase Pap test screening among women who were non-compliant to the recommended screening guidelines. The study finding indicates that the intervention was successful to increase women's Pap test screening behavior. Screening intention was assessed because of the strong relationship between screening intention and actual behavior. We expect to see differences in intention across groups as well as differences in the actual behavior. Although women in the intervention and comparison group showed similar rates of intention to obtain a Pap tests screening at follow-up, changes of intention between pre-and post-test times are significant in each group. Among women who reported no intention to obtain a Pap in the coming year at baseline survey (pre-contemplators), eighty-six percent of the women in the intervention group and ninety-three percent of the women in the comparison group reported an intention at follow-up. This change is likely due to a testing effect on intention.

In an article where the The Transtheoretical Model was applied to the prevention of cancer, Ruggiero underlined one important construct included in the model: decisional balance, which involves the balance between the pros and cons of changing the behavior.²⁰ Decisional balance is critical, especially in the early stage of a behavior change. This model suggests that an individual must increase perceived pros or benefits of changing a behavior in order to move forward from pre-contemplation or contemplation to become ready to take action.²¹ Since all of the recruited women in the current study were either in the pre-contemplation or contemplation stages of a behavior change, the intervention focused on changing the perceived pros of obtaining a Pap test.

Results indicate that the intervention had successfully influenced women's perceived pros of a Pap test as well as screening behavior. Women who received the intervention showed higher perceived pros scores, and reported higher Pap completion rate than women in the comparison group. Furthermore, the perceived pros were found to be a predictor of women's Pap test screening behavior (OR = 2.45).

For the within group comparison, perceived norms was the only factor that did not change over time for either group. This indicates that perceived norms (women's perception about what other women do and think) about the Pap test might be more difficult to influence through the mailed educational packages and phone intervention than the other factors measured.

Because the study population was made up of mostly younger women (age mean = 34), we cannot assume that the intervention would be the same level of effectiveness with older women. This study should be interpreted with the understanding that all the women agreed voluntarily

to participate, and that thirty-five percent of the eligible women refused to participate, therefore, self-selection bias may be functioning. Although we may have expected that these women could have higher screening rates than the general population, similar rates of screening were observed. Data showed about sixty-eight percent (656/969) of the women we approached had not had a Pap in the past year. In Lee and Chou's study conducted among a similar sample size of women in Taiwan ($n = 990$), their finding revealed a comparable percentage of non-compliant women (72%).

It is possible that some women were concealing their non-attendance for screening by not responding to the follow-up survey.¹⁶ Although forty percent of the women responding to the baseline survey were lost to follow-up at post-test, the results did not show differential drop-out rates between women in two groups. Additionally, there was no evidence of demographic differences (age, marital status, employment status, or education level) between women who dropped out and women who remained in the study. Women who were lost to follow-up did have lower levels of knowledge and higher perceived cons compared with women who completed the follow-up. Still, among the women were lost to follow-up, there were no significant differences found between women in the intervention and comparison groups on any demographics, prior screening behavior, intentions, as well as any factors associated with Pap screening. Post hoc power calculation revealed the follow-up sample provided a power of eighty-nine percent to detect a difference of twenty percent magnitude in the screening completion rate (assuming $\alpha = 0.05$).

Although there was some evidence of inaccuracy in the self-reported screening behavior in previous research, the inaccuracy was usually in the direction of over-reporting screening.¹⁶ The chance that women who reported not being screened but had in fact been screened was minimal. The self-reported negative predictive value estimates were ninety-five to ninety-four percent.²²⁻²³ Therefore, women in this study at baseline were likely to be a true sample of "under-screened" women. Questions about "when and where" women obtained a Pap test during the study period were asked in order to minimize the possibility of the over-reporting at post-test. If it occurred, it was assumed that the over-reporting rate was non-differential in intervention and comparison groups. Thus, the between group comparisons of screening behavior would not be affected.

The question may be raised as to why we observed a difference in pros scale but not the cons scale. The reason for the lack of significance found in the cons scale may be due to a larger variance observed in the responses of the cons scale compared with the pros scale. Although the *mean difference* between intervention and comparison groups at post-test was the same for these two scales, the post hoc power analysis for the cons scale indicated a power of only twenty-eight percent to detect a statistically significant differences between groups.

The study results suggest that a theory and evidence-based direct mail intervention can increase Pap screening behavior among Chinese women who were non-compliant to recommended screening guidelines. The direct mail intervention is a cost-effective way to change screening behavior and has the advantage of allowing women to read the information at their leisure. It is also relatively easy to disseminate. Future studies should investigate the role of perceived pros/cons on influencing cancer screening behavior, especially for intervention programs that focus on populations in the early stages of a behavior change. Similar strategies with tailored messages to promote screening behavior can also be adopted to reach at-risk populations.

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Stage of adoption and impact of direct-mail communications with and without phone intervention on Chinese women's cervical smear screening behavior



Stage of Adoption and Impact of Direct-Mail Communications with and without Phone Intervention on Chinese Women's Cervical Smear Screening Behavior

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Abstract

Background: The purposes of the study were to (1) assess the impact of direct-mail communications with and without phone intervention, and (2) examine the characteristics of women who were more likely to respond. **Methods:** Women were recruited from female family members of inpatients admitted to one of the major teaching hospitals in Taiwan (n=424), and were randomly assigned into an intervention group, who received direct-mails and a phone follow-up, or a control group, who received placebo messages. **Results:** Logistic regression analysis showed that women in the intervention group (OR_{adj.}=2.31) and contemplation stage (OR_{adj.}=4.18) were more likely to receive a screening at the end of the program. Among women in the intervention group, contemplators were 5.58 times more likely to receive a screening before the phone intervention (early adopters); and 40% of the screening adopters responded after the phone intervention (late adopters). Late and early adopters were similar in their stage, age, and education. **Conclusions:** Stage and intervention are both significant predictors of screening adoption. The study provides justification for programs to target women in contemplation stage. It also suggests that the boost of a later phone intervention may be consequential for encouraging more women with similar demographics to take action.

Keywords: stage of adoption; intervention studies; evaluation; cervical smears; screening; Chinese

Note

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Introduction

Cervical cancer is the second most common cancer among women, accounting for an estimated 12% of all female cancers worldwide. Some 80% of these cancers occur in developing countries, including Southeast Asia. And it has become the leading cancer among women in those regions [1]. In the U.S., the widely available and utilized cervical smear screening (Pap smear) has contributed greatly to the 70% decrease in the death rate over the past 50 years [2].

However, the few existing studies conducted among Chinese women showed low screening utilization. Hiatt and associates (2001) assessed breast and cervical cancer screenings among ethnic groups (including Chinese women) in the San Francisco Bay area in the U.S. Results from their baseline survey showed that cervical smear screening in the past 3 years was markedly lower among non-English-speaking Chinese women (24%), and only 40% of them reported having ever had a cervical smear [3]. Another study [4] using data from a population-based phone survey in Los Angeles indicated that Chinese women had one of the lowest cervical screening rates, compared with white women (56% vs. 81%). The disparity for cervical smear screening rate between whites and Chinese was significant even after controlling for major factors such as demographics, socioeconomic and health status. Similar low rate of screening has also been observed among Chinese women in Southeast Asia countries such as Taiwan. In Taiwan, the National Health Insurance Plan (1996) provides free health care coverage for an annual cervical smear screening among women aged 30 and over, or younger if married. Despite the universal coverage, the prevalence of screening utilization reported in the few existing studies was low, ranging from 58% to 70% [5-7]. The screening utilization among Chinese women is far from satisfactory.

Although the proven effectiveness of cervical smear screenings in reducing mortality from cervical cancer has led to various public health programs to encourage screening [2,8], few have targeted Chinese women [3,9-11]. Recently, there have been some community based intervention programs in the U.S. targeting Asian ethnic groups, such as Vietnamese-American [12-15], Cambodian Americans [16-17], and Korean Americans [18]. Interventions included mostly labor intensive strategies such as small group educational sessions provided by trained bicultural lay health outreach workers [3,9,12,14,16], home visits [9,16], counseling on perceived barriers and logistic assistance [9,17]. Less labor intensive strategies have been tried, however, these intervention usually succeeded only in increased screening recognition, intention, or awareness, but not behavior [13,14]. Taylor and colleagues [9] used a direct-mail intervention in one of their study arms; and were able to show some increase in screening utilization ($p=0.03$).

In summary, current knowledge is limited regarding (1) the types of less labor intensive strategies that can also be effective or sufficient to encourage screening behavior; and (2) the segments of the screening non-adherent women who are more likely to respond to such messages regarding cervical smear screening.

The present approach was guided by the Transtheoretical Model (TTM) [19]. The model suggests that the acquisition and maintenance of a health protective behavior is not an all-or-none phenomenon, but a gradual process [20]. In the TTM defines stages of adoption are derived from information on past and present screening behavior, and intention to get a screening in the future. This framework has recently been applied to mammography [21-23]. It has also been applied to minority groups [21,24-25]. Tailored intervention using stage-matched materials have been shown to improve mammography use [23,26]. Few studies have tried to apply the model to cervical smear screening behavior. Only one published study was found that described cervical smear screening behavior in Southeast Asian women [27], and none were found that utilized concepts from the TTM in intervention or evaluation studies.

The intervention used in this study consisted of two direct-mail communications, one per month, and a phone intervention at the third month, to encourage non-screening women to obtain cervical smear screenings. These direct-mail communications reflected messages relevant to different stage of readiness. Each participant in the intervention group received materials relevant to all stages, allowing them to respond to the materials most relevant to their own stage of adoption. Finally, there was a phone intervention at the third month. In this call, participants were able to make known whether they had had a cervical smear screening; if not, they were encouraged to have one. The overall effectiveness of the intervention on cervical cancer smear screening completion rate at the end of the program, as well as changes of several screening related beliefs, before and after the intervention, were reported earlier [28]. Results from this control randomized trial showed that the overall intervention was effective in encouraging women to receive a screening. The intervention message was guided by TTM, and central to that model is the notion of stage of adoption. From both theoretical and practical perspectives, it makes sense to know which segments of women are more likely to respond to the intervention. It is as important to know whether there is screening adoption, and also which categories of women are more likely to respond. In addition to examine the moderating effects of stage on the overall intervention in predicting women's cervical smear screening adoption, this study aimed to (1) assess the impact of direct-mail communications with and without phone intervention, and (2) examine the characteristics of women who were more likely to respond to the intervention. What were the characteristics of women who responded at the end of the direct-mail communications, which occurred before the phone intervention (early adopters), compared with those who did not (non-early adopters)? Among all of the women who received a screening at the end of the program, what were the characteristics of early adopters versus late adopters (responded after the phone intervention)? This study examined the impact of adding a phone intervention to moving additional women to higher levels of motivation / readiness for screening adoption. By answering these questions, public health educators can better make informed decision on where and how to devote and allocate prevention efforts to achieve cost-effective outcomes.

Methods

Sample and study design

This study used a true control group, pretest-posttest experiment design. Women were randomly assigned to either intervention or control groups. This study was conducted at one of the major teaching hospitals in Taiwan. Female family members of inpatients admitted to the hospital during fall 1999 were approached. A brief intake survey was used to determine the women's screening history and eli-

gibility. The inclusion criteria for this intervention trial were women who had not had a cervical smear screening in the past 12 months (screening non-adherents) and who were over 30 years and old (or younger than 30 years if married). Women who did not meet the above criteria or had undergone a hysterectomy or had been diagnosed with cervical cancer were excluded. A total of 424 eligible women agreed to participated in the study , with 212 women in each group. The recruitment process has been documented in detail elsewhere [28]. This research was conducted with the approval of Committee for the Protection of Human Subjects (CPHS) at The University of Texas Houston Health Science Center, School of Public Health (HSC-SPH-99-013).

Intervention Description

The three-month intervention was built on existing theories, empirical evidence, and insights gained from a pilot study conducted among the target population. Several important health belief constructs suggested by existing theories, such as perceived benefits (pros), perceived barriers (cons), perceived risk, and perceived norms, were incorporated in the design of the direct-mail communication messages [19, 29-30]. These factors have also been found to have significant association with cervical smear screening behavior among Chinese women with similar characteristics [7]. Additional insights on salient cultural concerns gained from focus groups in the pilot study were also taken into consideration in the communication messages and evaluation measures [31].

Women in the intervention group received two direct-mail communications, one per month, and a phone intervention at the third month. In the first month, each woman received a welcome letter addressed to her personally, an educational brochure which addressed several theory-based health beliefs related to cancer screening, other women's screening experience along with tips to reduce embarrassment or anxiety, and a screening schedule with a health hotline number. In the second month, each woman received a personalized screening invitation letter, role model stories with personal accounts from women in various stages of screening adoption, testimonials from survivors who found out about their cervical cancer early, a cervical cancer and screening fact sheet, and an updated screening schedule. In the third month, program staff proactively contacted women in the intervention group regarding their screening adoption status, offered screening counseling, and, if desired, assisted with arranging appointment for those who had not yet taken action.

Women in the control group received three monthly newsletters on general health information. Women in the control group did not receive a phone call as it might serve as a stimulus for screening adoption. Therefore, women in the control group only received the set of outcome measures at the end. Detailed accounts of the intervention development and program content have been described elsewhere [32].

Measurement

Outcome variable

The cervical smear completion rate was measured two times, first by self-reporting during the phone intervention among women in the intervention group, and again at the end of the intervention via a mailed follow-up survey sent to all women in the study. At least six phone attempts were made to each

woman in the intervention group. Program staffs were asked to make these calls at different times of a day (morning, afternoon, or evening) and different days of a week (weekday and/or weekend) in order to maximize reach among participants. When the line was busy, staffs were advised to call the number a maximum of three times and three minutes apart before that phone attempt was assigned a disposition code [33]. The overall phone contact rate in the program was 63%.

Similarly, several attempts were made to increase the response rate to the follow-up survey. At the end of three-month intervention, women in both intervention and control groups were mailed a posttest questionnaire with a pre-stamped envelope enclosed. As a token of appreciation for their participation in the follow-up survey, women were informed that they would receive a small gift (a nail cutter set) after the completed survey was received. A short notice was sent to women in both groups one week before the follow-up survey [34]. A cover letter personally addressed to each woman was attached to the survey to emphasize the importance of her participation. Reminder calls were conducted three weeks afterwards to those who had not yet returned the survey. A second questionnaire was mailed to those who indicated that the questionnaire was lost or misplaced. Finally, for those who still did not respond, a third round follow-up questionnaire was sent along with the gift incentive to further encourage response. The overall response rate to the follow-up mailed survey in the program was 58%.

Definition on Stage of Adoption

The stages of cervical smear screening adoption were developed and modified by using criteria from previous mammography studies [22, 35]:

1. *Precontemplation*: never had a screening and no intention to have one in the next 12 months.
2. *Contemplation*: no screening in the past year (include either women who have never had a screening or had screenings in the past) but has intention to have one in the next 12 months.
3. *Action / Maintenance*: has had one cervical smear screening in the past year (i.e. on schedule) and intends to have one in the next 12 months.
4. *Relapse Risk*: on schedule, but no intention to get another one in the future.
5. *Relapse*: one or more cervical smear screening in the past, none during the past 12 months, and does not plan to get one in the next 12 months.

Since this study recruited only screening non-adherent women (those who reported no cervical smear screening in the past 12 months), the possible stages for women in the study were Precontemplation, Contemplation, or Relapse. Women in Action / Maintenance, or Relapse Risk stages were not included in the screening intervention trial.

Definition on Early and Late Adopters

EARLY ADOPTERS

Early adopters in this study referred to women who reported having received a cervical smear screening before program staff conducted the phone intervention. These were women who took action (received a cervical smear screening) before the phone intervention.

NON-EARLY ADOPTERS

Non-Early adopters in this study referred to women who reported that they have *not yet* received a cervical smear screening when program staff conducted the phone intervention. Non-early adopters could be either those who did not receive a screening at all at the end of the program, or those who received a screening after the phone intervention (i.e. late adopter, see definition below).

LATE ADOPTERS

Late adopters in this study refers to women who reported not having had received a cervical smear screening when program staff conducted the phone intervention, but reported receiving a cervical smear screening at the end of three-month program. These were women who took action *after* the phone intervention.

Again, it should be noted that only women in the intervention group were contacted for phone intervention ($n=212$). Therefore, women in the control group were not included in the analysis of early versus late adopters. Women in the control group only received general information on health and without any phone contact to avoid the possibility of screening adoption due to phone contact. Both early and late adopters were only identifiable among those who were reached by the program staff through the phone intervention. Late adopters were further narrowed down to those who also returned the mailed follow-up survey at the end of the program.

Data Analysis

Multiple logistic regression analysis was used to examine the moderating effects of stage on the overall intervention in predicting women's cervical smear screening adoption. Furthermore, a combination of stage and demographic variables (age and education) were used in the multiple logistic regression analysis to predict early versus non-early adopters among women in the intervention group. Since almost everyone in the study was married, it made sense not to include marital status in the regression model. Those who received a cervical smear screening by the end of the intervention were classified as either early or late adopters based upon when they received a screening (i.e. before or after the phone intervention). Due to the limited size of these subgroups, Fisher's exact test (instead of multiple logistic regression) was used to compare early and late adopters on stage of adoption, demographics and other variables.

Results

Demographics and Stages at Baseline

Women who participated in the intervention trial were mostly young (mean age of 34 years) and married (90%). Forty percent of the women worked full time and twenty-eight percent of the women did not have a high school education. Prior screening behavior was similar between these two groups (58%). No statistical differences were found in demographics between women in the intervention and control groups [28]. Stages of adoption at baseline between women in the two groups were also similar (see Table 1).

TABLE 1: STAGE OF ADOPTION AMONG WOMEN IN THE INTERVENTION AND CONTROL GROUPS AT BASELINE SURVEY (N=424)

Notes:

^a *Precontemplation*: Never had a screening and no intention to have one in the next 12 months.

^b *Contemplation*: no cervical smear screening in the past year (could include either women who never had a screening or have had screenings in the past) but has intention to have one in the next 12 months.

^c *Relapse*: one or more cervical smear screening in the past, none during the past 12 months, and does not plan to get one in the next 12 months.

Stages of Adoption	Intervention (N=212)		Control (N=212)		All (N=424)		P-value [Chi-Square Tests]
	N	%	N	%	N	%	
Precontemplation (PC) ^a	35	16.5%	48	22.6%	83	19.6%	
Contemplation (C) ^b	137	64.6%	129	60.8%	266	62.7%	.271
Relapse (R) ^c	40	18.9%	35	16.5%	75	17.7%	[X(2)=2.61]
Total	212	100.0%	212	100.0%	424	100.0%	

Stage of Adoption and Intervention on Screening Completion

Univariate logistic regression analysis showed that women in the intervention group were more likely to obtain a cervical smear screening than women in the control group (odds ratio [OR] =2.29; p=.002). Stage of adoption was also a significant predictor of screening completion, with women in the contemplation stage more likely to receive a screening than women in the precontemplation stage (OR=4.41; p=.001). The full model which included intervention condition, stage, as well as the interaction of intervention and stage were examined. The treatment by stage interaction was not significant (p>.05), suggesting the effect of stage was not statistically different between the intervention and control group. The model was then re-run without the interaction term [36]. The multiple logistic regression analysis, which included both stage and intervention as predictors, provided some discrimination on women’s screening adoption (correct classification rate was 66.8%). Wald statistics indicated that both the intervention (adjusted OR=2.31; p=.003) and women’s stage had statistically significant coefficients. Similarly, women in the contemplation stage (adjusted OR=4.18; p=.002) were more likely to obtain a screening than pre-contemplators. No significant differences were found for screening adoption between women in relapse and precontemplation stages (Table 2).

TABLE 2: STAGE OF ADOPTION AND INTERVENTION ON SCREENING COMPLETION AT FOLLOW-UP (N=247)

Notes: -2 Log Likelihood=303.591; Hosmer-Lemeshow Goodness-of-Fit $p > 0.5$;Model $X^2(3) = 31.299$, $p < .001$ ^a Reference category

Interaction term (Intervention * Stage) was not significant

	Wald	df	p-value	Odds Ratio (OR) _{adj.}	95% C.I. for Odds Ratio	
					Lower	Upper
Intervention	9.139	1	.003	2.311	1.343	3.979
Stage	18.987	2	.000			
Precontemplation ^a				1.000		
Contemplation	9.835	1	.002	4.180	1.710	10.219
Relapse	.034	1	.854	1.107	.375	3.267
Constant	15.976	1	.000	.166		

Stage and Demographics among Early versus Non-Early Adopters

In order to investigate the characteristics of women who were more likely to receive screening without phone intervention, women in the intervention group were examined ($n=212$). Among these women, 63% ($n=134$) were reached during the phone intervention at the third month of the program. One in four of these women reported that they had already received a cervical smear screening (early adopters, $n=33$). Univariate logistic regression analysis showed that stage was a significant predictor of early adoption, with women in the contemplation stage more likely to receive a screening without phone intervention ($OR=5.31$; $p=.031$). The full model which included age, education, stage, as well as the interaction term was then examined. Again, no statistical difference was found for the interaction term ($p>.05$), thus it was dropped from the model. Results showed that the multiple logistic regression model, which included age, education, and stage as predictors, was statistically reliable in distinguishing between early versus non-early adopters (model classification rate= 75.4%). Analyses showed that both age and education were similar between early versus non-early adopters ($p>.05$). However, compared to pre-contemplators, contemplators were 5.58 times ($p=.028$) more likely to be early adopters (Table 3).

TABLE 3: STAGE OF ADOPTION AND DEMOGRAPHICS AMONG EARLY ADOPTERS^a AND NON-EARLY ADOPTERS^b
(N=134)

Notes:

-2 Log Likelihood=131.239; Hosmer-Lemeshow Goodness-of-Fit test $p > .05$;

Model $X^2(4) = 10.752, p = .029$

^a Only women in the intervention group and were reached in phone intervention were included. The phone intervention contact rate was 63.2% (134/212). One in four (33/134) of these women were early adopters, who responded at the end of the direct-mail communications (i.e. before the phone intervention).

^b Those women who reported having *not yet* received a cervical smear screening when program staff conducted the phone intervention were non-early adopters (n=134-33=101). Non-early adopters could be either those who did not receive a screening at all at the end of the program, or those who received a screening after the phone intervention (i.e. later adopter, Table 4).

^c Reference category

	Wald	df	P-value	Odds Ratio (OR) _{adj.}	95% C.I. for Odds Ratio	
					Lower	Upper
Age	.075	1	.784	.910	.465	1.784
Education	1.074	1	.300	1.378	.752	2.526
Stage	6.888	2	.032			
Precontemplation ^c				1.000		
Contemplation	4.823	1	.028	5.579	1.203	25.867
Relapse	.346	1	.556	1.770	.264	11.861
Constant	5.435	1	.020	.053		

Early Adopters versus Late Adopters

Among women who received a screening at the end of the intervention (n=55), 60% were early adopters (received screenings prior to the phone intervention) and 40% were late adopters. Fisher's exact tests showed that there were no significant differences in age, education, or stage between these late adopters and early adopters. For example, although younger women (less than 30 years) were more likely to report receiving screening prior to the phone intervention (33.3%) compared with women over 30 years old (18.2%), this difference was not statistically different. Similarly, although women with less education (without high school degree) were more likely to report receiving screening after phone intervention (late adopters) compared to women with a high school education (31.8% versus 18.2%), the analyses did not show statistical differences (Table 4). Screening knowledge and various screening beliefs (perceived pros, cons, susceptibility, and norms) were also examined among early versus late screening adopters, but the results revealed no significant differences (data not shown).

TABLE 4: STAGE OF ADOPTION AND DEMOGRAPHICS AMONG EARLY VERSUS LATE ADOPTERS (N=55)

Notes:

^a Women who were not reached in phone intervention were not included. The phone intervention contact rate was 63.2% (134/212). One in four (33/134) of these women were early adopters, who responded at the end of the direct-mail communications (i.e. before the phone intervention).

^b Women who were either not reached in phone intervention or were lost to follow-up were not included. The follow-up mail survey return rate was 58% (123/212) among women in the intervention group. Late adopters were identified among those who reported having not received a screening before the phone intervention (n=101), but reported receiving a screening in the follow-up mailed survey at the end of the program (n=22).

^c Fisher's exact tests were used in these comparisons.

Variables	Early Adopters		Late Adopters		All		P-value ^c
	N ^a	%	N ^b	%	N	%	
Stage of Adoption							
PC or R Stage	5	15.2%	5	22.7%	10	18.2%	.498
C Stage	28	84.8%	17	77.3%	45	81.8%	
Age							
less than 30 years	11	33.3%	4	18.2%	15	27.3%	.354
30 years and older	22	66.7%	18	81.8%	40	72.7%	
Education							
less than high school	6	18.2	7	31.8	13	23.6	0.334
high school & above	27	81.8%	15	68.2%	42	76.4%	
Total	33	60.0%	22	40.0%	55	100.0%	

Discussion

The findings from this study show that the adjusted effects of stage (OR_{adj.}= 4.18) and the overall intervention (OR_{adj.}= 2.31) were both significant predictors of women's screening adoption at the end of the intervention. Among women in the intervention group, contemplators were 5.58 times more likely to be early adopters. Late adopters consisted of 40% of all screening adopters. Regardless whether women responded before or after the phone intervention, results did not show significant differences in stage, demographics, screening knowledge or beliefs.

As mentioned, one limitation of the study was that screening adoption among women in the control group was only assessed at the end of the intervention. It was not possible to assess the effectiveness of the specific intervention components through comparisons. The current study could not conclude that screening among early adopters in the intervention group was the direct result of the direct-mail communications. Similarly, screening among late adopters could be attributed to factors other than the phone intervention or the cumulative impact of the overall intervention. Evidence from several process evaluation indicators examined in the current study provided reasonable support that the reported screening adoption was a result of the corresponding intervention strategies or components. Overall, almost all women in the intervention group reported (in the follow-up mailed survey) that they received the direct-mail communications (97.6%) and had read the intervention materials (95.9%).

More than 90% of the women found the information “very helpful” or “helpful”; and almost 80% felt the messages were very or somewhat relevant. The exploratory examination of the intervention strategies assumptions showed that early adopters were more likely than non-early adopters to rank the most important intervention component on their screening decisions to be those related to the direct-mail communications, such as the theory-based educational brochure (86% versus 59%; $p=.03$) and other women’s sharing or role model stories (77% versus 46%; $p=.019$). On the other hand, late adopters (received screenings after phone call) were more likely to rank phone intervention as the most important factor on their screening decisions, compared with early adopters (89% versus 53%; $p=.029$). Taken together, these process indicators suggest that the program was implemented well (activities executed) and that the assumptions underlying the intervention (participant exposure, method / strategy assumptions) were relevant. Additional qualitative information collected through the open-ended questions in the follow-up survey also supported these intervention assumptions (data not shown).

Another constraint was that women in the intervention group received information relevant to all states of TTM as opposed to receiving information specifically matched their stage of change. As a result, we do not know if women in the contemplation stage responded because they received information specifically targeted to their stage of readiness. Nevertheless, results from the study showed that health communication messages which included stage relevant notions seem to be effective in promoting the adoption of cervical smear screening. Such implementation strategy could in fact make future adoption and dissemination of the program easier, especially in the case when information on participants’ stages is not available or too costly to obtain. A previous study suggests that women in earlier stages (precontemplation and contemplation) might need more education about cancer and screening, while women in later stages (action and maintenance) might require more support to make appointments rather than education [37].

The small sample size of screening adopters could possibly contribute to the non-significant findings for stage or demographic factors among early versus late adopters. Current findings (although not statistically significant), however, showed some indication that the phone intervention encouraged women age 30 and older or a without high school educated to take action. Larger studies are needed before any firm conclusion can be made.

To the best knowledge of the author, this is the first study to examine the moderating effect of stage on the intervention effectiveness to encourage screening non-adherent Chinese women to receive a cervical smear screening. It is also the first study to investigate the impact of stage relevant direct-mail communications with and without phone intervention on women’s screening behavior. Stage was a significant predictor of early adoption. Results also indicated that stage relevant materials seemed to be effective in encouraging screening, and the boost of a latter phone intervention may be consequential in terms of encouraging more women with similar characteristics to take action. This study provides support for considering stage of adoption in future interventions directed screening behaviors. It also provides justification for targeting women in the contemplation stage. More studies are needed to identify effective strategies that encourage women in precontemplation or relapse stages to undergo cancer-related screenings.

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INSTRUMENT MEASUREMENT

Cervical Cancer Screening Knowledge Scale [Chinese]



Cervical Cancer Screening Knowledge Scale [Chinese]

SU-I HOU, DRPH, CPH, MCHES, RN

子宮頸癌以及子宮頸抹片檢查的認識

以下是有關子宮頸癌和子宮頸抹片的敘述，請告訴我您覺得這些

敘述是正確、錯誤或您不知道道（請圈出您的答案）

Q-Number	Question	True	False	Don't know
Q42.	子宮頸癌是台灣婦女最常見的癌症	正確	錯誤	不知道
Q43.	如果性行為不使用保險套，則得子宮頸癌的機率會較高	正確	錯誤	不知道
Q44.	子宮頸抹片是經由抽血檢查的	正確	錯誤	不知道
Q45.	更年期之後的婦女不必做子宮頸抹片檢查	正確	錯誤	不知道
Q46.	子宮頸抹片可以早期發現子宮頸癌	正確	錯誤	不知道
Q47.	子宮頸癌早期就會使你感到疼痛	正確	錯誤	不知道
Q48.	沒有定期做子宮頸抹片的婦女，發現子宮頸癌時通常已是末期	正確	錯誤	不知道
Q49.	婦女不生小孩以後，就不必做子宮頸抹片了	正確	錯誤	不知道
Q50.	每年定期做抹片是很有用的	正確	錯誤	不知道
Q51.	健康的婦女應該每年都做一次子宮頸抹片	正確	錯誤	不知道
Q52.	子宮頸抹片對像我這樣年齡的婦女是不重要的	正確	錯誤	不知道
Q53.	只有某些有多重性伴侶的婦女才需要做子宮頸抹片	正確	錯誤	不知道
Q54.	子宮頸抹片發現癌症時，通常問題都已到了嚴重得 不得了的地步	正確	錯誤	不知道
Q55.	就算沒有家族癌症病史的人，子宮頸抹片也是必要的	正確	錯誤	不知道
Q56.	只要我的子宮頸抹片結果正常，我就不需要再做了	正確	錯誤	不知道
Q57.	只有在月經之外的子宮出血的其況之下，我才需要去做 子宮頸抹片	正確	錯誤	不知道
Q58.	子宮頸抹片檢查和子宮頸切片是一樣的	正確	錯誤	不知道



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Cervical Cancer Screening Knowledge Scale [English]



Cervical Cancer Screening Knowledge Scale

[English]

Item Difficulty Analyses of the Cervical Cancer Screening Knowledge Scale from the Needs Assessment Pilot Study

Note: (T) – true statement; (F) – false statement
Internal consistency of the knowledge scale (Cronbach alpha) = 0.7010 (16-items).

Item	Percent correct	SD
Q42. Cervical cancer is the most common cancer among women in Taiwan. (T)	0.90	0.30
Q43. People having sex without condoms have higher risk of getting cervical cancer. (T)	0.50	0.50
Q44. Pap smear test is done through drawing your blood sample. (F)	0.89	0.32
Q45. Women who are post-menopausal do not need Pap smear tests. (F)	0.88	0.33
Q47. If you have early stage cervical cancer, you will feel pain. (F)	0.54	0.50
Q48. Women who do not have regular cervical cancer screenings are more likely to have advanced cervical cancer when they were diagnosed. (T)	0.62	0.49
Q49. After women stop having children, they do not need Pap smear tests. (F)	0.94	0.25
Q50. A Pap smear test is most effective when you have one every year or two. (T)	0.94	0.25
Q51. Healthy adult women should have a Pap smear every year. (T)	0.94	0.23
Q52. A Pap smear test is not important for women like me. (F)	0.94	0.25
Q53. Only women who have had many sex partners need to get a Pap smear test. (F)	0.93	0.26
Q54. A Pap smear test only finds problems when they are too far along to be treated. (F)	0.41	0.49
Q55. A Pap smear test is necessary even if there is no family history of cancer. (T)	0.92	0.27
Q56. Once I have a negative Pap smear test, I do not need to have any more. (F)	0.95	0.21
Q57. I need a Pap smear test only when I experience vaginal bleeding other than menstruation. (F)	0.92	0.27
Q58. A Pap smear test is the same thing as a cervix biopsy. (F)	0.59	0.49



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CCSP Research Instrument
[bi-lingual English-Chinese version]



CCSP Research Instrument
[bi-lingual English-Chinese version]

Appendix: Research measurement for the controlled randomized trial

台灣婦女子宮頸抹片篩檢研究調查
Cervical Smear Test Research Project among Women in Taiwan

研究單位: 美國德州大學公共衛生研究院 暨 澄清醫院社區健康室
Research Organizations: The University of Texas – School of Public Health, Houston,
TX, U.S.A.
& Department of Community Health, Cheng-Ching Hospital, Taichung, Taiwan
研究計畫主持人 侯書逸
Principle Investigator: Su-I Hou

以下是有關子宮頸抹片檢查的敘述, 請告訴我們您對每一個敘述的同意程度, 分為—
[非常同意, 同意, 不確定, 不同意, 或非常不同意]五個等級

Following are statements related to cervical smear test. Please tell us whether you strongly agree (SA), agree (A), unsure (U), disagree (D), or strongly disagree (SD).

例如:

For example:

我覺得我的社區治安很好

I feel my neighborhood is very safe.

非常同意 同意 不確定 不同意 非常不同意
SA A U D SD

Q-1	我覺得做子宮頸抹片檢查很痛。 I feel cervical smear test hurts.	非常同意	同意	不確定	不同意	非常不同意
Q-2	子宮頸抹片檢查可以在癌症發生之前 查出問題。 A cervical smear can find a problem before it develops into cancer.	非常同意	同意	不確定	不同意	非常不同意
Q-3	做子宮頸抹片檢查讓我覺得很困窘/ 不好意思。 I feel embarrassed to have a cervical smear.	非常同意	同意	不確定	不同意	非常不同意
Q-4	子宮頸抹片檢查可以在癌症還有可能 治癒的時候發現。 A cervical smear can find cancer at a point when it is likely to be cured.	非常同意	同意	不確定	不同意	非常不同意
Q-5	做抹片檢查讓我很緊張。 A cervical smear test makes me nervous.	非常同意	同意	不確定	不同意	非常不同意
Q-6	子宮頸抹片檢查是非常簡單而且快的 過程。 The cervical smear procedure is very simple and quick.	非常同意	同意	不確定	不同意	非常不同意
Q-7	定期做子宮頸抹片檢查可讓我對我的 健康放心/安心。 Regular cervical smear test gives me peace of mind about my health.	非常同意	同意	不確定	不同意	非常不同意
Q-8	每年定期做子宮頸抹片檢查讓我覺得 我照顧自己的健康。 Having a cervical smear every year gives me a feeling of control over my health.	非常同意	同意	不確定	不同意	非常不同意
Q-9	我的男朋友/丈夫不願意我去做子宮頸抹片檢查。 My partner / husband would not want me to have a cervical smear.	非常同意	同意	不確定	不同意	非常不同意
Q-10	如果我每年定期做抹片, 我的家人會 覺得我很關心照顧我的健康。 My family will think that I take care of myself if I have annual cervical smears.	非常同意	同意	不確定	不同意	非常不同意
Q-11	如果我做抹片, 我的男朋友/先生會 支持我。 My partner / husband will support me if I want to have a cervical smear.	非常同意	同意	不確定	不同意	非常不同意

Q-02	我願意為了我的健康做篩檢。 I am willing to obtain a cervical smear for health reason.	非常同意	同意	不確定	不同意	非常不同意
Q-03	我可以鼓勵我的親友去做篩檢 假如我自己去做篩檢。 I can encourage my friends to have a cervical smear if I do it myself.	非常同意	同意	不確定	不同意	非常不同意
Q-04	我覺得定期做篩檢是照顧我的家庭 最重要的一環表現。 I feel having annual cervical smear is a way to show I take care of my family.	非常同意	同意	不確定	不同意	非常不同意
Q-05	我做是為了我的先生/小孩做篩檢。 I want to have a cervical smear because I need to take care of my family.	非常同意	同意	不確定	不同意	非常不同意
Q-06	早期子宮頸癌的治療情況。 Cervical cancer in the early stage has high chance to be cured.	非常同意	同意	不確定	不同意	非常不同意
Q-07	我覺得我沒有時間做篩檢。 I do not have time for a cervical smear test.	非常同意	同意	不確定	不同意	非常不同意
Q-08	我覺得做篩檢對我來說太麻煩。 It is too much trouble for me to obtain a cervical smear test.	非常同意	同意	不確定	不同意	非常不同意
Q-09	做了宮頸篩檢對我來說不重要。 Getting a cervical smear is not an important thing for me (reverse coded).	非常同意	同意	不確定	不同意	非常不同意
Q-10	讓男醫師做篩檢會感到很不舒服! 不舒服。 I feel uncomfortable if a male doctor exam me.	非常同意	同意	不確定	不同意	非常不同意
Q-11	越早發現子宮頸癌,治療率越高。 The early a cervical cancer is detected, the higher chance of a cure.	非常同意	同意	不確定	不同意	非常不同意
Q-12	如果以醫師做子宮頸篩檢的檢查更 更加舒服。 I would feel more comfortable to have a smear if a female doctor performs the procedure.	非常同意	同意	不確定	不同意	非常不同意
Q-13	我只有向醫師提醒之下才去做篩檢。 I would only have cervical smears if I get reminders from my doctor.	非常同意	同意	不確定	不同意	非常不同意
Q-14	假如我沒有陰道不適我是不會去做 子宮頸篩檢。 I would not have a smear unless I feel some vaginal symptoms or discomfort.	非常同意	同意	不確定	不同意	非常不同意
Q-15	假如我沒有做性行為,我是不會去做 篩檢的。 I will not have a cervical smear if I am not sexually active.	非常同意	同意	不確定	不同意	非常不同意
Q-16	假如我未婚,我不會去做篩檢。 I will not have a cervical smear if I am not married.	非常同意	同意	不確定	不同意	非常不同意
Q-17	子宮頸篩檢已是平常例行的醫療檢查。 Cervical smear is now a very routine medical test.	非常同意	同意	不確定	不同意	非常不同意
Q-18	我覺得我得到子宮頸癌的機率很高。 I feel my chance of getting cervical cancer is high.	非常同意	同意	不確定	不同意	非常不同意
Q-19	我覺得其他婦女都定期做篩檢。 Other women in my age obtain a cervical smear regularly.	非常同意	同意	不確定	不同意	非常不同意
Q-20	所有的婦女都應該做定期的子宮頸 篩檢檢查。 All women should have regular cervical smears.	非常同意	同意	不確定	不同意	非常不同意
Q-21	我在一生中有可能得到了宮頸癌。 I might get cervical cancer at some point during my life.	非常同意	同意	不確定	不同意	非常不同意

Q-32	我認識的人認為抹片檢查很重要。 People I know think cervical smear is very important.	非常同意 SA	同意 A	不確定 U	不同意 D	非常不同意 SD
Q-33	和其他婦女相比我有可能得到子宮頸癌。 Comparing with other women, my chance of getting cervical cancer is high.	非常同意 SA	同意 A	不確定 U	不同意 D	非常不同意 SD

Brief Summary of the Research Instrument

This appendix contains measurement items of Cervical Smear Belief Inventory (CSBI) for Chinese Women. The baseline data, collected from the controlled randomized trial ($n=424$) described in Phase III, were used to examine the psychometrics of the research instrument. Reliabilities showed good internal consistency for the perceived Pros, Cons, and Susceptibility scales (α ranged .78 - .87). Factor analysis showed good construct validity of the scores of CSBI which revealed concordant patterns with existing social and behavioral theories, except that the Norms scale was loaded with the Pros scale. Moreover, in the Cons scale there appeared to be a “cultural belief toward virginity.” Item-discrimination analysis showed that all items in the CSBI successfully discriminated women with favorable cervical smear beliefs from those with unfavorable beliefs ($p < .001$). In summary, many psychometric properties of the CSBI showed that the scores of the inventory were reliable and valid to assess belief towards cervical smear among Chinese women (Hou & Luh, 2005).



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CONCLUSION

Mixed Methods Research: State of the Art Integration Procedures [Chinese version]



混合研究法：創新整合程序

(Mixed methods research: state of the art integration procedures)

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Note

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混合研究法導論

現代混合研究法肇始於1980年代末，目前約有50本相關書籍。混合研究法期刊(Journal of Mixed

Methods Research) 剛於2016年完成十年出版回顧[1]；國際複合研究方法期刊(International Journal of Multiple Research Approaches)由2007出版至2015，後於2017復刊。國際混合研究法學會(Mixed Methods International Research Association, MMIRA) 2014年於波士頓發起了第一屆MMIRA研討會[2]；日本混合研究法學會(Japan Society of Mixed Methods Research)於2016年成為MMIRA第一個關係組織；加勒比海分會(Caribbean Chapter of MMIRA)於2017年成為MMIRA第一個分會。以上時間點大致勾勒出混合法的發展脈絡。

以整合為主要特色的現代混合研究法

混合研究法誕生的一世紀前，質量並用的研究方法其實早已是自然及社會科學領域的常態[3]。關於混合方法研究存在兩個主要爭議。第一個質疑與批評主要針對質性建構主義和定量後實證主義哲學基礎的兼容性。此議題是該領域旗艦期刊“混合方法研究雜誌”前十年討論最多的問題之一。目前至少有五種混合方法研究範式被認為是該領域的哲學基礎，實用主義，參與/變革式，辯證多元主義，批判現實主義，及後現代主義[4]。儘管仍有一些學者不信服，但這場辯論似乎已基本消退[1]。第二個爭議是關於混合方法是否是新的。例如，Maxwell記錄了在許多學科中將定性和定量研究結合在一起的悠久歷史[3]。Fetters[5]分析了興起於1980年代的現代混合法，其四大特徵如下：1)具分析上的突破，尤其是關於整合質性及量性數據的手法；2)使用混合研究方法專用語言，使學者即使處於不同的領域也能就方法論交流想法；3)了解相關的哲學假設；以及4) 團隊研究從不同方法論觀點探討問題。Fetters和Molina也更進一步談到了混合研究法整合三部曲，哲學，方法論和方法，以及15個整合維度的機會[1]。

現代混合研究法主要特徵為整合，也就是系統性同時使用質性和量性的研究法[6]。過去的西文研究已系統性地探討健康科學研究如何整合多種研究法[7]，而本文目的則是以中文解說其關鍵整合程序以補足中文文獻的缺陷。

混合研究法主要程序

整合可以在研究問題、研究設計、抽樣、資料收集、分析、推理，以及研究成果彙報等各面向進行，以下將逐一解釋（表一）。

1. 透過研究問題整合

探討社會現象的過程中，質化研究者探討個人經驗，以及個人對現象的詮釋，而量化研究者會尋找變數間的因果關係，或做組間比較。使用混合法的研究問題結合了質量性研究問題的特質。

2. 透過研究設計整合

混合法之研究設計分為漸進設計及固定設計。漸進設計(emergent designs)是因應新浮現的議題而不斷修正的研究設計[2]；固定設計(fixed designs)是事前計畫好並嚴格遵守的研究設計。實務中這兩種研究設計常交互使用。

學術界就混合研究法中的固定設計已有許多討論，最常見的分類法是Creswell 和Plano Clark的三種核心設計(或稱基礎設計)：收斂型設計 (convergent designs, 又稱同時及平行設計)、解釋型序列設計(explanatory sequential designs)、以及探索型序列設計(exploratory sequential designs) [8]。目前學界將核心設計納入較複雜的研究設計中的專有名詞尚未統一，有稱為進階設計[8]、進階應用[4]、混合法多重流程設計[9]、複雜設計[10]、以及進階架構[6]等。

a) 核心設計

混合法的三種核心設計包含一個收斂型，以及兩個序列型混合法設計。這幾種設計區分了資料收集和分析的時間序。

i) 收斂型設計

此設計法又被稱為多重檢定設計(triangulation design)，其目的是同時收集及分析質量性兩種數據後比較結果。此法需收集量化（趨勢、大數據、一般化）及質化資料（細節、小數字、深入），接著再比對量化和開放性質性資料結果。例如，有研究者在推廣直腸癌篩檢的研究中，收集網路問卷（量化資料）與焦點團體訪談（質化資料），然後加以彙整為總體研究結果[11]。

ii) 解釋型序列設計

此法是先收集量化數據，再以質化資料進一步解釋。例如，某醫院平衡計分卡研究就是解釋型序列設計的應用[12]。研究者首先透過問卷收集資料，再以質性訪談分析動機及其影響。尤其當分析結果顯示統計差異，或當預期結果與實際結果不符時，後續的質化資料有助於解釋分析結果。此研究設計亦可用來選擇質化訪談的受訪者。

iii) 探索型序列設計

此法先進行質性探索，然後才收集量化資料。這種設計可以以質性研究發展出測量工具，並以量化方式驗證，或在變數不明時釐清變數以作量化研究之用。Hou等人在台灣子宮頸癌篩檢計畫中，研究者首先透過質化訪談找出接受抹片篩檢(pap screening)之關鍵因素[13]，之後再依此關鍵變數發展問卷，並以量化方式探討前階段得知的因素與篩檢行為的關係[14]。

b) 進階架構

進階架構包含多階段評估(multi-stage evaluation)、介入措施研究法(intervention)、個案研究，以及參與式（社會正義型）設計。

i) 多階段架構

進階架構是一種通稱，其特徵為多階段資料蒐集並常在評估研究中使用。此架構之設計元素可能包括序列型、收斂型，以及縱貫型研究設計(longitudinal)。舉例來說，Hou等人在多階段混合法探討台灣子宮頸癌篩檢行為的研究就採用了三個主要階段：(1)發展問卷與需求評估[13-15]；(2)以介入措施架構圖(intervention mapping, IM)發展介入計畫，一種融合理論與實證的創新介入措施發展流程[16,17]；以及(3)使用隨機對照試驗(randomized controlled trial, RCT)以評估篩檢成效[18,19]。

ii) 介入措施架構

介入評估研究如隨機對照試驗，通常以量化為焦點。質性資料可幫助支持評估過程：1)介入前，發展測量工具，找到適合的受試者，並評估可行性；2)介入中，了解執行相關因素或預料之外的變數；3)介入後，解釋結果，例如離群值、未預期結果，或發展前導數據等等。在Hou等人台灣子宮頸癌篩檢的研究中，第二階段即結合了第一階段收集的質量化兩種數據以了解背景因素，並發展過程與結果評估的研究問項[16]，而第三階段利用混合研究嵌入法於介入措施前中後的質性資料，以強化計畫評估結果[18,19]。

iii) 個案研究混合法架構

研究者可先定義案例範圍，然後依據案例特質、可行性要素及研究問題收集詳細的質化及量化數據。比較個案研究法(comparative case studies)即為此架構的延伸。Little et al.就曾使用多種質與量數據來評估日裔美籍婦女的產前照護成效(prenatal group visit program)[20]。

iv) 參與式（社會研究方法）架構

此設計納入了目標群體的意見，如社區參與研究(community-based participatory research, CBPR)[21]。這種研究常觸及健康差距或社會公義等議題，目的在賦權給社會弱勢團體。Schulz等人就曾和底特律社區合作，運用此架構以提升非裔美籍及拉丁美籍低收入戶的心血管健康[21]。

3. 透過抽樣整合

量化研究多使用概率抽樣(probabilistic sampling)，但質化研究使用的是立意抽樣(purposive sampling)[9]。混合法研究中，抽樣面向有：a)抽樣對象，b)時間點，以及c)樣本關係。抽樣對象包含人、文件檔、地點、事件等；時間點指收集不同質量數據的時間順序，如質化及量化數據可能同時收集（但不一定會同時分析）、依序收集（如縱貫型研究），或

在不同時間收集（如前測後測）。樣本關係分為四種：i)一致抽樣樣本，質化和量化數據都是從同一組研究樣本中收集的；ii)巢式抽樣(nested)，由大樣本群內收集量化數據，再由此樣本群內收集質化數據；iii)分開獨立抽樣(separate)，以一組資料當樣本，再由人口特質相近的另一群樣本裡收集另一組資料；iv)多階層抽樣，樣本來來自母群體的數個階層，如校園預防注射計畫中，樣本可來自教育官員、校長、教師、職員，及護理人員群體中取得[9]。

4. 透過資料收集整合

質化與量化的資料結合時，又被稱為「介面點」(the point of interface)。如前所釋，整合可以是把一種資料融入另一種，或是把兩種結合在一起。這些整合方式通常與研究設計有關，例如收斂型設計常使用配對，擴展（資料繞射，data diffraction），建立案例等。序列設計常使用連接(connecting)或建造(building)等整合方法，介入措施評估設計常使用嵌入式(embedding)的整合法。以上範例請見表二。

5. 透過分析整合

混合研究分析整合有三個面向：典範內程序、核心程序，以及進階程序[22]，範例請見表三。

6. 透過元推理（metainference）整合

元推理是分析了質量兩種資料後形成的推論，共有四種形式[7]：a)收斂(convergence)型，質化及量化資料呈現相同結果；b)互補(complementarity)型，質化及量化數據呈現不同但不相衝突的結果；c)延伸(expansion)型，質化及量化數據呈現同一現象的不同面向；d)不一致(discordance)型，質化及量化數據呈現互相衝突的結果。

7. 通過多篇期刊文章發表來整合一個複雜的混合方法研究計畫

混合方法研究計畫所發表的期刊文章可以是質化研究、量化研究、質量混合研究，混合方法學研究，或以上之任意組合[23]。

討論

公共衛生研究人員可以通過混合方法研究的優缺點來思考自己的工作。在概念上和實踐上，混合方法研究通過利用量性與質性研究法的相互優勢並抵消彼此弱點，為公共衛生研究人員提供了將研究者的觀點以及目標人羣的觀點結合起來的機會。至於缺點，混合方法研究通常較為複雜和昂貴，因為它不僅需要使用兩種範式進行嚴謹研究的能力，而且還需要有整合質量性結果的專業知識技巧。

結論

現代混合研究法已興起成為第三種典範[24]，但使用過程中應考慮各種整合面向。比如研究問題、研究設計、抽樣、資料收集、分析、元推理，以及研究結果發表。本文簡述了各種面向整合程序的總體觀念，希望能促進此研究法在台灣公共衛生研究領域的應用。

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表一 混合研究法創新整合程序（根據整合面向與途徑）

整合面向	途徑
研究問題	質化研究問題
	量化研究問題
	混合研究問題
研究設計	3種核心設計
	- 收斂型
	- 解釋序列型
	- 探索序列型
	4種進階架構
	- 多階段
	- 介入措施評值
	- 個案研究法
	- 參與式社會研究架構
	- 一致性抽樣
- 巢式抽樣	
抽樣	- 分開獨立抽樣
	- 多階層抽樣
	配對
	擴展 (資料繞射)
資料收集	建立案例
	連結
	建造
	產出
	嵌入
	a) 典範內分析
	b) 核心程序
	- 螺旋型比對法
	- 穿針引線法
	c) 進階程序
- 資料轉換及融合	
- 繪製聯合顯示圖表	
- 視覺化資料	
- 收斂	
- 互補	
元推理討論	- 延伸
	- 不一致

報告發表	- 階段式發表出版 (staged)
	- 質量結果鄰近呈現法(contiguous)
	- 質量結果交織呈現法(weaving)

表二 透過資料收集整合

整合途徑	例子
a) 透過構面對達整合目的 此法始於研究設計階段，研究者針對相同構面收集質化及量化兩種數據。	訪談題項和問卷題項配對，如研究者可藉比對訪談和問卷結果以了解癌症病患的生活品質。
b) 透過擴展（資料繞射）達整合目的 此法收集質化及量化的資料，據以探討同一現象的不同構面。	測量母群體對預立遺囑(advance directives)概念之理解，再輔以質性方法解析採取或不採取行動的理由。此法使用「裁剪」或「繞射」來擴展以整合資料[25]。
c) 透過建立案例達整合目的 此法藉質化及量化兩種資料來發展案例，特別是透過多元資訊源來解釋案例。	Shultz等人透過具多樣性的受試者收集到各種質化及量化的資料，並據此評估一項為家庭醫學科住院醫師執行生殖部位檢查的培訓計畫[26]。
d) 透過連結達整合目的 此法重點為連接質化及量化兩種形式的數據，也就是以一組數據為本，據此決定另一種形式的數據該如何收集。	Fetters等人在大樣本群中瞭解懷孕婦女的經驗，再從這個樣本群裡抽取少數樣本進行質化訪談，以突破文化及語言障礙來瞭解無痛分娩[27]。
e) 透過建造達整合目的 此法由一個資料庫決定另一個資料庫該如何收集資料。	質化研究可以找出能納入量化問卷的變數，而量化問卷也能點出質化無法解釋的結果或模式。量化問卷結果在後續質性研究中亦可進一步做為訪談綱要的擬定。
f) 透過產出和驗證達整合目的 研究者透過整合質化及量化數據來測試新模式。	這種模型可以透過多種方式改進，例如先收集質性資料再測試量化問卷，或發展出初步量化模型後，再透過質化程序檢視其外在效度。
g) 透過嵌入法達整合目的 研究者引入一種形式的資料以支持另一種形式的資料。例如，在量性的臨床實驗的前中後期收集質化資料。此法最大的特色就是可以在多個焦點上同時連結質化及量化資料。	在臺灣子宮頸癌篩檢計畫中，質化及量化的資料皆被用於介入措施發展，以了解此計畫之重要影響因素與成效[16,18]。

表三 透過資料分析來整合

整合途徑

a) 典範內分析法

在分析資料之始，使用質化程序分析質化資料或統計程序進行量化資料分析。

b) 核心程序

核心程序中通常包含同時檢視質化和量化資料，連結兩種資料以加速理解研究主題，也能找出共同議題做後續比較。

r. C) 進階程序

進階程序分為三種：資料轉換及融合、聯合顯示圖表、其他視覺化程序。

「資料轉化(conversion)」和「融合(merging)」指的是將一種資料轉換成另一種資料。「繪製聯合顯示圖表」指的是研究者將質量性資料並置一起，利用表格或矩陣來並排顯示資料[29]。其他視覺化程序也不斷進步包括社群網絡分析法或地理資訊系統分析等。

例子

這個程序幾乎在所有混合研究法的初期都會使用，研究者會從兩種方法中取得研究發現。

1. 「螺旋型比對法」－研究者在質量化結果裡螺旋比對，找尋兩種資料的共通點[1]。
2. 「穿針引線法」－研究者選擇一個關鍵主題或研究問題後就緊緊跟隨它，並在另一個資料庫中找尋共同性來做比較[28]。

1. 資料轉換－「量化」是將質化資料轉換成量化資料，「質化」是將量化資料轉換成質化資料。

2. 聯合顯示圖表－目的是由同時檢視質量化結果以提出新見解，透過將相關資料並列整理成圖表、表格、矩陣等。

3. 其他視覺化程序：Wagner等人使用社群網絡分析法(social network analysis)檢視女性性工作者網絡，並解釋他們跟私生活中男性伴侶的關係[30]。



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