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The Social Ecology of Cervical Cancer: The Challenges to Pap Smear Screening

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ABSTRACT
Cervical cancer is a preventable disease. The risk factors for the development of cervical cancer include both biologic factors and social factors. In the United States, the leading risk factor for the development of cervical cancer is not having a Pap smear for five years prior to the diagnosis of cancer. In low and middle income countries, cervical cancer incidence and mortality are directly related to the lack of both screening programs and cancer treatment facilities. This paper examines the social ecology of cervical cancer. The literature is reviewed on social and cultural barriers to access to health care and its effect of cervical cancer rates and outcomes.

Keywords: Cervical Cancer; Pap Smear; Screening; Social Ecology

1. Introduction
Cervical cancer is a preventable cancer. It has a long preinvasive phase that can be easily detected by an accurate screening test, the Pap smear. Pap smear screening has become so successful that the American Society of Cytologists and Cervical Pathologists (ASCCP) 2012 guidelines recommend a reduction in screening frequency to every three years [1]. Despite this highly successful test along with the use of HPV testing, which increases the screening sensitivity, women still present cervical cancer in high-income countries (HICs) such as the United States and the European Union [2].

In low and middle income countries (LMICs), screening programs with Pap smear screening are challenged by a lack of medical infrastructure. As a result, low cost solutions using visual inspection with acetic acid (VIA) have become a successful triage program for cervical disease since the mid 1990’s.

Yet in LMICs, cervical cancer is the leading cause of cancer death in women. In HICs, cervical cancer is directly related to not getting a Pap smear and to not coming in for a pelvic examination. The reasons for not accessing screening opportunities whether by VIA in LMICs or by Pap smear and HPV testing in HICs is complex and nuanced by socioeconomic status, culture, and the structural violence of healthcare bureaucracies. This paper examines the social challenges to women in North America that delay or prevent a life saving, inexpensive screening test. The problem is examined at five different levels: intrapersonal, interpersonal, organizational, community and societal which are also summarized in Table 1. The paper concludes with a brief summary of the international literature.

2. The Magnitude of the Public Health Issue
In the United States, there were 12,610 new cases of cervical cancer and 4290 deaths in 2011. Two thirds of cervical cancer cases occur in the underserved populations of the United States including those living in rural communities and the poor [3]. In particular, the rates of cervical cancer among Latina women and African American women were 14.7 per 100,000 and 13 per 100,000 respectively compared to 8.6 per 100,000 for white women [4].

2.1. Factors Related to Delay of Screening at the Intrapersonal Level
The factors that impact health from an intrapersonal level include both psychological and biological issues. These
Table 1. Challenges to Pap smear screening the social ecology levels.

| General Influences | Barriers to Cervical Cancer Screening |
|--------------------|--------------------------------------|
| Personality        | Depression, anxiety                  |
| Intrapersonal level|                                      |
| Comprehension      | Ability to navigate healthcare system |
| Genetics           | Less common high-risk subtype HPV     |
| Family             | Family history cervical cancer        |
| Home environment   | Embarassment                          |
| Culture            | Fatalistic beliefs                    |
| Social mores       | Smoking                               |
| Employment         | Unemployment                          |
| Interpersonal level|                                      |
| Organization       | Lack of health care awareness         |
| School             | Lack of healthcare coverage           |
| Health Insurance   | Minority status, discrimination       |
| Race, Ethnicity    |                                      |
| Community level    | Low socioeconomic status              |
| Socioeconomic status|                                     |
| Public resources   | Citizenship status                    |
| Healthcare facilities|                                   |
| Society level      | Delay of services                     |
| Educational system | Utilization of healthcare             |
| Government policy  | Lack of financial support             |

include factors that make up personality, ability to understand health issues, ability to navigate the healthcare system, and genetics.

Women who suffer from psychiatric disorders will be less likely to undergo cancer screening [5]. The consequences include delay in diagnosis and treatment. However one study demonstrated that depression and anxiety correlated with a reduction in cervical cancer screening and diagnostic delays of abnormal Pap smears [5]. Another systematic review of nineteen studies on mental illness and screening confirmed the presence of disparities in screening rates for this vulnerable population [6].

A fascinating study analyzed the distribution of HPV oncogenic subtype by ethnicity and poverty. There was a significantly lower proportion of preinvasive disease related to the most common HPV subtypes (HPV 16 and 18) among African American and Hispanic women in poverty based areas [7]. This suggests that for poor, minority women, the current 16/18 HPV vaccine may not be effective for prevention of cervical cancer.

2.2. Screening Barriers at the Interpersonal Level

In the social ecology health model, the interpersonal level includes the influences of the family, the home environment, and the culture and mores of the peer group. Despite universal healthcare and an aggressive cervical cancer-screening program in Canada, Chinese-Canadian women have had a higher incidence of cervical cancer and a higher death rate [8]. An analysis of Chinese women who live in North America revealed a reluctance to undergo Pap smear screening because of embarrassment. These women considered Pap smear testing to be linked to sexual promiscuity [9].

In the United States, Latinas have an increased rate of cervical cancer compared to white women. Cultural norms are important to understand. Latina women who never underwent Pap smear screening frequently held fatalistic beliefs [4]. A program of planned behavior training to increase perceived behavior control was useful to increase Pap smear screening in this population [10].

In Canada, there has been an increase in cervical cancer rates among the First Nation population. An analysis of lifestyle risk factors and screening shows no difference in Pap screening suggesting that the increase is due to an interpersonal ecology level shift dues to smoking [11].

An analysis of attitudes towards screening and compliance with Pap smear screening did not show a change based on a family history of cervical cancer [12].

2.3. Challenges at the Organizational Level

The organizational level of social ecology includes healthcare barriers that can occur through employment challenges, the school environment, and healthcare in-
surance. In the absence of universal healthcare in the United States, insurance coverage becomes one of the factors associated with delays in screening for cervical cancer. Screening was strongly associated with health insurance among African American women in South Eastern United States [12].

In an analysis of the New Jersey State Cancer Registry, lack of health insurance was linked to significantly higher death rates from cancer compared with people with private insurance [13]. Cervical cancer five-year survival rates for the 2002 to 2004 period were 68% versus 73% for uninsured versus privately insured [13]. A national health interview survey of cancer survivors analyzed the rates of screening for other cancers compared to healthy controls. Women who had survived one cancer were less likely to undergo cervical cancer screening compared to the general population and were between 8% and 20% below the screening goals of “Healthy People 2010” [14]. The reasons for lack of screening were unclear and the authors recommended information campaigns to address this screening deficit.

Interventions at an organizational level can be effective for vulnerable groups. A program using lay health workers to educate and navigate Mexican-American women led to an increase in Pap smear screening in this population [15]. Another similar intervention recruited female family members among Arab, African American, and Latina women to increase willingness to get screened [16].

2.4. Challenges at the Community Level

The community level includes factors that affect healthcare that derive from issues of race, socio-economic status, the resources of available public resources, and the “built environment”. Minorities by race and ethnicity experience a disproportionate incidence of cervical cancer compared to whites. In African American women, the rate of cervical cancer escalates with age [3]. Looking at changes in disparities from 1979 to 2009, the cervical cancer incidence equalized for younger African American women compared to whites but the disparities persisted for older black women [17]. Delay in definitive therapy for cervical cancer occurs among women with lower income and educational background. Analysis of delays pointed to financial barriers, delay on the part of the doctor, and inability to navigate the healthcare system [18].

In Georgia, there were geographic differences in incidence and death rates for cancer that appeared to be directly linked to proximity to health centers and socio-economic status [19]. The mortality to incidence ratio (MIR) is higher among black women at 0.423 compared to white women with a MIR of 0.279 [19].

Another study looking at screening among African immigrant women in Minnesota analyzed health behaviors through a survey [20]. Age and education were not associated with getting Pap smears. The most important factor was duration of living in the United States. This data suggests that unlike African American women, the barriers to Pap smear screening for immigrant women have more to do with learning the system of a new country.

Native American women reported reluctance to use health care facilities for cancer screening because of perceived discrimination [21]. Other factors of importance for these women included a high school education, unemployment, and a history of diabetes.

2.5. Cervical Cancer Screening Disparities at the Society Level

The societal influences of healthcare usage and outcomes include the infrastructure of healthcare, the presence of health facilities, economics, the educational system, and government policy.

The incidence of cervical cancer in the United States varies by geography and region. This partially reflects areas of deep poverty such as Appalachia, the Deep South, and the Mexican-Texan border. For example, the incidence of cervical cancer and the cancer death rate is higher among white women in Appalachia than among white women who do not live in Appalachia (9.6 and 3.1 per 100,000 and 7.7 and 2.3 per 100,000 respectively) [22]. There are disparities in medical infrastructure utilization. Follow-up of abnormal results and utilization of treatment services are significantly delayed for ethnic minorities and poor women compared to white women [23].

3. Cervical Cancer Screening Challenges around the World

In Malaysia, the incidence of cervical cancer is increasing [24]. However, semi-structured interviews of patients with cancer revealed that the majority of people had never heard of cancer screening tests. Analysis of the barriers to cervical cancer screening revealed a lack of public education suggesting an organizational level deficit. This was combined with a personal and community belief system that was suspicious of medical testing [24].

Cervical cancer screening rates have been increasing in Korea from 40% in 1998 to 52.5% in 2010. However demographic data reveal that screening is related to socioeconomic status through educational level and household income [25]. This data suggests that the main barrier to screening in Korea is at the organizational level in the social ecology model. This same pattern by socioeconomic status for cervical cancer was identified looking at cancer registry data in Iran [26].
In Argentina and Latin America in general, cervical cancer is the second most common cancer in women. An analysis of Pap smear screening showed an increase in screening from 51.6% in 2005 to 60.5% in 2009 [27]. However, most of the increase in Pap smears screening has been among the high-income women. An evaluation of eight provinces in Argentina revealed either a stable or an increasing inequality by income and education gradients among medium-income women. This suggests that the world economic crisis has differentially impacted the medium-income group.

In the European Union, all the countries of the EU have universal healthcare. Disparities in screening are still seen. For instance, in the United Kingdom, cervical cancer screening rates were significantly lower in women with learning disabilities [28]. This barrier is at the intrapersonal level and would require the establishment of a navigation system within the medical infrastructure to address this population a risk. In Italy, education and occupation were associated with high levels of cervical cancer screening compared to unemployed women [29].

4. Conclusion

The barriers to cervical cancer screening are complex and intimately linked to social, cultural, and societal forces.

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