RISK SCORING FOR SELECTIVE SCREENING OF CERVICAL CANCER

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ABSTRACT

Context: Cervical cancer is the leading cause of cancer related mortality in developing countries. The lack of routine cytological screening in developing countries is largely responsible for this high mortality.

Objectives: To develop a risk score that would easily identify women at greater risk of having cervical intraepithelial neoplasia (CIN) for use in selective population screening.

Study Design, Setting and Subjects: This is a cross sectional study carried out in two tertiary institutions in Northern Nigeria.One thousand one hundred and twenty-nine women attending clinics at two Teaching Hospitals in Nigeria were randomly screened for CIN. Each had a pap smear taken for cytology after a questionnaire had been filled.

Results: There were 1129 questionnaires administered during the study period. The mean age was 28.9±6.8 years. The majority, 61.9% had no formal education and 76.2% were unemployed housewives of low socio economic class. The risk factors that showed statistically significant relationship with CIN were number of marriages (OR = 12.6, P=0.006), polygamy (OR = 21.7,P=0.001), premarital coitus (OR = 30.0,P=0.001), coital frequency (OR = 30.9,P=0.002), number of sexual partners (OR = 35.9,P=0.003), parity (OR = 51.4,P=0.001), coitarche (OR = 52.8,P=0.020), age at first marriage (OR = 78.1,P=0.001) and age (OR = 107.9,P=0.001).

Conclusion: Risk scoring can help filter those women at high risk of cervical neoplasia from history alone during clinic visits. This is particularly beneficial in resource poor settings with highly competing health demands, hence improving the sensitivity and specificity of screening by selectively targeting population at risk.

Keywords: Cervical cancer, risk score, selective screening

INTRODUCTION

Organised cytological screening for cervical cancer has for long drastically reduced the incidence of the invasive disease and its mortality [1, 2, 3]. And though invasive cervical cancer is now preventable**, the global incidence stands at 500,000, with 233,000 deaths per year, 80% of which occur in developing countries** [4, 5]. Cervical cancer remains the commonest cause cancer deaths among women in developing countries, largely due to failure to establish cytology based screening programs [6]. Cost, inadequate manpower and ignorance are among various factors militating against this organised routine cytological screening.

The difficulty in establishing routine cytological screening in low resource settings could be overcome reducing the burden of the population that requires screening without comprising its benefits [7]. This could be achieved through selective screening of high-risk patients in targeted screening programs [8]. The high-risk group could be identified via a risk scoring system for the targeted selective screening of those most like to develop the disease.

There is overwhelming evidence that population cytological screening is effective in reducing morbidity and mortality from cervical cancer [2, 9]. It is also clear that competing health needs of developing countries cannot support routine population screening for cervical cancer in the foreseeable future. And while vaccines against HPV 16 and 18 may be effective,many unanswered questions have to be clarified before it comes into large scale clinical use in developing countries. Thus the way out of the

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current impasse for developing countries is to develop effective methods of targeting high risk individuals to reduce the screening burden and improve the pick up rate for precursor lesions

OBJECTIVES

The objective of the study was to develop a risk score that would easily identify women at greater risk of having CIN for use in selective screening of targeted high risk population.

SUBJECTS AND METHODS

The subjects studied were sexually active women attending gynaecological clinics at the University of Maiduguri and Aminu Kano University Teaching Hospitals both in Northern Nigeria, who had their pap smears taken sporadically with an Ayre's spatula.

The women were instructed to come for the procedure between 10 and 20 days after the first day of their menstrual periods. They were also advised to avoid douching, using spermicidal foams, creams or jellies for at least two days before the procedure to avoid washing away or hide any abnormal cells. In dorsal position, a bivalve speculum was used to expose the cervix after lubrication with water. Ayre's spatula was inserted into the cervical os and rotated 360 degrees and then withdrawn. The samples were then spread evenly from both sides of the spatula and fixed immediately in 95% alcohol provided by the histopathology laboratory.

Staining technique used was Papanicolaou. Questionnaires were administered to each woman enquiring about her socio demographic, sexual and reproductive factors. The data collected were analysed on SPSS version 13.0 statistical software for odds ratio of all the risk factors for predicting CIN. The odds ratios were then classified into 5 levels of score from 1-5.

RESULTS

There were 1129 questionnaires administered during the study period. Table 1 shows that majority, 67.8% of women who availed themselves to this opportunistic screening were under 30 years of age with a 70% illiteracy rate and 76% unemployment rate. In table 2, the risk factors studied are depicted. Their risk association with CIN are also shown in order of increasing statistical significance. The risk factors that showed statistically significant relationship with CIN were number of marriages (OR = 12.6, P=0.006), polygamy (OR = 21.7,P=0.001), premarital coitus (OR = 30.0,P=0.001), coital frequency (OR = 30.9,P=0.002), number of sexual partners (OR = 35.9,P=0.003), parity (OR = 51.4,P=0.001), coitarche (OR = 52.8,P=0.020), age at first marriage (OR = 78.1,P=0.001) and age (OR = 107.9,P=0.001). The scale for scores based on the odd ratios ranged from 1-5 as demonstrated on table 3. The greater the risk, the higher the score (table 4). There were eight risk factors with a total score of 0-21, which are arbitrarily classified as low, medium or high risk as detailed on table 5 based on total scores <8, 8-16 and >16 respectively.

Table 1: Socio-demographic Characteristics

Factors	Frequency	Percentage (%)
1. Age		
=19	66	5.8
20-29	700	62.0
30-49	315	27.9
=50	48	4.3
Total	**1129**	**100**
2. Education		
Nil	699	61.9
Primary	39	3.5
Qur'anic	112	9.9
Secondary	210	18.6
Postsecondary	69	6.1
Total	**1129**	**100**
3. Occupation		
Housewife (unemployed)	860	76.2
Trader	133	11.8
Civil servant	93	8.2
Nil	43	3.8
Total	**1129**	**100**

Table 2: Relationship between Risk Factors and CIN

Risk Factors	Odds ratios	P-values
Endocervical swab isolate	0.5	0.921 (NS)
Number of co-wives	3.1	0.797 (NS)
Pre-menarcheal coitus	4.7	0.856 (NS)
Previuos STIs	7.8	0.255 (NS)
Postcoital bleeding	9.4	0.152 (NS)
Smoking	10.1	0.122 (NS)
Vaginal discharge	11.0	0.089 (NS)
Extramarital coitus	12.2	0.057 (NS)
Number of divorces	12.8	0.046 (NS)
Number of marriages	12.6	0.006 (S)
Polygamy	21.7	0.001 (S)
Pre-marital coitus	30.0	0.001 (S)
Coital frequency	30.9	0.002 (S)
Number of sexual partners	35.9	0.003 (S)
Parity	51.4	0.001 (S)
Coitarche	52.8	0.020 (S)
Age at first marriage	78.1	0.001 (S)
Age	107.9	0.001 (S)

Key

NS----not significant
N------significant

Table 3: Scale for Scores Based on Odds Ratio

Odds Ratio	Scores
<35	1
36-50	2
51-65	3
66-80	4
>80	5

Table 4: Differential Scores of Significant Risk Factors

Risk Factors	Scores
Coitarche (years)	
=12	4
13-14	3
15-17	2
18	1
=19	0
Age at first marriage(years)	
<12	4
12-13	3
14-15	2
16-17	1
=18	0
Premarital coitus	
No	0
Yes	1
Polygamy	
No	0
Yes	1
Number of marriages	
0	0
1-2	1
=3	2
Coital frequency	
1-2	0
3-4	1
=4	2
Number of sexual partners	
1-2	0
3-4	1
=4	2
Parity	
0	0
1	1
2-4	2
=5	3

Table 5: Classification of Risk factors Based on Scores

Total Scores	Risk Classification
<8	Low
8-16	Medium
>16	High

DISCUSSION

Where the majority of the populace are unenlightened and the limited resources available to government cannot cater for the health needs of the people, a selective screening of high risk women that is easily identifiable from the history is vital in minimizing waste without compromising benefits. The classification of women into low, medium and high risk based on the significant risk factors will help retain sufficient specificity to reduce the number of those screened. By selectively screening women with scores >16 (high risk), the limited resources will be targeted to those at greatest risk of cervical neoplasia.[2]

All the significant risk factors identified in this study are known to be associated with cervical cancer. Perhaps there is no epidemiologic parameter so studied as sexual activity.[9] The observation of significant association of sexual activity (coitarche, age at first marriage, premarital coitus, polygamy, number of marriages, coital frequency and number of sexual partners) are in keeping with earlier studies [10-12]. Studies using carcinoma in situ as an end point reported the association of increasing parity with cervical neoplasia [13]. However recent studies have shown that the association of parity to cervical neoplasia may be independent of HPV infection [14]. There is general agreement in the literature that older age is a strong determinant of cervical cancer [15-17]. In an attempt to develop a risk scoring system for prediction of cervical cancer, an Indian study found illiteracy, poor genital hygiene, long duration of married life, multiparity and early menarche as risk factors significantly associated with cervical cancer [18].

Despite the high false negative rate with Pap smear, the need for cytological screening in preventing invasive cancer of the cervix cannot be overemphasized. In Nordic countries where cervical screening services and modern tracking systems are well established, the incidence of invasive cervical cancer has been reduced by 90 % [2]. However, in most developing countries where cervical screening services are not well established, the majority of patients present with late disease [19-21]. In these low resource settings screening is commonly not available and where available are located far from the reach of those that need the services most. Such unhealthy developments often lead to indiscriminate screening of women at low risk [22]. To

overcome the problems of poor coverage and cost of cervical cancer screening in developing countries several alternatives have been tried among which are visual inspection- aided and unaided, magnivisualizer and gynaescope with disappointing results [23-25]. Our best bet is still the cervical cytology but since there is no organized screening service, selective screening of women at high risk using our risk assessment score approach (score >16) may be a viable alternative in the interim. This way the limited resources can be targeted to those women at greatest risk of cervical cancer and probably a significant reduction in incidence of invasive disease may be seen in the not too distant future.

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