The Mode Ages of Women with Cervical Dysplasia and Cancer Cervix.

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Summary : It is our clinical observation that dysplasia occurs at the younger age than reported mean age.
However a small number of elderly women would offset the mean age of large number of young women. Hence other measures like median or mode will be more accurate. 5360 pap smears were selected. 304 of CIN I, 36 of CIN II, 59 of CIN III lesions and 37 of carcinomas were detected with mode as 40, 35, 30 and 50 was the value which were less than described in literature and the mean value observed in the study.

Introduction

In our clinical setting it is observed that many women seem to have Papanicolou smears with dysplasia at younger age than the reported mean ages. It is possible that the mean may not be the appropriate statistics to describe the ages of these women. A small number of elderly women could offset the mean age of large number of younger women. It therefore looked sensible that in such a situation (where extreme values are present or the distribution of the ages are skewed rather than symmetrical) the other measures of central tendency for age that is median or mode might be more appropriate and useful. In order to help clinicians in planning for better follow up and care of these women, the present study was undertaken with the following objectives.

Objectives

Primary objective : whether mode age is better measure of central tendency than mean for describing ages of women dysplasia or squamous cell carcinoma of cervix.

Secondary objective : To resolve the discrepancy that women seem to have cancer cervix at younger ages than the reported mean ages in the literature.

Material and Methods

During a period of three years (January 1994 to December 1996) 5360 smears were selected retrospectively from those women attending Gynaec department, at Governemnt medical college and hospital, Nagpur. Inflammatory and unsatisfactory smears were excluded from the study. Because these reports have to be reviewed manually a systematic random sample of women were collected in which every 10th case was selected, to make the volume of the data managable. Thus the cytologic diagnosis of 534 women were reviewed. The reports were generated before the Bethesda System of cytological classification. The smears were grouped into different catagories, mild, moderate, severe and carcinoma depending upon the original diagnosis. A comparison population of 611 of nondiseased smears during the period of one year was assembled from women without any cytologic abnormality and whose ages were noted. This group served as a control group. The ages of women were retrieved from both the diseased and nondiseased group.

The mean ages along with standard deviations (SD), medians and modes were calculated for different groups by diagnosis. The histogram showing age distribution was plotted for each population and the normality was assesed. The Kolmogrov Smirnov test was used to detect the dis-

tribution of each pupulation by assessing the normal distribution. If this test for 'goodness of fit' determined a population to the symmetrically distributed, then the mean could be used as an appropriate measure of central tendency, otherwise mode would be the appropriate choice. Kruskal Wallis one way analysis of variance with multiple comparison method was used to test the significance of age differences by diagnosis. Statistics were computed using Minitab Statistical software. The same software was used for producing graphics like Histogram.

Results

There were total 536 cases of dysplasia or carcinoma out of which 304 had mild, 86 moderate, 59 severe dysplasia and 87 squamous cell carcinoma. The comparison population with no disease had 611 cases. Table I represents the mean (along with SD), median and mode ages by diagnosis.

Table I
Mean standard deviation, median and mode of ages of women by diagnosis.

Diagnosis	n	mean (SD)	median	mode
Mild dysplasia	304	36.3 (8.8)	35.0	40
Moderate dysplasia	36	39.2 (9.4)	30.0	35
Severe Dysplasia	59	38.7 (11.4)	35.0	30
Carcinoma	87	50.4 (10.6)	50.0	50
No disease	611	37.1 (11.2)	36.0	40

Fig. I - V display the cases by age and diagnosis showing that women with moderate and severe dysplasia were asymmetrically skewed to younger ages. Statistical analysis confirmed this observation. In order to assess the symmetrical normal distribution of the population, the P value of Kolmogrov Smirnov statistic had to exceed conventional level of significance that is 0.05. For women with moderate and severe dysplasias the P values were less than 0.001.

($p<0.001$) hence the assumption of normality was rejected for the ages of women with moderate and severe dysplasia. For other two groups that is mild dysplasia and no disease even though moderate degree of skewness was observed the assumption of normal distribution was accepted. As obvious by inspection, the squamous cell carcinoma group is normally distributed significance level of Kolmogrov and Smirnov statistic was greater than 0.05, Further Kruskal-Wallis one way analysis of variance with multiple comparison showed significant difference ($p<0.001$) between ages of women on diagnosis.

Discussion

Table II
Comparison of mode and mean ages of dysplasia and carcinoma between present study and other reports.

Lesion	Mode ages		Mean ages		
	present study	Carson & DeMay	Present study	Carson & Demay	Patten
mild	40	22	36.3	29.0	34.7
moderate	35	22	39.2	28.3	32.0
severe	30	23	38.7	30.3	35.7
carcinoma	50	39	50.4	52.8	51.7

Table II compares our results with Carson et al (1993) and Patten (1978) that reported the mean ages of women with dysplasia or carcinoma. Data in the above table shows that many women in moderate and severe dysplasia were younger than the mean ages would lead one to believe. These two groups had symmetrical distribution. Hence mode will describe the appropriate central tendency of age for these patients rather than the mean value. This study shows that the ages of women with no disease and mild dysplasia are though normally distributed they are moderately skewed to older ages. One of the other measures of central tendency i.e. median or mode might better describe the ages of these women. Like the mean the median is unique for a population and by definition is in the middle of population. Advantage of using

the median is that it is less sensitive to the effect of extreme values than is the mean.

Histogram of Mild Dysplasia (N = 304), Each * represents 2 obs.

Midpoint	Count	
15	1	*
20	15	********
25	41	********************
30	58	****************************
35	46	***********************
40	76	**************************************
45	36	******************
50	23	************
55	4	**
60	2	*
65	1	*
70	1	*

Figure I : The population with mild dysplasia is slightly skewed to the right. The mode, 40 years may be more appropriate to describe central tendency.

Histogram of Moderate Dysplasia (N = 86)

Midpoint	Count	
20	2	**
25	6	******
30	13	*************
35	20	********************
40	17	*****************
45	12	************
50	7	*******
55	6	******
60	2	**
65	1	*

Figure II : The population with moderate dysplasia is asymmetrical. The mode, 35 years may be more appropriate to describe central tendency.

Histogram of Severe Dysplasia (N = 59)

Midpoint	Count	
20	2	**
25	7	*******
30	16	****************
35	6	******
40	7	*******
45	7	*******
50	6	******
55	3	***
60	3	***
65	2	**

Figure III : The population with severe dysplasia is asymmetrical. The mode, 30 years may be more appropriate to describe central tendency.

Histogram of Carcinoma (N = 87)

Midpoint	Count	
30	3	***
35	6	******
40	13	*************
45	12	************
50	19	*******************
55	9	*********
60	11	***********
65	8	********
70	6	******

Figure IV : The carcinoma in situ population is symmetrical. In this population mean, 50 years is an appropriate measure of central tendency.

Histogram of Normal (N = 611)

Midpoint	Count	
20	54	***********
25	88	******************
30	96	********************
35	77	****************
40	127	***************************
45	70	**************
50	44	*********
55	19	****
60	17	****
65	12	***
70	7	**

Figure V : The non-diseased comparison population is symmetrical but slightly skewed to the older age. Mode, 40 years will be an appropriate measure of central tendency.

However in our population median approximated to mean closely that this measure of central tendency for age did not resolve the discrepancy that we observed clinically. The nondiseased comparison population was also not normally distributed. This result is not surprising because the nondiseased population represented the women of all ages including the older women. For dysplasia moderate and severe, we suggest that using the mode resolves the discrepancy based on the clinical impression that dysplasia occurs in women younger than the reported mean ages would lead one to expect. For mild displasias mean age incidence in the present study was 35 years which was close to the known incidence of dysplasias in the literature. However the mode value of 40 years for this group appeared to be high and it is also not matching with the reported values in the literature. This discrepancy or anomaly might be due to late reporting of the patients from the rural areas to the study hospital which is a tertiary care hospital. It seems, for moderate dysplasias also, all the three measures namely mean, median and mode resulted in high age incidence because of the same reason.

References

1. Carson H. J. and DeMay R. M., Obstet. & Gynaec. 82: 3; 1993.
2. Patten S. F. In:Wied GL, ed. Monographs in clinical cytology Vol. 3. Basel Switzerland: S. Karger 115; 1978.