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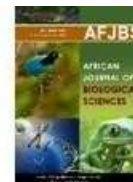
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EVALUATION OF SYMPTOM INDEX IN PREDICTING OVARIAN CANCER – A CROSS SECTIONAL STUDY IN A TERTIARY CARE CENTRE IN CHENGALPATTU DISTRICT

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ABSTRACT
Background- Ovarian malignancy has a high mortality rate as it is mostly diagnosed at an advanced stage. It is observed that women have symptoms like abdominal pain, pelvic pain, abdominal distention, bloating, difficulty eating, and a feeling of fullness even at an early stage of malignancy. These are taken as symptom indexes if they occur more than 12 times a month within a year. **Objective:** To evaluate the symptom index, based on the Goff symptom index for ovarian cancer, as a screening tool for detecting ovarian malignancy in the Indian population. **Methods:** This was a hospital-based, cross-sectional study. A total of 183 participant patients attending Gynaec OPD and inpatients are included in the study. Sensitivity and specificity were calculated. **Results:** The symptom index has 96% sensitivity and 87% specificity for predicting ovarian cancer. Abdominal pain was the most prevalent symptom. **Conclusion:** The symptom index can be used as a screening tool for the early detection of ovarian malignancy.
Key words: Ovarian Malignancy, Sensitivity and Specificity, Goff Symptom Index, Cross-Sectional Study.

INTRODUCTION
Ovarian malignancy is the second-most common gynaecological malignancy[1]. The very high mortality rate is due to detection at an advanced stage. If not detected early, the survival rate is only 20% to 30%[2]. Ovarian malignancy ranks seventh among cancer deaths in Asia[3]. There are no screening tests for ovarian malignancy, but Goff *et al.*[4], in their study on the development of the ovarian cancer symptom index, stated that a symptom index can be used to detect ovarian malignancies early. Specific symptoms like abdominal pain, pelvic pain, abdominal distention, bloating, a feeling of fullness, and difficulty eating are evaluated for their frequency and duration. This study was carried out to find out the association of Goff 's symptom index with ovarian malignancy in the Indian population.

MATERIALS AND METHODS
After getting approval from the ethical committee of the Karpaga Vinayaga Institute of Medical Sciences, Chengalpattu district, Tamil Nadu, India, informed written consent was obtained from all the patients participating in the study. This study was conducted in the obstetrics and gynaecology department of the Karpaga Vinayaga Institute of Medical Sciences, Chengalpattu, Tamil Nadu, India, between June and December 2023. It is a cross-sectional study. Patients attending the Gynaec outpatient department with ultrasound reports of simple ovarian cysts, functional ovarian cysts, and benign ovarian cysts were taken as group A. Patients admitted to the gynaecology ward with suspected ovarian malignancy underwent ultrasound, then CT/MRI, along with tumour markers. Finally, there will be a staging laparotomy. If histopathology confirms it as ovarian malignancy, they are taken as group B. If the histopathology report comes up as a benign tumour, then they are included in group A.

Symptoms like abdominal pain, pelvic pain, abdominal distention, bloating, a feeling of fullness, and difficulty eating were elicited in both groups. The symptom index was considered positive if any of these symptoms were present more than 12 times in a month within one year. The age, parity, BMI, and pre- or postmenstrual period were considered. A history of OCP intake and ovulation induction drug intake was elicited. A statistical analysis was performed. Symptoms were compared between groups A and B using chi-square tests. The odds ratio for each symptom was calculated by logistic regression analysis.

OBSERVATION AND RESULTS
Most of the patients with ovarian malignancy belonged to stages 3 and 4. Epithelial ovarian tumours were the most common malignancy. Out of the 183 women included in the study with benign, simple cysts in group A and malignancies in the histopathological report in group B, the demographic characteristics are given in Table 1.

About 12 patients in Group A had abdominal and pelvic pain, but it was less than 12 times a month. Abdominal pain, pelvic pain, and abdominal distention were the most common symptoms in the symptom index. Sensitivity was 98%.

Table 1: Demographic characteristics reported among Histopathology

Characteristic	Benign (Group A) n = 130 (%)	Malignancy (Group B) n = 53 (%)
Age		
Median (Min - Max)	33 (19 - 54)	49 (20 -75)
Parity		
Multiparous	78 (60.0)	46 (86.8)
Nulliparous	29 (22.3)	5 (9.4)
Primiparous	23 (17.7)	2 (3.8)
BMI		
< 18	6 (4.6)	0 (0.0)
18 - 24.9	105 (80.8)	40 (75.5)
25 - 29.9	12 (9.2)	8 (15.1)
> 30	7 (5.4)	5 (9.4)
Menstrual Status		
Pre-Menopausal	121 (93.1)	22 (41.5)
Post Menopausal	9 (6.9%)	31 (58.5)

Table 2: The association between Positive modified Goff symptom index for ovarian malignancy and distribution of symptoms clusters reported

Symptom cluster	Benign (Group A) n = 130 (%)	Malignancy (Group B) n = 53 (%)	P - Value
Abdominal Pain			
Yes	48 (36.9)	52 (98.1)	0.000*
No	82 (63.1)	1 (1.9)	
Pelvic pain			
Yes	19 (14.6)	50 (94.3)	0.000*
No	111 (81.0)	3 (5.7)	
Distension			
Yes	19 (14.6)	48 (90.6)	0.000*
No	111 (85.4)	5 (9.4)	
Bloating			
Yes	9 (6.9)	39 (73.6)	0.000*
No	121 (93.1)	14 (26.4)	
Feeling of fullness			
Yes	7 (5.4)	40 (75.5)	0.000*
No	123 (94.6)	13 (24.5)	
Difficulty in eating			
Yes	13 (10.0)	31 (58.5)	0.000*
No	117 (90.0)	22 (41.5)	

$P < 0.05$ consider as Significant, * Highly Significant

Table 3: Clinical efficacy of individual symptoms clusters and the modified Goff symptoms in predicting ovarian malignancy among test (n = 183)

Variable	Sensitivity %	Specificity %	PPV %	NPV %
Symptom cluster				
Abdominal Pain	98.11	63.08	52.00	98.8
Pelvic pain	94.34	85.38	72.46	97.31
Distension	90.57	85.38	71.64	95.69
Bloating	73.58	93.08	81.25	89.63
Feeling of fullness	75.47	94.62	85.11	90.44
Difficulty in eating	58.49	90.00	70.45	84.17

PPV = positive predictive value, NPV = negative predictive value
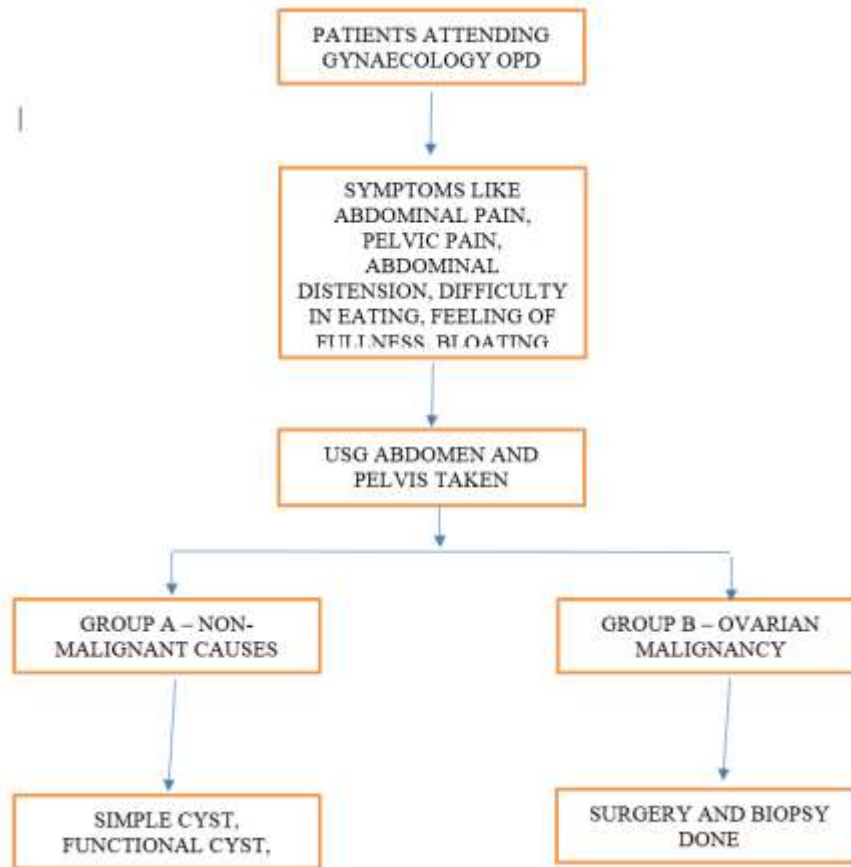
Figure 1: Study Flow chart

DISCUSSION

High mortality of ovarian cancer is due to late detection[4]. Van Nagell *et al.* in his study was able to find out that sonography and CA125 were not cost effective in screening ovarian malignancy[5]. Goff *et al.* in his study was able to find out that symptoms like abdominal pain, pelvic pain, abdominal distention, bloating, difficulty in eating, feeling of fullness occurs in women with ovarian malignancy[6,7].

The mean age of the participants was 49 (20–74) years. Comparable to the study done by Kunwar *et al.*, the mean age was 45 years[8], but in Kim *et al.*, it was 54 years[9], Dilly *et al.*, it was 62 years[10], Anita W. M. Lim *et al.*, it was 65 years[11], and Baun *et al.*, the median age was 67 years[12].

Of the 53 women with ovarian malignancy in our study, 58.5% were postmenopausal. J Shetty in his study, 52.7% of postmenopausal women had ovarian cancer[13]. J. Shetty's study included 62.2% of multiparous women with ovarian malignancy. In our study, 86% were multiparous women[13].

Out of 183 participants with adnexal mass, 28.96% had malignancy histopathologically proven, which was like Krishnamorthi *et al.*'s study (32.84%)[14].

The overall sensitivity of the Goffs symptom index was 96.3%, with a specificity of 87%[1]. Kim *et al.*, in their study done among the Korean population, found that the efficacy of the symptom index was 65.5% sensitivity and 84.75% specificity[9]. Krishnamoorthy *et al.*, in their study, had a sensitivity of 84.8% and a specificity of 88.6% for the Goffs symptom index[14].

In our study, epithelial ovarian tumours were about 84.9%; similarly, in the Anita W. M. *et al.* study, epithelial tumours were 85.6%[11] and the J. Shetty *et al.* study had 78% of women with ovarian cancer as epithelial tumours[13]. In the Funston *et al.* study, it accounted for 48.6%[15], and in a study by Kunwar *et al.*, it was > 50%[8].

Bankhead CR and colleagues in their study found out that abdominal pain, bloating, and abdominal distention were the common symptoms[16], and in Menon *et al.* it was unexplained pain in the abdomen, stomach, or pelvis' being the most common (35%), in Krishnamorthi *et al.* study it was 84.8%[14], Kunwar *et al.* it was 96%[8] and in Dilly *et al.* it was 90%[10].

Abdominal pain had a sensitivity of 98% and a specificity of 63%, with a positive predictive value of 52% in our study. Pelvic pain had a sensitivity of 94%, a specificity of 85%, and a PPV of 72%. Abdominal distension has a sensitivity of 90%, a specificity of 85%, and a PPV of 71%. Like the study by Krishnamorthy *et al.*[14]., the sensitivity, specificity, and PPV were 84.8%, 88.6%, and 78.5%, respectively.

In our study, urinary symptoms were rare. But Fitch *et al.* found that urinary symptoms were present in 34%[17]of cancer patients, compared to abdominal pain in 77%[17]. Pelvic pain was found in 94.3% of cases. Hartman *et al.*, in their study,

showed that 60% of ovarian cancer patients had pelvic pain[18]. Women with ovarian malignancies had more symptoms than women with benign ovarian tumours.

About 21 (39.63%) were in stage 2 at the time of diagnosis; they also presented with abdominal pain, pelvic pain, and abdominal distention. Like the study by Kunwar *et al.*, 29 (96.7%) cases in the early stages had abdominal pain[8]. Vine *et al.* found that abdominal pain was the most common reported symptom for early and advanced-stage ovarian malignancy[19,20]. J. Dilly in the study had 23.9% in stages 1 and 2. And 75.9% in stages 3 and 4[10], Anita *et al.* found that in their study, 73 (37.6%) were in stages 1 and 2, and 108 (55.7%) were in stages 3 and 4[11]. J. Shetty *et al.*, in their study, showed that 64.7% were in stage 1, 50% were in stage 2, 76.7% were in stage 3, and 83.3% were in stage 4[13]. So, in almost all the studies, many of the women were in stages 3 and 4 at the time of diagnosis. Early diagnosis always has better survival rates[20,21,22,23,24], which is often difficult in ovarian cancer.

In our study, these three symptoms—abdominal pain, pelvic pain, and abdominal distension were significantly higher in all women with ovarian malignancy. So, women with these three symptoms can be further evaluated for ovarian malignancy. And the positive predictive value for all the symptoms is <0.05, which is statistically significant. This was consistent with the findings of Goff *et al.*[1]. In the general population of women, anyone who has had any one of these symptoms for less than 1 year that occurred more than 12 times a month can be taken as positive for screening and needs further evaluation for ovarian malignancy.

These symptoms are mostly ignored by many women and are treated symptomatically only.

This study result suggests that women who have abdominal pain, pelvic pain, abdominal distension, bloating, difficulty eating, and a feeling of fullness in less than 1 year and occur more than 12 times a month should be evaluated for potential ovarian malignancy. In a study in California by Smith *et al.* (1985), women with ovarian malignancy and breast cancer were age-matched with non-cancer controls[25]. Patients with ovarian malignancy had more visits to the hospital for abdominal pain, pelvic pain, and abdominal distension.

About 32 (60.97%) women with ovarian malignancy belong to stages 3 and 4. In the treatment of ovarian cancer, the most significant factors are the volume of disease at the time of diagnosis and the optimal cytoreduction thereafter[26,27]. And it is known that ovarian malignancy has a very rapid doubling time; even 3 to 6 months may be a very significant time for diagnosis and prognostic significance. Our study supports that these 3 symptoms—abdominal pain, abdominal distension, and pelvic pain—if present for less than 1 year or more than 12 times in a month should be further evaluated for ovarian malignancy. There are various studies that suggest that late diagnosis results in a poor prognosis[21].

We can create awareness among women about these symptoms and their frequency so that they can seek medical assistance earlier to diagnose ovarian malignancy at an early stage.

CONCLUSION

At the end of this study, we conclude that with the symptom index tool formulated by Goff *et al.*[1,6], most of the women had abdominal pain or pelvic pain as the earliest and predominant symptom followed by other symptoms for which we can create an awareness among women in the general population to report to a gynaecologist or to get evaluated in a hospital for ovarian malignancy if they have this symptoms. This study recommends that for an early detection of ovarian malignancy this symptom index tool by Goff *et al.*[1,6] can be used as a mandatory screening tool for all women initially followed by other specific definitive tools for ovarian malignancy and thereby, we can decrease the mortality of ovarian cancer by avoiding detection at an advanced stage.

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