





Prevalence of Abnormal Ovarian Masses/Cysts in Sri Lankan Women over 40 Years of Age

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ABSTRACT

Aim: For any unsuspecting woman, the finding of an ovarian cyst/mass that has the potential to be either malignant or end up in a cyst accident (torsion, rupture, or hemorrhage) and hence requires intervention, is of paramount importance. Based on ultrasound-guided explicit criteria, this study was aimed at determining the prevalence of abnormal ovarian masses, both malignant and benign, in the most vulnerable age group.

Materials and methods: A community-based; descriptive cross-sectional study was conducted among 931 females aged over 40 years who were selected by probability proportionate to the cluster sampling technique. All the study participants underwent trans-abdominal ultrasound scanning. Married subjects were offered a subsequent transvaginal scan (TVS) if indicated.

Results: The prevalence of abnormal ovarian masses based on ultrasound assessment was 2.9% [95% confidence interval (CI): 1.8–4.0]. Thirteen subjects (1.4%) had complex cysts between 3 and 5 cm diameter (95% CI: 0.8–2.3) and five (0.53%) had complex cysts larger than 5 cm (95% CI: 0.2%–1.2%). The prevalence of simple ovarian cysts exceeding 5 cm was 0.97% (95% CI: 0.5–1.8). Histopathological examination of abnormal ovarian masses that needed surgery revealed; endometrioma ($n = 6$), mature cystic teratoma ($n = 1$), mucinous cyst adenoma ($n = 1$), serous cyst adenoma ($n = 1$), and serous papillary cyst adenocarcinoma ($n = 1$).

Conclusion: Abnormal ovarian cysts/masses were more prevalent among women aged above 50 years, and those who had attained menopause. Pelvic ultrasound assessment of women in their 50s belonging to potential high-risk groups can be recommended on an annual basis.

Keywords: Ovarian cyst, Ovarian mass, Postmenopausal, Premenopausal, Prevalence, Ultrasound assessment.

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INTRODUCTION

The burden of ovarian cancer is colossal from a global perspective and is escalating by the day. It was estimated that in 2012, there were 239,000 cases and 152,000 deaths worldwide from ovarian cancer, along with some 600,000 women living within five years of diagnosis.¹ In the South East Asian region, ovarian cancer is the third commonest cancer among females; accounting for 72,951 (6.3%) new cases in the year 2020.² According to the latest available cancer incidence data, it is the second commonest gynecological malignancy with the age-standardized rate of 7.6 per 100,000 population in Sri Lanka, accounting for 7% ($n = 951$) of female cancer incidence.³ In the absence of a proper screening test for ovarian cancer, early detection is a challenge. In Sri Lanka, at present, ovarian cancers are commonly diagnosed in routine gynecological practice as symptomatic presentations or as referrals following an incidental finding at an ultrasound assessment done for other reasons.

Being minimally invasive, ultrasound has become a useful tool for evaluating pelvic masses. Transvaginal ultrasound scans (TVS) provide a sensitivity of 85.0%, and specificity of 98.7%⁴ in the assessment of small ovarian cysts; whereas trans-abdominal scans (TAS) are endowed with a sensitivity of 91% and specificity of 68%.⁵ However, TVS is the ideal diagnostic modality in patients presenting with infertility.⁶

An ovarian cyst is defined as a fluid-containing structure measuring more than or equal to 30-mm diameter.⁷ Simple cysts up to 10 cm are most likely benign, regardless of the menopausal status.⁸ However, in a complex or solid mass, size correlates

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somewhat with the possibility of malignancy, with notable exceptions being some solid fibromas, or mucinous cystadenomas that could reach massive proportions.⁹ Although functional ovarian cysts are commonly seen in females during reproductive years, an ovarian cyst with benign or malignant potential may occur at any age. Ovarian serous cystadenoma is the most common of the

ovarian tumor occurring in third to fifth decades of life.¹⁰ The finding of an incidental ovarian cyst/mass which requires intervention has significant importance if the ovarian cyst/mass has the potential to become malignant or to undergo a cyst accident.

Hence, this study aimed to determine the prevalence of abnormal ovarian masses, comprising both malignant and benign ovarian tumors in women over 40 years of age in the district of Colombo, Sri Lanka. The results of this study would give important insights into the magnitude of the problem within the local context, especially in the absence of a screening program.

MATERIALS AND METHODS

In defining abnormal ovarian masses (both benign and malignant) a lesion arising from the ovary which is above or equal to 5-cm diameter or a cyst measuring 3–5-cm diameter, which persists or increases in size over a period of more than three menstrual cycles,¹¹ those that were complex in nature or symptomatic were considered. The complexity of the cyst/mass was assessed about the thickness of the cyst wall, the presence of septa, papillary projections, solid/cystic/mixed areas, ground glass appearance, acoustic shadowing, Rokitansky nodules, increased Doppler flow, and presence of ascites.^{12,13}

A community-based descriptive cross-sectional study was carried out among women over 40 years of age, who had been residing in the Colombo district, Sri Lanka for one year or more by the date of commencement of the study. Subjects who had undergone bilateral oophorectomy, those being pregnant or within 3 months after childbirth at the time of data collection, those unable to respond reliably due to diagnosed impaired mental capacity, or being bedridden and hence unable to be physically present at the study setting were excluded from the study. Data collection was carried out from July 2018 to July 2019 after obtaining ethical clearance from the Faculty of Medicine, University of Colombo, Sri Lanka.

A sample size of 1,025 was calculated using a standard formula¹⁴ and a design effect.¹⁵ The subjects were selected by multistage probability proportionate to the cluster sampling technique; from six randomly selected divisional secretariat divisions in the Colombo district. Informed written consent was obtained during the household visits and eligible consented females were invited to attend a selected field clinic on a pre-arranged day. Ultrasound scanning was carried out by a consultant gynecologist using SIUI Apogee 1200® color Doppler ultrasound machine, having a 15 inches monitor, convex transducer (R60) (5.0 MHz), and a trans-vaginal transducer (7.5 MHz). Information on age, parity, menstrual status, and current contraceptive usage was obtained. Anthropometric measurements were recorded adhering to standard protocols.

The subjects who were founded with an abnormal ovarian mass/cyst were further evaluated with CA 125, repeat scans, and other required investigations at the Gynecology Clinic at De Soyza Hospital for Women, Colombo, Sri Lanka. Any existing cases were followed up at gynecology clinics in other tertiary care hospitals where they were already registered.

RESULTS

Out of the 1,025 eligible subjects, only 931 (90.8%) were present for the ultrasound scans conducted at the field clinics (Flowchart 1). Eleven participants had previously undergone

unilateral oophorectomy. The mean age of the participants was 52.93 years (SD ± 8.00) and ranged 40–79 years.

The prevalence of ovarian mass/cyst based on its maximum diameter is depicted in Table 1. Only 1.5% ($n = 14$) of the study participants were found to have ovarian masses/cysts exceeding 5 cm (95% CI: 0.7–2.3).

Many of the cysts detected were simple cysts, while 13 (1.4%) had complex cysts between 3cm to 5-cm diameter (95% CI: 0.8–2.3%), and five (0.53%) had complex cysts larger than 5 cm (95% CI: 0.2–1.2%) (Table 2).

Therefore, the prevalence of abnormal ovarian masses/cysts based on the operational definition was 2.9% ($n = 27$) (95% CI: 1.8–4.0%). Of these 27 subjects, 37.1% ($n = 10$) underwent surgery. Histopathology of abnormal ovarian masses was endometrioma ($n = 6$), mature cystic teratoma ($n = 1$), mucinous cyst adenoma ($n = 1$), serous cyst adenoma ($n = 1$), serous papillary cyst adenocarcinoma ($n = 1$).

The prevalence of hydrosalpinx and polycystic ovaries was 3.5% ($n = 33$) (95% CI: 2.4–4.7) and 4.9% ($n = 46$) (95% CI: 3.7–6.5).

Abnormal ovarian masses/cysts were prevalent among women over 50 years of age, nulliparous, and menopause. It was less prevalent among women who were currently using hormonal contraception (Table 3).

DISCUSSION

Colombo district has the highest population and population density in Sri Lanka. It is where the highest number of ovarian cancer cases are reported.³ The study population consisted of the most vulnerable age group according to the National cancer incidence data.³ Multi-staged, cluster sampling technique, with a probability proportionate to the population, which was used enabled having a representative sample while being less reliant on the full list's availability.¹⁶ Hence this study, preserved its internal validity while minimally compromising the generalizability.

Despite its low sensitivity (91%) and specificity (68%),⁵ TAS was carried out in all the study participants due to ethical reasons. Whenever the ovaries were placed high (beyond the focal limits of the TVS transducer), or when large masses were arising from the ovaries, they were visualized better with TAS.¹⁷ However, married subjects were offered a subsequent TVS if the ovaries were not visualized during the trans-abdominal ultrasound, or if there was sonographic evidence suggesting an adnexal mass, for further evaluation of the findings. Therefore, TAS followed by TVS improved the validity of detecting an abnormal ovarian mass.

In the published articles and management guidelines, the size of the ovarian cysts/masses is defined about the maximum diameter^{18–20} or the volume of the cyst.^{21,22} However, their complexity has been assessed according to International Ovarian Tumor Analysis (IOTA) group simple ultrasound rules.¹²

In this study, the prevalence of abnormal ovarian masses/cysts was 2.9%. These 27 ovarian masses included cysts/masses above 5-cm diameter, as well as cysts/masses between 3 and 5 cm that were complex in nature. Thus, the proportion of women having either simple or complex cysts is comparable with the findings made elsewhere and published in the literature.^{18,20,23} However, large population screening trials have shown higher prevalence of ovarian cysts different in size compared to this study.^{21,24}

The below 3-cm diameter (which are more likely to be functional/physiological), para ovarian cysts (where the ovary could

Flowchart 1: Flowchart showing the outcomes of the study

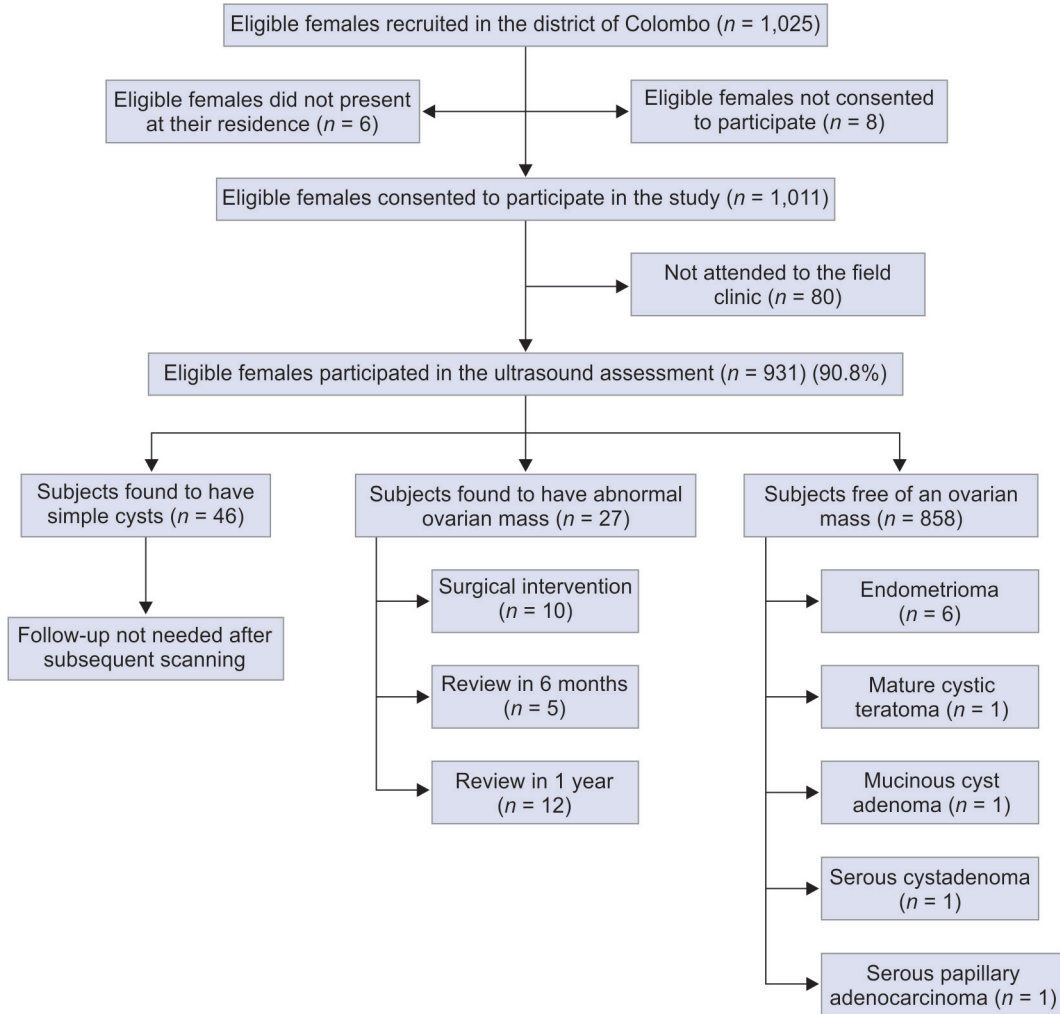


Table 1: Prevalence of ovarian mass/cyst by maximum diameter of the mass/cyst

Maximum diameter (cm)	Frequency	Prevalence (95% CI)
3–5	59	6.3 (4.8–7.9)
>5	14	1.5 (0.7–2.3)
Total	73	7.8 (6.1–9.7)

Table 2: Prevalence of ovarian masses/cyst by complexity

Cyst characteristics	Frequency	Prevalence (95% CI)
Simple cysts (between 3 and 5 cm)	46	4.9 (3.7–6.5)
Simple cysts >5 cm	9	0.97 (0.5–1.8)
Complex cysts (between 3 and 5 cm)	13	1.4 (0.8–2.3)
Complex cysts >5 cm	5	0.53 (0.2–1.2)

be identified separately), and hydrosalpinx were excluded from the final calculation in this study. Out of these 27, 10 subjects (37.1%) were operated, and histopathological examination revealed were six endometriomas, one mature cystic teratoma, one mucinous cystadenoma, one serous cystadenoma and one papillary cyst adenocarcinoma.

In this study, abnormal ovarian masses were commonly found among the women aged over 50 years (3.7%) and who had already attained menopause (3.6%). This goes in line with the findings of other researchers, which had shown high prevalence rates^{25,26} further emphasizing the fact that, in women who are beyond their reproductive age, an ovarian cyst is unlikely to be functional.

In this study, women who had never given a birth to a child (4.7%) were found to be having a higher proportion of abnormal ovarian masses compared to their primi- and multiparous counterparts. In contrast, a study conducted among Chinese women had revealed a higher prevalence of ovarian cysts among multiparous women (6.7%).¹⁸ However, preliminary results of the Prostate, Lung, Colon and Ovarian (PLCO) cancer screening trial, have shown multiparity as a protective factor for complex ovarian cysts.²¹

The main mode of action of hormonal contraceptives is inhibition of ovulation.²⁷ Oral Contraceptive Pills, Depot Medroxy progesterone Acetate injections and Hormonal implants are the commonly used hormonal contraceptives in Sri Lanka. In this study, a higher prevalence of abnormal ovarian masses was observed among the women who were not on any method of hormonal contraceptives. On the contrary, the PLCO trial did not reveal any association.²¹

Table 3: Characteristics of the subjects who were found to have an abnormal ovarian mass/cyst ($n = 27$)

Study characteristics	Number of participants	Frequency of abnormal ovarian masses	Prevalence (95% CI)
Age (years)			
<50	388	7	1.8 (0.8–3.5)
≥50	543	20	3.7 (2.4–5.6)
Parity			
Nulliparous	82	4	4.9 (1.9–11.9)
Parous	849	23	2.7 (1.8–4.3)
Menstrual status			
Non-menopause	347	6	1.7 (0.8–3.7)
Menopause	584	21	3.6 (2.4–5.4)
Hormonal ^a contraceptives			
Currently on hormonal contraceptive	192	1	0.52 (–0.4–2.9)
Currently not on hormonal contraceptive	739	26	3.5 (2.4–5.1)
LRT ^b			
LRT done	31	1	3.2 (0.6–16.2)
LRT not done	900	26	2.9 (1.8–4.2)
BMI ^c			
^d <18.5 kg/m ²	10	0	0
^e 18.5–24.9 kg/m ²	179	6	3.4 (1.5–7.1)
^f 25–29.9 kg/m ²	413	10	2.4 (1.3–4.4)
^g >30 kg/m ²	329	11	3.3 (1.9–5.9)
Waist-to-hip ratio			
<0.80	447	13	2.9 (1.7–4.9)
>0.80	484	14	2.9 (1.7–4.8)

^aOral contraceptives, depot medroxy progesterone acetate and hormonal implants; ^bLigation and resection of tubes; ^cBody mass index; ^dUnder weight; ^eNormal weight; ^fOverweight; ^gObese

Different schools of thought widely argue about benefits vs harmful effects of ovarian cancer screening and reduction of mortality rates and morbidities.^{21,24,28} Besides this, it's high time to assess the clinical significance of evaluating ovarian cyst irrespective of the malignant potential considering the potential complications of benign ovarian pathologies.

Although this study was not a screening trial, it was beneficial to the individuals who were asymptomatic at the time of scanning but were incidentally detected with an abnormal mass which need surgical intervention or further follow-up.

However, it needs to be acknowledged that the psychological stress thus incurred to the women who were incidentally found with an abnormal ovarian mass/cyst could not be alleviated until the histopathology report becomes available.

The this study has certain limitations. Our study had a cross-sectional study design; hence, all the subjects were not followed up with repeat scanning to find incidental cases. At the same time, histopathological reports were not available for every woman with an ovarian cyst. However, all the subjects who were found to have ovarian masses/cysts which could be followed up expectantly with follow-up scans were referred to the gynecology clinic by the consultant gynecologist (for repeat scans at 6-months or 1-year interval based on the findings of the initial scan).

CONCLUSIONS AND RECOMMENDATIONS

The prevalence of abnormal ovarian cysts/masses, based on ultrasound assessment among females over 40 years of age, in the district of Colombo, Sri Lanka was 2.9%. The abnormal ovarian cyst/masses were more prevalent among women over the age of 50 years (3.7%), and among those who were in menopause (3.6%). Their prevalence was low among women who were currently using a hormonal contraceptive method.

If no contraindications present, hormonal contraception methods for females in the latter half of the reproductive years needs to be encouraged. Women in their fifties belonging to potential high-risk groups need to be assessed with pelvic ultrasound scans, ideally on an annual basis.

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AUTHORS' CONTRIBUTIONS

Gunathilake KAMP: Research planning; Lead – analysis; Lead – writing, original draft. Kumarapeli V: Supervision; Equal – writing,

review, and editing; Kaluarachchi A: Supervision; Equal – writing, review, and editing; Hunukumbure RMCB: Ultrasound scanning; Lead – writing, review, and editing.

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