ORIGINAL RESEARCH ARTICLE

Patterns of contraception utilization among reproductive-aged women with thyroid cancer undergoing radioiodine ablation: A study at Hasan Sadikin Hospital

DOI: 10.29063/ajrh2024/v28i5.5

Haidarotul Milla[1], Mulyanusa A. Ritonga[1,2], Hartanto Bayuaji[1,2] and Erwin Affandi Soeriadi[3]

Department of Obstetrics and Gynecology, Faculty of Medicine, Universitas Padjadjaran –Dr. Hasan Sadikin General Hospital, Bandung, Indonesia[1]; Subdivison of Fertility and Endocrinology, Faculty of Medicine, Universitas Padjadjaran –Dr. Hasan Sadikin General Hospital, Bandung, Indonesia[2]; Department of Nuclear Medicine, Faculty of Medicine, Universitas Padjadjaran – Dr. Hasan Sadikin General Hospital, Bandung, Indonesia[3]

*__For Correspondence:__ Email: *haidarotul21001@mail.unpad.ac.id*

Abstract

The incidence of new cases of thyroid cancer worldwide is around 10.1/100.000 in woman dan 3.1/100.000 in men. Women with thyroid cancer are advised to avoid pregnancy while undergoing radioablation due to teratogenicity. Therefore, it is crucial to utilize contraception to avoid pregnancy during treatment. The purpose of this study was to determine the characteristics of contraceptive use patterns in women with thyroid cancer of reproductive age who underwent radioablation at Hasan Sadikin Hospital Bandung.Cross-sectional study conducted at Hasan Sadikin Hospital Bandung in May 2023. The research sample was all female thyroid cancer of reproductive age who underwent radioablation at the Nuclear Medicine polyclinic of Dr. Hasan Sadikin Bandung in January-December 2022 by purposive sampling. Data obtained from patient medical records and primary data from patients. A total of 450 patients fulfilled inclusion criteria, but only 329 analyzed with complete data. Majority of the patient was in age group 35-49 years (58.1%), parity >1 (55.9%), last education high school (39.2%), married (81.8%), type of papillary thyroid carcinoma (79.9%), sources of information about contraception from doctors (71.7%), and 75.4% use contraception. The most widely used type of contraception was intrauterine device (IUD), accounting for 28.6% patients. Approximately 75.4% patient use contraception. The most widely used type of contraception is the IUD. Contraception counselling is important for increasing contraceptive use rates among women with thyroid cancer. Further research in the form of analytical research is needed to assess the factors that influence contraceptive use in women with thyroid cancer of reproductive age. *(Afr J Reprod Health 2024; 28 [5]: 39-46).*

Keywords: Contraception, thyroid cancer, radioiodine ablation

Résumé

L'incidence des nouveaux cas de cancer de la thyroïde dans le monde est d'environ 10,1/100 000 chez la femme et 3,1/100 000 chez l'homme. Il est conseillé aux femmes atteintes d'un cancer de la thyroïde d'éviter une grossesse lorsqu'elles subissent une radioablation en raison de la tératogénicité. Il est donc crucial d'utiliser une contraception pour éviter une grossesse pendant le traitement. Le but de cette étude était de déterminer les caractéristiques des modes d'utilisation des contraceptifs chez les femmes atteintes d'un cancer de la thyroïde en âge de procréer qui ont subi une radioablation à l'hôpital Hasan Sadikin de Bandung. Étude transversale menée à l'hôpital Hasan Sadikin de Bandung en mai 2023. L'échantillon de recherche était entièrement cancer de la thyroïde chez la femme en âge de procréer qui a subi une radioablation à la polyclinique de médecine nucléaire du Dr Hasan Sadikin Bandung en janvier-décembre 2022 par échantillonnage raisonné. Données obtenues à partir des dossiers médicaux des patients et des données primaires des patients. Au total, 450 patients remplissaient les critères d'inclusion, mais seulement 329 ont été analysés avec des données complètes. La majorité des patients appartenaient à la tranche d'âge 35-49 ans (58,1%), parité >1 (55,9%), dernier diplôme d'études secondaires (39,2%), mariés (81,8%), type de carcinome papillaire de la thyroïde (79,9%), sources d'information sur la contraception auprès des médecins (71,7 %) et 75,4 % utilisent la contraception. Le type de contraception le plus utilisé était le dispositif intra-utérin (DIU), représentant 28,6 % des patientes. Environ 75,4 % des patientes utilisent une contraception. Le moyen de contraception le plus utilisé est le DIU. Les conseils en matière de contraception sont importants pour augmenter les taux d'utilisation des contraceptifs chez les femmes atteintes d'un cancer de la thyroïde. Des recherches supplémentaires sous forme de recherches analytiques sont nécessaires pour évaluer les facteurs qui influencent l'utilisation de la contraception chez les femmes atteintes d'un cancer de la thyroïde en âge de procréer. *(Afr J Reprod Health 2024; 28 [5]: 39-46).*

Mots-clés: Contraception, cancer de la thyroïde, ablation à l'iode radioactif

Introduction

Over the past few decades, the incidence of thyroid cancer has increased worldwide. The global incidence rate of thyroid cancer is 10.1 per 100,000 women and 3.1 per 100,000 men[1]. The global mortality rate by age is 0.5 per 100,000 women and 0.3 per 100,000 men. In 2020, the number of new cases of thyroid cancer worldwide was approximately 449,000 in women and 137,000 in men[2]. Thyroid cancer can affect various ages and ethnic groups, with an increased risk among women under 45 years of age[1,2]. The incidence rate of thyroid cancer among women has been estimated to be 2.6 to 3 times higher than that among men, peaking at the productive age in women[2]. Thyroid cancer therapy includes surgery, chemotherapy, and radioablation. Generally, women with thyroid cancer are advised to avoid pregnancy during chemotherapy or teratogenic radioablation[3]. Exposure to radioablation during pregnancy can lead to various consequences for both the mother and fetus[4]. Effects on the fetus may include inhibited fetal growth, congenital hypothyroidism, malformations, brain function disorders, and cancer[4]. Apart from the impact of radioablation on pregnancy, pregnancy itself has negative effects on thyroid cancer development. One study suggests that pregnancy can enlarge the size of cancer due to hormonal mechanisms. Therefore, contraception may be highly necessary for women with thyroid cancer to prevent pregnancy[4–6]. Most radiation oncologists advise their patients not to conceive even up to 1-2 years after completing therapy. This is due to considerations regarding the risk of tumor recurrence, which may necessitate further radiation, surgery, or chemotherapy[5].

In addition to the importance of contraception use, the choice of contraception is also crucial for thyroid cancer patients. Hormonal and reproductive factors have long been suspected to play a significant role in the high incidence of thyroid cancer in women of reproductive age. Hormonal factors can be classified into exogenous and endogenous types[7]. Hormonal contraception is one form of exogenous hormone commonly used by reproductive-age women, whether in the form of pills, injections, implants, or hormonal IUDs. Hormonal contraception can consist of either single progestogens or a combination of progesterone and estrogen[8]. The use of hormonal contraception in some types of cancer is contraindicated to prevent its side effects.

Previous research indicates that the use of oral contraceptives can affect thyroid-stimulating hormone (TSH) levels. Estrogen has also been found to increase proliferation, migration, and invasion of malignant thyroid cells. A study by Hedayati *et al*. links the use of oral contraceptives with the development and aggressiveness of thyroid cancer, through increased proliferation and migration, as well as inhibition of apoptosis[9]. On the other hand, a meta-analysis of prospective cohort studies suggests that oral contraceptives actually reduce the risk of thyroid cancer[10]. A French population-based case-control study also reported that oral contraceptive use may reduce the risk of thyroid cancer by up to one-third, although the mechanisms are not yet understood[11].

The conflicting evidence surrounding the impact of oral contraceptives on thyroid cancer underscores the need for a comprehensive understanding of the interplay between hormonal factors and thyroid cancer pathogenesis. Moreover, it highlights the importance of elucidating the role of contraception in thyroid cancer management to guide clinical practice effectively. Given the controversy surrounding hormonal contraception and thyroid cancer, educating patients with thyroid cancer about contraceptive selection is crucial. Studies by Mitwally *et al*. and Maslow *et al*. have reported that cancer patients have limited awareness regarding contraceptive use and the selection of suitable contraceptives for their condition, due to a lack of contraceptive counseling for cancer patients[12].

Data on contraception in thyroid cancer patients is crucial, considering the significant impact of contraception on reproductive-age women with thyroid cancer. This data can serve as the basis for contraceptive education in cancer patients. There is currently no research examining the patterns of contraceptive use in thyroid cancer patients undergoing radioablation at Dr. Hasan Sadikin General Hospital Bandung, hence researchers are interested in investigating and providing data on this matter. The purpose of this study is to determine the characteristics and patterns of contraceptive use among reproductive-age women with thyroid cancer undergoing radioablation at Dr. Hasan Sadikin General Hospital Bandung.

Methods

This study is a descriptive study with a cross-sectional design involving reproductive-age female patients with thyroid cancer undergoing radioablation at Dr. Hasan Sadikin General Hospital Bandung. The research was conducted at Dr. Hasan Sadikin General Hospital, Bandung. The study was carried out in May 2023. The data observed in this study were from January to December 2022.

The target population of this study is all reproductive-age female patients with thyroid cancer undergoing radioablation. Meanwhile, the accessible population for this study comprises all reproductive-age female patients with thyroid cancer undergoing radioablation in the Nuclear Medicine Department of Dr. Hasan Sadikin General Hospital Bandung from January to December 2022. Sampling was conducted using purposive sampling, where all subjects who came and met the selection criteria were included in the study within the specified time frame determined by the researcher.

The data used in this study are both primary and secondary. Primary data were obtained by contacting patients through the telephone numbers recorded in their medical records, then providing them with a brief questionnaire using the Google Form application to be filled out by the respondents. Meanwhile, secondary data were obtained from hospital medical records of patients diagnosed with thyroid cancer undergoing radioablation therapy who visited the Nuclear Medicine Clinic of Hasan Sadikin General Hospital Bandung from January to December 2022. The inclusion criteria for this study are women diagnosed with thyroid cancer, aged 15-49 years, undergoing radioablation at the Nuclear Medicine Clinic of Hasan Sadikin General Hospital Bandung from January to December 2022, and willing to participate in the study. The exclusion criteria are patients who are unwilling to participate in the study, do not respond when contacted, and have incomplete medical record data. The examined data include age, parity, highest level of education, marital status, source of information about contraception, and type of contraception used during the ablative therapy.

The presentation of data in this research will involve displaying demographic information of the research subjects in tables, depicting frequency numbers and percentages (%). This data will be processed using a computer and further presented as proportional data (%) pertaining to age, parity, highest education level, marital status, and sources of information about contraception. The relationship between these factors and the type of contraception used during ablative therapy will be explored through cross-tabulation tables.

Results

This study successfully obtained a total of 450 patients who met the predetermined inclusion criteria, consisting of reproductive-aged female thyroid cancer patients undergoing radioablation at the Nuclear Medicine Clinic of Dr. Hasan Sadikin

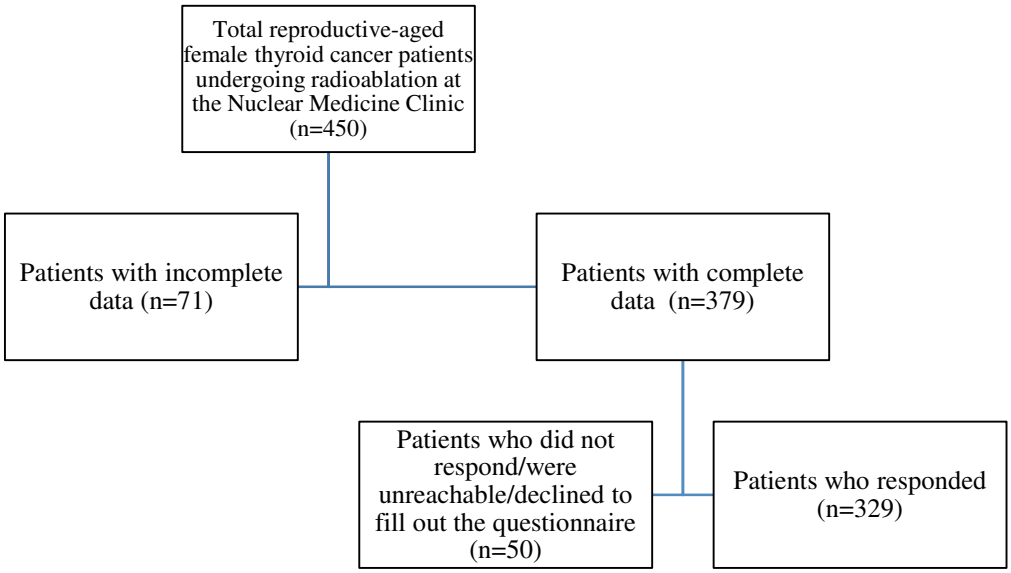

Figure 1: Flowchart of research subjects

Table 1: Characteristics of research subjects

Variable	Frequency	Percentage (%)
Age (years)		
15-24	47	14.3
25-34	91	27.7
35-49	191	58.1
Parity		
0	62	18.8
1	83	25.2
>1	184	55.9
Highest Education Level		
No education	0	0.0
Primary school	11	3.3
Junior high school	59	17.9
Senior high school	129	39.2
Tertiary education	130	39.5
Marital Status		
Single	41	12.5
Married	269	81.8
Divorced	19	5.8
Type of Thyroid Cancer		
Papillary thyroid carcinoma	263	79.9
Follicular thyroid carcinoma	66	20.1
Source of Contraception Information		
Doctor/Medical personnel	236	71.7
Social Media/Internet	15	4.6
Family/Friends	21	6.4
Never received information	57	17.3
Contraceptive Use		
Yes	248	75.4
No	81	24.6

Table 2: Pattern of contraceptive use in thyroid cancer patients undergoing radioablation

Contraceptive Method	Frequency	Percentage (%)
IUD	94	28.6
Tubal ligation	13	4.0
Oral contraceptives	23	7.0
Injectable (1 month)	23	7.0
Injectable (3 months)	21	6.4
Implant	27	8.2
Condom	14	4.3
Coitus interruptus	13	4.0
Calendar method	20	6.1
None	81	24.6

General Hospital in Bandung from January to December 2022. During data collection, a total of 379 patients were identified with complete medical records and patient data. Subsequently, researchers contacted patients via telephone and administered a brief questionnaire regarding contraceptive usage.

Table 3: Distribution of contraceptive use based on characteristics of research subjects

Variable	Contraceptive Use	
	Yes, n (%)	No, n (%)
Age (years)		
15-24	9 (2.74)	38 (11.5)
25-34	75 (22.8)	16 (4.86)
35-49	164 (49.8)	27 (8.21)
Parity		
0	10 (3.04)	52 (15.8)
1	69 (20.9)	14 (4.26)
>1	169 (51.3)	15 (4.56)
Highest Education Level		
No education	0 (0)	0 (0)
Primary school	11 (3.34)	0 (0)
Junior high school	35 (10.6)	24 (7.29)
Senior high school	103 (31.3)	26 (7.90)
Tertiary education	99 (30)	31 (9.42)
Marital Status		
Single	0 (0)	41 (12.4)
Married	242 (73.5)	27 (8.21)
Divorced	6 (1.82)	13 (3.95)
Source of Contraception Information		
Doctor/Medical personnel	213 (64.7)	23 (6.9)
Social Media/Internet	11 (3.34)	4 (1.22)
Family/Friends	13 (3.95)	8 (2.43)
Never received information	11 (3.34)	46 (13.9)

As a result, a total of 329 patients responded and provided complete data (Figure 1).

The characteristics of the research subjects can be seen in Table 1. Patient age was predominantly in the 35-49 age group (58.1%), with parity >1 (55.9%), tertiary education level (39.5%), married marital status (81.8%), papillary thyroid carcinoma (79.9%), source of contraception information from doctors/medical personnel (71.7%), and 75.4% of patients using contraception.

The pattern of contraceptive use in thyroid cancer patients undergoing radioablation can be seen in Table 2. The most commonly used type of contraception is the IUD, accounting for 28.6%.

The distribution of contraceptive use based on the characteristics of research subjects can be seen in Table 3. Among cancer patients aged 15-24 years, a greater proportion do not use contraception (11.5%) compared to those who do (2.74%). Individuals with a high school education have a higher proportion of contraceptive use (31.3%) compared to those with other educational levels. Patients who receive information about contraception from doctors, healthcare professionals, social media, the internet,

or family and friends are more likely to use contraception compared to cancer patients who have never received contraceptive information.

Discussion

Characteristics of reproductive-aged women with thyroid cancer undergoing radioablation at Dr. Hasan Sadikin General Hospital, Bandung, are predominantly in the age group of 35-49 years old, and the most common type of cancer is papillary thyroid carcinoma. These findings are consistent with a study by Toro-Wills *et al*., which stated that reproductive-aged women with thyroid cancer are mostly over 35 years old[13]. Another study conducted in hospitals in Bandung by Saputri *et al*. in 2021 stated that thyroid cancer patients are predominantly in the age range of 40-49 years old, and the most common type of cancer is papillary carcinoma[14]. Another study conducted at Sanglah Hospital in Denpasar in 2017 stated that the characteristic of thyroid cancer patients is dominated by the age group of 30-39 years old[15].

In this study, reproductive-aged female thyroid cancer patients predominantly have parity of more than one (55.9%), and 81.8% of them are already married. These results differ from reproductive-aged women with thyroid cancer in Pennsylvania, United States, where the majority have no parity, and only 46% are married[16]. The difference in these results may be attributed to cultural differences between Indonesia and the United States.

The most commonly used type of contraception in this study is the IUD (28.6%). This result differs from research in the United States, which states that the most preferred contraceptives among reproductive-aged women with cancer are condoms and oral contraceptives. Only 4% of women chose the IUD in that study[17]. This difference is likely related to contraceptive preferences in Western countries, where oral contraceptive pills are more commonly used, whereas in Indonesia, injectable contraceptives and IUDs are more prevalent[17].

Based on data from the World Health Organization (WHO), among 1.9 billion women of reproductive age (15-49 years) worldwide in 2019, 1.1 billion used contraception[18]. Female sterilization is the most commonly used contraceptive method globally. Approximately 23.7% of women rely on female sterilization, while the next most common methods are male condoms (189 million), IUDs (159 million), and pills (151 million). Overall, 45.2% of contraceptive users rely on permanent or long-acting methods (female and male sterilization, IUDs, implants), 46.1% on short-acting methods (such as male condoms, pills, injections, and other modern methods), and 8.7% on traditional methods (withdrawal, rhythm methods, and other traditional methods)[18]. In East and Southeast Asia, the most commonly used contraceptive method is the IUD, followed by male condoms[19]. In Europe and North America, pills and male condoms are the most common methods, while in Latin America and the Caribbean, female sterilization and pills are predominant[20]. In Oceania, the dominant method is the pill, and in Central and South Asia, it's female sterilization[21]. In North Africa and the Middle East, the two most common methods are pills and IUDs[22].

The use of hormonal contraceptives, including injectable birth control, implants, hormonal IUDs, and birth control pills, in thyroid cancer remains controversial. Research by Hedayati *et al*. indicates that the use of oral contraceptives can affect thyroid-stimulating hormone (TSH) levels, thereby influencing the development of thyroid cancer[9]. The estrogen hormone in hormonal contraceptives is also found to be associated with the proliferation, migration, and invasion of malignant thyroid cells. Hedayati *et al*. found a relationship between oral contraceptive use and the development and aggressiveness of thyroid cancer through increased proliferation and migration and inhibition of apoptosis[9]. On the other hand, a meta-analysis of prospective cohort studies suggests that oral contraceptives actually reduce the risk of thyroid cancer due to hormonal mechanisms. Population-based case-control studies in France also reported that the use of oral contraceptives can reduce the risk of thyroid cancer by up to one-third, although the mechanisms are not yet clearly understood.

Due to the controversy surrounding the use of hormonal contraceptives in thyroid cancer, non-hormonal contraceptive options such as condoms and IUDs are more recommended for thyroid cancer patients. The use of condoms is generally less favored in Indonesian society among married individuals, and short-acting contraceptive methods are at high risk of drop-out, hence IUDs could be suggested as an alternative. Schwarz et al. reviewed

evidence supporting the safety and effectiveness of available contraceptive methods for cancer patients, and concluded that the Copper T380A IUD is a highly effective, reversible, long-acting, non-hormonal method that can be considered as a first-line contraceptive option for women with a history of cancer.

In this study, thyroid cancer patients aged 15-24 years old were more likely not to use contraception (11.5%) compared to those who used contraception (2.74%). Thyroid cancer patients who have not yet had children also predominantly do not use contraception. Based on data from the National Socioeconomic Survey (Susenas), young adults in their early 20s do not often use contraception because they are not ready to postpone having children, do not have children yet, or are not married[23]. Thyroid cancer patients undergoing radioablation therapy constitute a special population whose pregnancies should be postponed for the benefit of both the fetus and the mother, thus emphasizing the education on contraceptive use for young patients and those who have not yet had children is still necessary[24]. Patients should postpone pregnancy until treatment is completed due to the negative effects of radioablation treatment on both the mother and the fetus. The effects of fetal exposure to radioablation include fetal growth restriction, congenital hypothyroidism, malformations, brain function disorders, and cancer[24]. One study indicated that pregnancy can also enlarge the size of the cancer due to hormonal mechanisms[25].

Based on the level of education in this study, it is shown that patients with a high school education have a higher proportion of contraceptive use (31.3%) compared to other education levels. This emphasizes the importance of education and counseling regarding contraceptive use for cancer patients, which should be provided to everyone regardless of the patient's educational background.

In this study, cancer patients who received contraceptive information from doctors, healthcare providers, social media, the internet, or relatives or friends were more likely to use contraception compared to cancer patients who never received contraceptive information. A meta-analysis study involving 3,835 participants stated that when contraceptive education and counseling were provided to cancer patients, there was a significant increase in contraceptive use[26]. Contraceptive counseling interventions as part of thyroid cancer care have the potential not only to influence women with thyroid cancer to make informed decisions regarding their reproductive health but also to empower them to plan for future pregnancies when in better health.

This study has limitations due to differences in data from the previous year because of the COVID-19 pandemic. The research was conducted using data from 2022, when the pandemic had begun to decline, resulting in increased visits to outpatient clinics. The end of 2020 and the beginning of 2021 were the peaks of COVID-19 cases in Indonesia, which led to fewer visits to outpatient clinics, with 743,198 cases in 2020, whereas by the end of 2022, there was a decrease with only 9,871 active cases[27].

Characteristics of reproductive-aged women with thyroid cancer undergoing radioablation at Dr. Hasan Sadikin General Hospital, Bandung, are predominantly in the age group of 35-45 years old, with parity >1, a high school education as their highest level of education, married marital status, papillary thyroid carcinoma as the type of cancer, contraceptive information sourced from doctors/healthcare providers, and the majority are already using contraception (69.0%). The most commonly used type of contraception is the IUD (25.9%). Further research in the form of analytical studies is needed to assess the factors influencing contraceptive use in reproductive-aged women with thyroid cancer.

Funding

The authors declare that no funds, grants, or other support were received during the preparation of this manuscript.

Competing interests

The authors have no relevant financial or non-financial interests to disclose.

Author contributions

All authors contributed to the study conception and design. Material preparation, data collection and analysis were performed Haidarotul Milla. The first draft of the manuscript was written by Haidarotul Milla and all authors commented on previous

versions of the manuscript. All authors read and approved the final manuscript.

Data availability

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

Ethical approval

Approved by Hasan Sadikin Hospital Bandung

Consent to participate

Informed consent was gained by all included participants and were aware that their data were being used for publication

Consent to publish

Informed consent was gained by all included participants and were aware that their data were being used for publication.

References

1. Lee K, Anastasopoulou C, Chandran C and Cassaro S. Thyroid Cancer. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Apr 7]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK459299/
2. Pizzato M, Li M, Vignat J, Laversanne M, Singh D, La Vecchia C, et al. The epidemiological landscape of thyroid cancer worldwide: GLOBOCAN estimates for incidence and mortality rates in 2020. Lancet Diabetes Endocrinol. 2022 Apr;10(4):264–72.
3. Limaiem F, Rehman A, Anastasopoulou C and Mazzoni T. Papillary Thyroid Carcinoma. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Apr 7]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK536943/
4. Kim HO, Lee K, Lee SM and Seo GH. Association Between Pregnancy Outcomes and Radioactive Iodine Treatment After Thyroidectomy Among Women With Thyroid Cancer. JAMA Intern Med. 2020 Jan 1;180(1):54–61.
5. Singh S and Sandhu S. Thyroid Disease and Pregnancy. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Apr 7]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK538485/
6. Springer D, Jiskra J, Limanova Z, Zima T and Potlukova E. Thyroid in pregnancy: From physiology to screening. Critical Reviews in Clinical Laboratory Sciences. 2017 Feb 17;54(2):102–16.
7. Wiegratz I, Kutschera E, Lee JH, Moore C, Mellinger U, Winkler UH, et al. Effect of four oral contraceptives on thyroid hormones, adrenal and blood pressure parameters. Contraception. 2003 May;67(5):361–6.
8. Starup J and Friis T. Thyroid function in oral contraception. Acta Endocrinologica. 1967 Nov;56(3):525–32.
9. Hedayati M, Rajabi S and Nikzamir A. Papillary Thyroid Cancer-Promoting Activities of Combined Oral Contraceptive Components. Galen Med J. 2020;9:e1648.
10. Mannathazhathu AS, George PS, Sudhakaran S, Vasudevan D, Krishna Km J, Booth C, et al. Reproductive factors and thyroid cancer risk: Meta-analysis. Head Neck. 2019 Dec;41(12):4199–208.
11. Cordina-Duverger E, Leux C, Neri M, Tcheandjieu C, Guizard AV, Schvartz C, et al. Hormonal and reproductive risk factors of papillary thyroid cancer: A population-based case-control study in France. Cancer Epidemiol. 2017 Jun;48:78–84.
12. Mitwally MFM. Fertility preservation and minimizing reproductive damage in cancer survivors. Expert Rev Anticancer Ther. 2007 Jul;7(7):989–1001.
13. Toro-Wills MF, Imitola-Madero A, Alvarez-Londoño A, Hernández-Blanquisett A and Martínez-Ávila MC. Thyroid cancer in women of reproductive age: Key issues for the clinical team. Womens Health (Lond). 2022;18:17455057221136392.
14. Saputri Y, Nur IM and Damayanti MM. Karakteristik Pasien dengan Nodul Tiroid di Rumah Sakit Al-Ihsan Bandung. J Integr Kes Sains [Internet]. 2021 Jul 31 [cited 2024 Apr 7];3(2). Available from: https://ejournal.unisba.ac.id/index.php/jiks/article/view/7412
15. Arrumugam K, Ekawati NP and Gotra IM. Characteristic of thyroid carcinoma based on age, sex and histology type at Sanglah General Hospital, Bali, Indonesia, 2016. Intisari Sains Medis [Internet]. 2018 Dec 1 [cited 2024 Apr 7];9(3). Available from: https://isainsmedis.id/index.php/ism/article/view/285
16. Asmelash D, Tesfa K and Biadgo B. Thyroid Dysfunction and Cytological Patterns among Patients Requested for Thyroid Function Test in an Endemic Goiter Area of Gondar, North West Ethiopia. Int J Endocrinol. 2019;2019:9106767.
17. Bansode OM, Sarao MS and Cooper DB. Contraception. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 [cited 2024 Apr 7]. Available from: http://www.ncbi.nlm.nih.gov/books/NBK536949/
18. World Health Organization. Contraception [Internet]. 2024. Available from: https://www.who.int/health-topics/contraception#tab=tab_1
19. Nguyen N, Nguyen L, Nguyen H and Gallo MF. Correlates of use of withdrawal for contraception among women in Vietnam. BMC Womens Health. 2020 Apr 29;20(1):87.
20. Costescu D, Chawla R, Hughes R, Teal S and Merz M. Discontinuation rates of intrauterine contraception due to unfavourable bleeding: a systematic review. BMC Womens Health. 2022 Mar 21;22(1):82.
21. Iype E, Nair VR, Rajammal null. Laparoscopic removal of displaced intra uterine devices. Asia Oceania J Obstet Gynaecol. 1984 Jun;10(2):181–3.
22. Cartwright AF, Mackenzie ACL, Callahan RL, Bahamondes MV and Dorflinger LJ. IUD self-removal as self-care: Research is needed in low and

middle-income countries. Front Glob Womens Health. 2022;3:992639.
23. Badan Pusat Statistik Indonesia. Angka Penggunaan Metode Kontrasepsi Jangka Panjang (MKJP) Cara Modern, 2012-2017 [Internet]. 2024. Available from: https://www.bps.go.id/id/statistics-table/2/MTM5NiMy/angka-penggunaan-metode-kontrasepsi-jangka-panjang--mkjp--cara-modern.html
24. Hussain I, Zulfiqar F, Li X, Ahmad S and Aljammal J. Safety and Efficacy of Radiofrequency Ablation of Thyroid Nodules-Expanding Treatment Options in the United States. J Endocr Soc. 2021 Aug 1;5(8):bvab110.
25. Cherian KE, Kapoor N, Paul TV and Asha HS. Functioning Endocrine Tumors in Pregnancy: Diagnostic and Therapeutic Challenges. Indian J Endocrinol Metab. 2021;25(4):299–304.
26. Harris ML, Feyissa TR, Bowden NA, Gemzell-Danielsson K and Loxton D. Contraceptive use and contraceptive counselling interventions for women of reproductive age with cancer: a systematic review and meta-analysis. BMC Med. 2022 Dec 17;20(1):489.
1. 27. Sutaryono S, Andasari SD and Kasjono HS. Diagnosis and epidemiology of Coronavirus (COVID-19) outbreak in Indonesia. J Teknol Lab. 2020 Jul 2;9(1):49–57.