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# A Critical Discourse Analysis of Gender Equity and Sex Education in Indonesian High School Biology Textbooks

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## *Abstrak*

*Materi pembelajaran Biologi, khususnya pada topik sistem reproduksi, masih didominasi oleh pendekatan biologis mekanistik yang mengesampingkan pentingnya integrasi pendidikan seks remaja dan nilai keadilan gender. Kondisi ini berpotensi mempertahankan bias gender dan miskonsepsi terkait seksualitas di kalangan peserta didik. Penelitian ini bertujuan untuk menganalisis secara kritis representasi nilai keadilan gender dan pendidikan seks dalam buku ajar Biologi SMA kelas XI melalui kerangka analisis wacana kritis. Penelitian ini menggunakan pendekatan kualitatif dengan metode analisis wacana kritis model Norman Fairclough yang mencakup tiga tahapan: analisis teks, analisis praktik wacana, dan analisis praktik sosial. Subjek penelitian terdiri dari tiga buku ajar Biologi SMA kelas XI yang umum digunakan, yakni satu buku terbitan pemerintah dan dua buku terbitan swasta sebagai pembanding. Hasil penelitian menunjukkan pola yang seragam dalam penempatan topik sistem reproduksi di bagian akhir buku, dengan dominasi pembahasan anatomi dan fisiologi tanpa integrasi pendidikan seks yang komprehensif dan berkeadilan gender. Ditemukan pula adanya bias gender, minimnya pembahasan tentang persetujuan (consent), kekerasan seksual, serta ketimpangan informasi kontrasepsi. Penelitian ini menyimpulkan bahwa buku ajar tersebut masih mereproduksi ideologi patriarkal dan wacana sains yang eksklusif. Implikasinya, diperlukan revisi buku ajar yang mengedepankan pendidikan seks komprehensif, adil gender, dan relevan dengan konteks sosial remaja.*

***Kata Kunci**: Adil Gender; Bias Gender; Buku Ajar Biologi; Edukasi Seksual; Pendidikan Inklusi*

## Abstract

Biology learning materials, particularly on the reproductive system, often emphasize mechanistic and biological aspects while overlooking the importance of integrating adolescent sex education and gender equity values. This gap may perpetuate misconceptions and gender bias among students. This study aims to critically analyze the representation of gender equity and sexuality education in senior high school Biology textbooks through a critical discourse analysis framework. A qualitative research design was employed, utilizing Norman Fairclough's three-dimensional model consisting of text analysis, discourse practice analysis, and social practice analysis. The study involved three widely used Grade XI Biology textbooks, including one government-issued and two private publishers' editions as comparative data sources. The findings reveal a uniform pattern of placing reproductive system topics at the end of the textbooks, predominantly presenting anatomical and physiological content without integrating comprehensive, inclusive, and gender-equitable sexuality education. Moreover, the textbooks demonstrate gender bias, insufficient discussions on consent, sexual violence, and unequal access to contraceptive information. This study concludes that the textbooks reproduce patriarchal ideologies and exclusive scientific discourse, failing to address adolescents' psychosocial and ethical aspects of sexuality. The findings highlight the urgent need for textbook revisions that promote comprehensive, gender-equitable, and contextually relevant sex education for high school students.

**Keywords**: Biology textbooks; Gender Bias; Gender Equity; Inclusive Education; Sex Education

## 1. INTRODUCTION

Adolescent health remains a complex and multidimensional global issue, particularly concerning the rising prevalence of risky sexual behaviors in various countries, including Indonesia. Data from the Ministry of Health indicate that individuals aged 20–24 constitute the largest proportion of new HIV/AIDS cases in Indonesia. Additionally, approximately 62% of adolescents have reportedly engaged in premarital sexual activity, increasing their risk of contracting sexually transmitted infections and experiencing unintended pregnancies (Khemkhaeng et al., 2022; Malinovska, 2023; Santelli et al., 2018). This situation is further

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aggravated by the high rate of teenage pregnancies, with around 20% of out-of-wedlock pregnancies occurring among teenagers, and the majority opting for abortion. This phenomenon poses a serious challenge, not only in terms of physical health but also encompassing social, psychological, and moral dimensions (Ansari & Landin, 2022; Fasil et al., 2022; Hughes et al., 2020).

Education within families and schools plays a strategic role in shaping adolescents' understanding of sexual health, consent, and the consequences of sexual behavior. Unfortunately, the low quality of comprehensive sex education both at home and in schools has led to widespread misinformation, risky behaviors, and the normalization of coercion in sexual relationships. Effective sex education should not be confined to anatomical knowledge and pregnancy prevention but must address critical issues such as consent, healthy relationships, and mutual respect for personal rights and boundaries. Collaboration between parents and educators in delivering accurate, age-appropriate, value-based education that empowers adolescents to make responsible decisions is urgently needed (D'Angelo et al., 2024; Hull et al., 2023; Nuraini et al., 2025). Previous studies have shown that school-based sexual violence prevention programs, such as the Child Sexual Abuse Prevention Education (C-SAPE), effectively enhance children's ability to recognize dangerous situations and practice self-protective behaviors. Additionally, the Comprehensive Sexuality Education (CSE) model has been proven to reduce risky sexual behaviors by providing accurate information and fostering positive attitudes toward sexuality. CSE emphasizes the importance of human rights and gender equality in sex education, extending beyond biological aspects to empower students to understand and respect their own sexual rights and those of others (Amanda, 2023; Giersch, 2020; Firdani et al., 2024).

In formal educational curricula, Biology is the primary subject incorporating sex education topics, particularly concerning the human reproductive system. Biology textbooks play a crucial role in shaping students' comprehension of reproductive, genetic, and reproductive health concepts. The quality of these textbooks significantly influences students' understanding and attitudes regarding reproductive health issues. However, the reproductive system materials in high school Biology textbooks have been predominantly dominated by a mechanistic-biological approach, with minimal attention to social, emotional, and gender equity values. Effective sex education should link biological aspects with social contexts to help students appreciate the importance of maintaining reproductive health and making wise life decisions (Fajar & Prasetyo, 2022; Hendriks et al., 2024; Parish et al., 2021; Pramono et al., 2024). Research has demonstrated that sex education, which considers not only formal instruction but also students' lived experiences, is more effective in fostering a healthy understanding of sexuality. Therefore, a holistic approach integrating biological and social aspects, along with gender equity values, is necessary for reproductive and sexuality education content. This integration is vital in equipping students with knowledge about bodily autonomy, consent, and equitable, healthy interpersonal relationships (Fitriani & Lutfi, 2021; Goldfarb & Lieberman, 2021; Shibuya et al., 2023).

Integrating gender equity values into sex education is crucial for preventing sexual violence, fostering critical understanding of consent, reproductive choices, and bodily autonomy, while addressing power dynamics in gender relations. Gender-sensitive educational content raises students' awareness of sexual violence issues and the importance of healthy relationships, simultaneously equipping them with decision-making skills related to reproductive health. However, sex education programs in schools remain limited and predominantly target female students, neglecting male involvement. This imbalance perpetuates the misconception that sex education is only relevant to girls, weakening efforts to prevent sexual violence (Holme & Finnigan, 2020; O'Farrell et al., 2021).

The analysis reveals a significant discrepancy between the ideal objective of comprehensive, gender-equitable, and contextually relevant sex education and the current reality, where reproductive system materials in high school Biology textbooks remain gender-biased, limited to anatomical and physiological aspects, and largely ignore social, ethical, and psychological issues. This gap underscores the urgency for a critical examination of Biology textbook content, particularly on human reproduction topics (Andini et al., 2023; Hughes et al., 2020; Khemkhaeng et al., 2022). The state of the art indicates that most research on sex education in Biology textbooks has focused on developing instructional media or analyzing students' misconceptions regarding reproductive system material. A study successfully developed character education-based modules that were validated as effective in improving students' comprehension of reproductive systems (Firdani et al., 2024). Other studies have uncovered common student misconceptions, such as the belief that reproductive organs consist only of the penis and vagina or that contraceptive pills are the sole method of birth control (Hull et al., 2023; Izdebski et al., 2020; Mittelmeier et al., 2024; Wan-Yusoff et al., 2023). However, studies specifically analyzing representations of gender equity and patriarchal ideologies in Indonesian high school Biology textbooks remain scarce. Few have employed Norman Fairclough's Critical Discourse Analysis (CDA) framework to examine gender and sexuality discourse in educational texts in Indonesia. Thus, this study offers novelty by presenting an integrative approach that combines biological science and gender discourse through CDA to examine the representation of gender equity values and adolescent sex education in high school Biology textbooks (Kusuma & Nurhayati, 2019; Panjaitan et al., 2019).

This research is significant because the presentation of reproductive system materials in textbooks not only conveys biological information but also has the potential to shape students' perspectives on sexuality and gender relations. Biased textbooks may perpetuate patriarchal ideologies and exclusive scientific discourse, further reinforcing gender inequality in society. The findings from this study are expected to provide valuable recommendations for curriculum developers, educators, and textbook authors in creating more inclusive, contextual, and gender-equitable sex education materials (Kusumaadhi et al., 2021; Parish et al., 2021). Based on the issues and background described above, the specific objective of this research is to critically analyze the representation of gender equity values and adolescent sex education in government-published high school Biology textbooks, particularly on the topic of the human reproductive system. Additionally, the study aims to explore how gender roles and sex education are portrayed in these textbooks and uncover the ideological messages embedded within the structure and content of the reproductive system materials.

## 2. METHODS

This study employed a qualitative research design with a critical discourse analysis (CDA) approach, adopting Norman Fairclough's model consisting of three interrelated stages: textual analysis, discursive practice analysis, and social practice analysis. The study aimed to examine how gender equity and adolescent sex education are represented in high school Biology textbooks, particularly in the topic of the human reproductive system. The research design allowed for a comprehensive exploration of the text, its production and interpretation processes, and its connection to broader sociocultural structures. The research subjects consisted of three high school Biology textbooks purposively selected based on their official status and widespread use in Indonesian schools. The selected textbooks included one published by the Ministry of Education, Culture, Research, and Technology (Kemendikbud), and two others produced by private publishers, Erlangga and Quadra. The selection aimed to capture diverse perspectives from both government and private educational publishers that

are commonly adopted nationwide. A summary of the textbook selection criteria is presented in Table 1.

**Table 1.** Textbook Selection Criteria

| Publisher | Justification for Selection | Relevance |
|---|---|---|
| Ministry of Education, Culture, Research, and Technology (Kemendikbud) | Official government-issued textbook used in public schools | Represents national curriculum standards and official policies |
| Erlangga | Major private publisher with broad market penetration | Provides alternative perspectives, widely used in private schools |
| Quadra | Private publisher recognized for innovative and contextual content | Adds pedagogical diversity and comparison of teaching approaches |

Source; (Quadra, 2022)

Data were collected through document analysis of verbal and visual content in the selected textbooks, focusing on the sections related to the human reproductive system. Relevant excerpts were purposively sampled based on their thematic relevance to gender equity and sex education. The primary instrument used in this study was a data extraction and coding grid developed from the theoretical constructs of Fairclough's CDA framework and indicators of gender-sensitive education and reproductive health literacy. The grid was designed to systematically capture information on linguistic features (vocabulary, metaphors, modality, and grammar), visual representation, thematic emphasis, and implicit ideological messages concerning gender and sexuality.

**Table 2**. Instrument Grid Structure

| Aspect | Indicator Example | Category |
|---|---|---|
| Vocabulary & Language Use | Gendered terms, euphemisms for sexual concepts | Biased / Neutral / Inclusive |
| Thematic Emphasis | Focus on anatomy, physiology, or social issues | Dominant / Marginal / Absent |
| Visual Representation | Depiction of male/female bodies, gender roles | Balanced / Stereotypical |
| Ideological Messages | Promotion of gender norms, consent, reproductive rights | Patriarchal / Egalitarian |

Source: (Blumberg, 2008)

Instrument validation was carried out through expert review involving two specialists in discourse analysis and gender education studies. The experts evaluated the clarity, relevance, and consistency of the grid's categories and indicators. Feedback obtained from this process was used to refine the instrument before final data analysis commenced, ensuring content validity and alignment with the research objectives. Data analysis was conducted in two distinct stages: data collection and data interpretation. Textual and visual data were first extracted and categorized according to the coding grid. An inductive thematic analysis was applied to identify recurring patterns, discursive strategies, and ideological positions embedded within the textbooks. Codes were developed iteratively through repeated readings and coding discussions among the research team. To enhance reliability, intercoder

agreement was calculated by comparing coding results from multiple researchers, ensuring consistency in category interpretation and theme identification.

The study's ethical considerations were carefully maintained by exclusively analyzing publicly available, officially published textbooks authorized for educational use. No human participants were involved in this research. All interpretations of textual and visual data adhered to Fairclough's CDA framework as an academically recognized, ethically sound method for discourse analysis in educational research. The researchers avoided personal bias, selective interpretation, or misrepresentation of data. Cited excerpts were presented within their original context to preserve authenticity and ensure analytical transparency. Moreover, the research was conducted without any conflict of interest regarding the selection or analysis of textbook samples. The study prioritized academic integrity, fairness, and responsibility in its critique, aiming to contribute constructively to the development of gender-equitable and inclusive sex education curricula in Indonesia without discrediting any author, publisher, or institution.

## 3. RESULTS AND DISCUSSION

This study uses Norman Fairclough's critical discourse analysis approach to examine the representation of gender justice values and the substance of adolescent sex education in the government-published high school biology textbook for the *Merdeka* Curriculum, issued by the Ministry of Education, Culture, Research, and Technology. However, for comparative data, this study also analyzes the class XI high school biology textbooks for the *Merdeka* Curriculum published by Erlangga and Quadra. This approach is based on the idea that discourse is not merely a communication tool, but a social practice that shapes, sustains, and challenges power relations within society. Fairclough divides discourse analysis into three dimensions: (1) text, which refers to the linguistic structure and narrative content; (2) discursive practice, which involves how the text is produced, distributed, and consumed; and (3) social practice, which includes the ideological and institutional contexts in which the discourse operates.

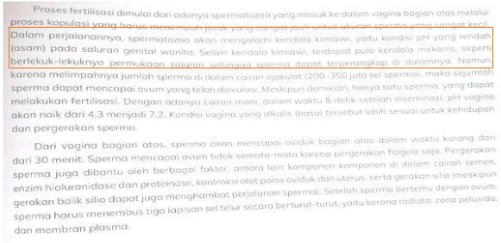
This study show that all three textbooks share similar patterns. Some of the common patterns include the placement of this discussion in the final chapters, specifically Chapter 7 and sometimes Chapter 8. Additionally, there is a significant portion dedicated to explaining the anatomy of the human reproductive system, the organs that make up the reproductive system, and their functions. This material occupies the largest section of these chapters. All three books discuss the anatomy in detail, distinguishing between the male and female reproductive systems. The next topic covers the process of fertilization, the formation of the zygote, and its development. Furthermore, various hormones involved in the reproductive system are discussed, along with disorders within the reproductive system. There are also some differences in certain aspects, such as in the elaboration of gender equality values, which vary in the discourse analysis across the three textbooks. Another difference lies in the inclusion of reflective content that integrates phenomena like early marriage. In the Erlangga-published book, this is presented as a knowledge insight and is separated into a distinct paragraph, while in the Ministry-published book, it is discussed as additional knowledge at the end of the chapter. The Quadra-published book, however, does not address this topic.

An in-depth critical analysis of reproductive health representation in high school biology textbooks reveals a gendered bias, particularly in how female and male reproductive organs are discussed. This analysis, grounded in critical discourse theory, highlights the need to scrutinize the framing of biological content that may inadvertently reinforce gender stereotypes or unequal power relations in educational discourse. One prominent issue arises in the differential association of reproductive organs with dysfunction and infertility, which

can influence students' perceptions of gender, health, and responsibility in reproduction. In textbooks published by the Indonesian Ministry of Education and Culture (Kemendikbud), female reproductive organs are often described in contexts closely tied to disorders, abnormalities, or hormonal imbalances that can lead to infertility. While male reproductive issues are also mentioned, they tend to be less emphasized, with the descriptions often being more mechanistic or structural rather than pathological. This pattern in representation suggests a discursive bias that aligns with the historical construction of the female body as fragile, unpredictable, and biologically problematic. For instance, in the section discussing fertilization in the Kemendikbud-published Class XI Biology textbook, the reproductive process is detailed as follows: sperm cells enter the vagina through copulation and travel toward the ovulated egg for fertilization to occur. A further elaboration is provided in the hormonal regulation section, specifically emphasizing female infertility. The text reads:

> "*…menstruasi pada perempuan memiliki dua siklus, yaitu siklus ovarium dan siklus uterus/rahim yang harus bekerja sama dalam menjalankan fungsi reproduksi. Pembahasan menstruasi secara mendalam akan Kalian bahas nanti di bagian khusus dalam bab ini. Jika kedua siklus ini tidak berkoordinasi, maka dapat menyebabkan kondisi kemandulan. Sebagai contoh, jika seorang perempuan tidak mengalami ovulasi, maka tidak akan terjadi persatuan sperma dan ovum meskipun kondisi uterus/rahimnya normal. Ataupun sebaliknya, jika seorang perempuan mengalami ovulasi yang normal, tetapi rahimnya belum siap untuk menyokong pertumbuhan embrio, maka kehamilan tidak akan terjadi.* (Class XI High School Biology Textbook published by Kemendikbud, pages 215-216).

Notably, while this section extensively discusses potential dysfunctions within the female reproductive system, the corresponding section on male hormonal regulation lacks any comparable reference to dysfunctions or abnormalities. Although infertility caused by male factors is addressed elsewhere in the textbook, the initial emphasis on female dysfunction contributes to an imbalance in the perceived source of reproductive issues. In contrast, the textbook published by Quadra similarly explains the fertilization process, stating that sperm must navigate both chemical and structural challenges within the female reproductive tract to reach the ovum. These obstacles include the acidic environment of the vagina and the curved anatomical pathways of the female reproductive organs. This content, shown in Figure 2, reinforces the notion that the female body presents inherent barriers to successful fertilization, thereby framing it as a site of biological complication. Such portrayals may subtly suggest that female biology is a principal source of reproductive failure, even though male infertility is medically recognized as being just as prevalent.



Proses fertilisasi dimulai dari adanya spermatozoa yang masuk ke dalam vagina bagian atas melalui proses kopulasi yang harus dilengkapi jutaan yang sangat kecil. Dalam perjalanannya, spermatozoa akan mengalami kendala kimiawi, yaitu kondisi pH yang rendah (asam) pada saluran genital wanita. Selain kendala kimiawi, terdapat pula kendala mekanis, seperti berlekuk-lekuknya permukaan saluran, sehingga sperma dapat terperangkap di dalamnya. Namun, karena melimpahnya jumlah sperma di dalam cairan ejakulat (200–350 juta sel sperma), maka sejumlah sperma dapat mencapai ovum yang telah diovulasi. Meskipun demikian, hanya satu sperma yang dapat melakukan fertilisasi. Dengan adanya cairan mani, dalam waktu 8 detik setelah inseminasi, pH vagina akan naik dari 4,3 menjadi 7,2. Kondisi vagina yang alkalis (basa) tersebut lebih sesuai untuk kehidupan dan pergerakan sperma.

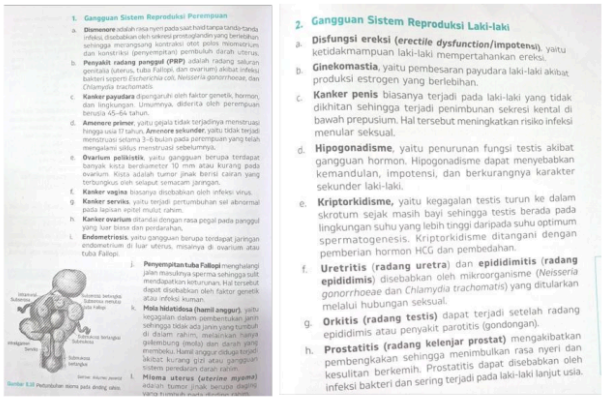
Dari vagina bagian atas, sperma akan mencapai oviduk bagian atas dalam waktu kurang dari dari 30 menit. Sperma mencapai ovum tidak semata-mata karena pergerakan flagela saja. Pergerakan sperma juga dibantu oleh berbagai faktor, antara lain komponen-komponen di dalam cairan semen, enzim hialuronidase dan proteinase, kontraksi otot polos oviduk dan uterus, serta gerakan silia (meskipun gerakan balik silia dapat juga menghambat perjalanan sperma). Setelah sperma bertemu dengan ovum, sperma harus menembus tiga lapisan sel telur secara berturut-turut, yaitu korona radiata, zona pelusida, dan membran plasma.

**Figure 2.** Review of the Obstacles for Spermatozoa Cells in Reaching the Ovum (Senior High School Biology XI, Quadra, 2023)

These forms of representation carry important implications. The persistent portrayal of the female body as a "site of risk" subject to dysfunction, disorder, and moral regulation perpetuates a cultural narrative that women are inherently vulnerable and in need of supervision both medical and social. This framing contributes to a discourse in which women are problematized, while men are constructed as biologically normative and unproblematic. Consequently, educational materials risk reproducing patriarchal ideologies by reinforcing gendered expectations around health, biology, and responsibility for reproduction. However, not all textbooks follow this pattern. The textbook published by Erlangga offers a slightly more balanced representation. In the section discussing fertilization, the Erlangga textbook provides a straightforward and neutral description of the biological process without associating it with dysfunction or abnormality. It merely outlines the mechanism of sperm reaching the ovum and the subsequent process of fertilization. The discussion of reproductive system dysfunctions is addressed separately, in a dedicated subsection, which includes an equitable treatment of both male and female disorders.

Where the content shows an even-handed presentation of reproductive issues for both sexes, covering hormonal imbalances, structural anomalies, and lifestyle factors that can contribute to infertility in both men and women. The Erlangga textbook's structure and content thus reflect a more inclusive and non-discriminatory pedagogical approach. By decoupling the discussion of dysfunctions from a specific gendered framing within the fertilization narrative, it avoids the implication that one sex is more likely to be biologically problematic than the other. Furthermore, within the same context, the Erlangga-published book shows a slight difference. In the fertilization section, the Erlangga book does not mention dysfunction but only outlines the mechanism of fertilization. The discussion of dysfunction has its own subsection, and dysfunctions and disorders are discussed in a balanced way for both the female and male reproductive systems. This content, shown in Figure 3. Equally important is the discussion on the risks of early sex and consent, especially in relation to the biological and psychological unpreparedness. Various studies suggest that comprehensive sex education must include information about the sexual and emotional consequences, not just descriptions of the organs, even Unesco has released the publication provides sound technical advice on the characteristics of effective comprehensive sexuality education (CSE) programmes, a recommended set of topics and learning objectives that should be covered in comprehensive sexuality education (Unesco, 2024). In the books published by Kemendikbud and Erlangga, there is additional reflective content that integrates the phenomenon of the dangers of early marriage. In the Erlangga-published book. The Quadra-published book does not mention this. The text reads:

> "*Masa pubertas pada perempuan, yaitu usia 8-13 tahun. Salah satu ciri pubertas pada perempuan adalah mengalami menstruasi. Menstruasi adalah proses peluruhan dinding rahim akibat tidak terjadi pembuahan sel telur oleh sel sperma. Menstruasi terjadi setiap bulan. Meskipun sudah mengalami siklus menstruasi, pernikahan yang dilakukan sebelum mencapai usia 18 tahun dianggap sebagai pernikahan dini. Pernikahan dini berdampak buruk pada kesehatan maupun kehidupan sosial, antara lain peningkatan resiko penyakit seksual (akibat kurangnya pengetahuan seks yang sehat dan aman); peningkatan kekerasan seksual (akibat pasangan belum mampu berfikir secara dewasa); resiko kehamilan premature; anemia; mengalami masalah psikologis, serta tingkat sosial dan ekonomi yang rendah. Menurut undang-undang di Indonesia, batas usia menikah minimal 19 tahun untuk laki-laki maupun perempuan.* (Class XI High School Biology Textbook published by Erlangga, pages 460)."



1. **Gangguan Sistem Reproduksi Perempuan**

a. **Dismenore** adalah rasa nyeri pada saat haid tanpa tanda-tanda infeksi, disebabkan oleh sekresi prostaglandin yang berlebihan, sehingga merangsang kontraksi otot polos miometrium dan konstriksi (penyempitan) pembuluh darah uterus.

b. **Penyakit radang panggul (PRP)** adalah radang saluran genitalia (uterus, tuba Fallopi, dan ovarium) akibat infeksi bakteri seperti *Escherichia coli*, *Neisseria gonorrhoeae*, dan *Chlamydia trachomatis*.

c. **Kanker payudara** dipengaruhi oleh faktor genetik, hormon, dan lingkungan. Umumnya, diderita oleh perempuan berusia 45–64 tahun.

d. **Amenore primer**, yaitu gejala tidak terjadinya menstruasi hingga usia 17 tahun. **Amenore sekunder**, yaitu tidak terjadi menstruasi selama 3–6 bulan pada perempuan yang telah mengalami siklus menstruasi sebelumnya.

e. **Ovarium polikistik**, yaitu gangguan berupa terdapat banyak kista berdiameter 10 mm atau kurang pada ovarium. Kista adalah tumor jinak berisi cairan yang terbungkus oleh selaput semacam jaringan.

f. **Kanker vagina** biasanya disebabkan oleh infeksi virus.

g. **Kanker servisa**, yaitu terjadi pertumbuhan sel abnormal pada lapisan epitel mulut rahim.

h. **Kanker ovarium** ditandai dengan rasa pegal pada panggul yang luar biasa dan pendarahan.

i. **Endometriosis**, yaitu gangguan berupa terdapat jaringan endometrium di luar uterus, misalnya di ovarium atau tuba Fallopi.

j. **Penyempitan tuba Fallopi** menghalangi jalan masuknya sperma sehingga sulit mendapatkan keturunan. Hal tersebut dapat disebabkan oleh faktor genetik atau infeksi kuman.

k. **Mola hidatidosa (hamil anggur)**, yaitu kegagalan dalam pembentukan janin sehingga tidak ada janin yang tumbuh di dalam rahim, melainkan hanya gelembung (mola) dan darah yang membeku. Hamil anggur diduga terjadi akibat kurang gizi atau gangguan sistem peredaran darah rahim.

l. **Miama uterus (*uterine myoma*)** adalah tumor jinak berupa otot polos yang tumbuh pada dinding rahim.

2. **Gangguan Sistem Reproduksi Laki-laki**

a. **Disfungsi ereksi (*erectile dysfunction*/impotensi)**, yaitu ketidakmampuan laki-laki mempertahankan ereksi.

b. **Ginekomastia**, yaitu pembesaran payudara laki-laki akibat produksi estrogen yang berlebihan.

c. **Kanker penis** biasanya terjadi pada laki-laki yang tidak dikhitan sehingga terjadi penimbunan sekresi kental di bawah prepusium. Hal tersebut meningkatkan risiko infeksi menular seksual.

d. **Hipogonadisme**, yaitu penurunan fungsi testis akibat gangguan hormon. Hipogonadisme dapat menyebabkan kemandulan, impotensi, dan berkurangnya karakter sekunder laki-laki.

e. **Kriptorkidisme**, yaitu kegagalan testis turun ke dalam skrotum sejak masih bayi sehingga testis berada pada lingkungan suhu yang lebih tinggi daripada suhu optimum spermatogenesis. Kriptorkidisme ditangani dengan pemberian hormon HCG dan pembedahan.

f. **Uretritis (radang uretra)** dan **epididimitis (radang epididimis)** disebabkan oleh mikroorganisme (*Neisseria gonorrhoeae* dan *Chlamydia trachomatis*) yang ditularkan melalui hubungan seksual.

g. **Orkitis (radang testis)** dapat terjadi setelah radang epididimis atau penyakit parotitis (gondongan).

h. **Prostatitis (radang kelenjar prostat)** mengakibatkan pembengkakan sehingga menimbulkan rasa nyeri dan kesulitan berkemih. Prostatitis dapat disebabkan oleh infeksi bakteri dan sering terjadi pada laki-laki lanjut usia.

**Figure 3.** Review of Reproductive System Disorders in Women and Men (Senior High School Biology XI, Erlangga, 2021)

Meanwhile, in the chapter on the reproductive system, there is no discussion on consent in sexual relationships. Yet, the concept of consent is fundamental to healthy and ethical sexual relations and is an essential principle in efforts to prevent sexual violence (Marianne, 2019). Without this discussion, students are not encouraged to understand that sexuality is an interpersonal relationship that requires active and conscious consent, not just a biological interaction and mechanism. In Fairclough's framework, this is a form of discursive silence, where the absence of important representations reinforces the dominance of a patriarchal social structure that disregards the bodily rights of adolescents, especially women and other vulnerable groups.

The topic of contraception and pregnancy regulation is a crucial component of reproductive health education. It serves not only to inform students about biological processes but also to shape their understanding of sexual and reproductive rights, gender roles, and personal agency. However, an analysis of Indonesian high school biology textbooks reveals significant variation and gender bias in how these topics are addressed, particularly in the distribution of contraceptive responsibilities between men and women. In the Class XI Biology textbook published by the Ministry of Education and Culture (Kemendikbud), the topic of contraception is notably absent. There is no dedicated section or even a passing mention of pregnancy regulation or family planning methods. This omission is concerning given that national education standards emphasize the importance of comprehensive reproductive health education to support adolescent development and public health outcomes. The exclusion of such fundamental content limits students' access to essential knowledge about bodily autonomy, reproductive rights, and methods of preventing unintended pregnancies.

In contrast, the textbook published by Quadra includes a brief discussion of contraception under the subheading Family Planning. This section consists of a single paragraph that outlines the general principles of family planning and the biological mechanisms for preventing pregnancy. Specifically, the text mentions strategies such as inhibiting the release of gametes, preventing ovum maturation, blocking fertilization, and impeding implantation. While these mechanisms are explained in biological terms, they are primarily presented as processes that occur within the female reproductive system. The

explanation is purely functional and does not elaborate on the types of contraceptive methods available. This limited description overlooks the diverse range of contraceptive options, particularly those that involve male participation.

The Erlangga-published textbook offers a more comprehensive and pedagogically sound approach to the topic of contraception. Under the subheading Contraceptive Methods, this textbook provides detailed information that includes demographic data, a rationale for regulating pregnancies, and descriptions of various contraceptive methods. Importantly, it discusses methods used by both women and men. The section covers coitus interruptus (withdrawal method), vasectomy (male sterilization), tubectomy (female sterilization), birth control pills, implants, intrauterine devices (IUDs), and hormone injections. This breadth of coverage helps balance the narrative by acknowledging the role of both sexes in contraception and promoting shared responsibility.

Despite the comparatively equitable treatment found in the Erlangga textbook, the broader analysis of biology textbooks still reveals a dominant focus on female-centered contraceptive methods. The majority of instructional content related to contraception emphasizes tools and procedures applied to the female body such as hormonal pills, IUDs, and injections while male contraceptive options like condoms and vasectomy are mentioned minimally, if at all. This pattern reflects a persistent gender bias in science education, where the burden of reproductive regulation is discursively and biologically placed on women. The content about contraception in the biology textbooks shown in Table 3.

**Table 3.** Comparison of Contraceptive Methods and Gender Narratives in Biology Textbooks

| Textbook | Methods for Females | Methods for Males | Explanation of Side Effects | Responsibility Narrative |
|---|---|---|---|---|
| Kemendikbud | Not mentioned | Not mentioned | None | Not mentioned |
| Erlangga | Birth control pills, injection, IUD | Condom, vasectomy | Yes (for females only) | Focus on females |
| Quadra | Brief mention (only pills) | Not mentioned | Not explained | Not included |

Source: (Kimport, 2018)

The analysis results in Table 3 show that the majority of biology textbooks, particularly in the section on the human reproductive system, focus on methods used by women (such as pills, injections, or IUDs), while contraceptive methods for men, like condoms or vasectomy, are discussed very minimally. This reflects a gendered burden of responsibility, where women are expected to bear the burden of controlling pregnancy (Hull et al., 2023). When educational materials disproportionately present women as the primary agents of contraception, they reinforce societal expectations that women are solely responsible for managing the risks and consequences of sexual activity. This portrayal can contribute to a broader cultural narrative that views women as the gatekeepers of sexual morality and health, thereby placing the psychological, physical, and social burden of pregnancy prevention squarely on their shoulders. Such educational approaches may unintentionally perpetuate gender inequalities, both in how students perceive reproductive roles and how they enact them in their personal lives. Adolescents, who are at a formative stage in developing attitudes toward sexuality and gender, may internalize the belief that contraception is a woman's responsibility. This can hinder open communication between partners, reduce male participation in reproductive health decisions, and obscure the role that men must play in promoting safe, consensual, and equitable sexual relationships.

From the standpoint of rights-based sex education, this imbalance is deeply problematic. Effective and ethical sex education should promote the idea of shared

responsibility in all aspects of sexual and reproductive health. This includes equitable knowledge of and access to contraceptive methods for all genders, along with a recognition of the social dynamics that shape reproductive decision-making. A curriculum that embraces such principles would foster more inclusive, respectful, and informed relationships among young people. Moreover, the way contraception is framed in textbooks also reflects underlying cultural and political ideologies about gender, sexuality, and power. The near-absence of male contraceptive methods from educational materials not only marginalizes men's role in reproductive health but also upholds a patriarchal framework that positions women as both biologically and morally accountable for reproduction. As critical theorists have noted, the curriculum is not neutral; it carries embedded values and discourses that influence students' socialization and worldview. These findings indicate that textbooks are not neutral media, but rather instruments that represent specific ideologies and can reproduce unequal social structures. When textbooks fail to provide space for gender diversity, do not teach consent, and place the burden of reproductive responsibility on women, they actively contribute to maintaining these inequalities. The representation of gender and sexuality in high school biology textbooks under the Merdeka Curriculum has significant implications for pedagogical practices, curriculum policy, and the formation of student identities. These implications are particularly evident in the context of Indonesia, where cultural, religious, and institutional factors intersect to influence educational content and delivery

The analysis of the textbooks reveals distinct patterns of gender representation, both in textual language and visual elements. These patterns carry implicit pedagogical messages that can shape students' perceptions of gender roles, especially in scientific and educational contexts. The table below summarizes the key aspects of this representation and their corresponding pedagogical implications. This comparison is shown in Table 4.

**Table 4.** Gender Representation in Textbooks and Their Pedagogical Implications

| Analytical Aspect | Male Representation | Female Representation | Pedagogical Implications |
|---|---|---|---|
| Word Choice in Text | Active verbs: "produce", "carry", "insert" | Passive verbs: "receive", "hold", "released" | Reinforces stereotype of males as active agents and females as passive recipients |
| Visual Illustrations | More frequently depicted as scientists, doctors, or researchers | Limited to illustrations of biological roles such as motherhood | Reduces science-related aspirations among female students |
| Social Roles in Narratives | Portrayed as decision-makers and drivers of processes | Linked to domestic roles like caregiving and nurturing | Reproduces traditional gender roles within scientific contexts |
| Professional References in Science | Predominantly shown in scientific or technical professions | Rarely mentioned, and when included, often in non-STEM contexts | Weakens the representation of women in STEM careers |
| Moral Discourse and Social Values | Neutral, not associated with social norms | Often linked to norms of modesty and virginity | Reinforces social control over female bodies |

Source: (Lee, J. F. K. & Collins, 2008)

These recurring patterns not only reflect but also reproduce dominant gender ideologies in science education. The use of active language for male figures and passive constructions for females subtly positions male students as agents of action and knowledge, while females are cast in roles of reception or moral control. Such representations, though implicit, influence classroom dynamics, student identity formation, and aspiration toward STEM careers, particularly for woman. Teachers play a pivotal role in mediating textbook content and facilitating discussions on sensitive topics such as gender and sexuality. However, studies have highlighted several challenges faced by educators in this domain. In Mataram City, Indonesia, for instance, teachers reported a lack of confidence in delivering comprehensive sexuality education (CSE) due to insufficient training and resources. Many educators had not received formal instruction in CSE, leading to reliance on personal beliefs and experiences when addressing these topics. Furthermore, the absence of standardized guidelines and teaching materials exacerbates these challenges. Without clear directives, teachers may inadvertently perpetuate gender biases present in textbooks, such as emphasizing female reproductive responsibilities while neglecting male roles in contraception. This imbalance can reinforce traditional gender norms and hinder the development of equitable perspectives among students

Meanwhile, within the field of human reproductive science, there is a concept known as the sociology of reproduction. This aspect emphasizes that reproductive education should include relevant information for all genders, including men, women, and non-binary or transgender individuals. This means that education should not focus solely on female reproduction but should also provide men and people of other genders with an understanding of their reproductive responsibilities and health. Additionally, it should address issues such as bodily autonomy and consent. Curriculum policies significantly influence the content and emphasis of educational materials. In Indonesia, the integration of CSE into the national curriculum remains limited, often resulting in inconsistent and inadequate coverage of essential topics like consent, gender diversity, and reproductive rights. This gap is partly due to sociocultural and religious considerations that shape policy decisions and educational priorities. Internationally, there is a growing recognition of the need for comprehensive and inclusive sexuality education. For example, New South Wales, Australia, has implemented a revised curriculum that introduces the concept of consent from Year 7, emphasizing its importance in fostering respectful relationships. Such policy initiatives underscore the potential for curriculum reforms to address existing deficiencies and promote gender equity in education.

Furthermore, research that explores the integration of scientific content with gender sociology discourse, particularly on the reproductive system and adolescent sex education, remains very limited. Additionally, historically, the topic of the reproductive system is often placed at the end of biology textbooks. This can make the material appear less important compared to other topics. In the context of biology education, the formation of student identity is closely linked to how gender-related topics are framed and discussed in instructional materials. Rather than centering on binary or non-binary gender identity, this study emphasizes students' awareness of gender equity the ability to recognize, question, and reflect on unequal power relations and roles traditionally assigned to males and females in scientific discourse.

The reviewed textbooks offer minimal space for students to critically examine gendered assumptions in reproductive health. For instance, the recurrent emphasis on women's responsibility in family planning methods, without equal discussion on male involvement, reinforces outdated gender roles. Such one-sided narratives risk shaping students' identities in a way that normalizes unequal gender expectations. According to Hughes et al. (2020), gender-equitable teaching practices in science classrooms involve

promoting student agency to challenge stereotypes and ensure all students see themselves as active participants in scientific inquiry. Similarly, Smith et al. (2024) emphasize that awareness of gender equity positively impacts students' confidence and participation in STEM fields, particularly for girls. When instructional content and pedagogy fail to reflect gender fairness, it limits the development of a just and inclusive science identity. Therefore, educators play a pivotal role in guiding students to identify bias, question normative narratives, and recognize their role in fostering a gender-equitable learning environment. Textbooks, as a central medium of instruction, must move beyond implicit bias and actively support students in developing critical gender consciousness.

**Discussion**

The results of this study highlight several critical insights regarding the representation of gender equity and sex education in Indonesian high school biology textbooks, particularly those addressing the topic of the human reproductive system. Fundamentally, the study reveals that the textbooks continue to employ a predominantly biological-mechanistic approach, which reduces complex and sensitive subjects such as reproductive health, consent, and bodily autonomy to mere discussions of anatomy and physiology. This approach neglects the broader socio-cultural, emotional, and ethical dimensions of sexuality education that are crucial for adolescent development (Nkala-Dlamini, 2021; Pramono et al., 2024; Wan-Yusoff et al., 2023). From a critical discourse analysis perspective, this tendency indicates that biology textbooks function as ideological tools that reinforce dominant social narratives, particularly patriarchal ideologies. Fairclough (2015) emphasized that language in educational texts is never neutral; it is always a vehicle for power relations and the reproduction of social structures. The study's findings align with this view, demonstrating that patriarchal values are subtly embedded within both the textual content and visual representations of the textbooks analyzed. For instance, the consistent portrayal of women primarily in reproductive contexts and the absence of male involvement in discussions about reproductive responsibility reinforce gender stereotypes and contribute to the unequal distribution of reproductive agency (Khemkhaeng et al., 2022; Marianne, 2019; Pešić, 2022).

Comparing these findings with previous studies reveals both continuity and divergence. Earlier research identified similar issues in Indonesian biology textbooks, particularly the lack of contextualized and gender-sensitive content (Firdani et al., 2024). However, their work primarily focused on developing instructional modules to address misconceptions rather than critically analyzing the ideological content of existing textbooks. This study extends those insights by applying Norman Fairclough's Critical Discourse Analysis (CDA) framework, which not only exposes the surface-level content but also uncovers the deeper ideological structures that shape educational discourse. Internationally, studies conducted in various contexts have similarly criticized educational materials for perpetuating gender biases and neglecting comprehensive sexuality education. For example, when textbooks fail to address issues such as consent, reproductive rights, and gender-based violence, students are left with incomplete and potentially harmful understandings of sexuality. These findings mirror the situation in Indonesia, highlighting the global nature of this educational challenge (Firdani et al., 2024; Mukaromah, 2023; Santelli et al., 2018).

The scientific rationale for integrating gender equity into sex education is well-documented. UNESCO (2018) advocates for comprehensive sexuality education (CSE) programs that are age-appropriate, scientifically accurate, and culturally relevant. Such programs emphasize human rights, gender equality, and critical thinking about social norms. When compared to these international standards, the Indonesian textbooks examined in this study fall short in several key areas, notably in their failure to address the social and emotional aspects of sexuality, the dynamics of consent, and the importance of mutual

respect in relationships. This research also contributes to the broader academic discourse on textbook analysis by demonstrating the utility of CDA in educational contexts. While previous studies have predominantly employed content analysis or misconception identification, the application of CDA allows for a more nuanced understanding of how language and imagery perpetuate social inequalities. It underscores the importance of examining not just what is said, but how it is said, and what is left unsaid. This approach provides valuable insights into the ways educational texts shape students' worldviews and social attitudes (Kusumaadhi et al., 2021; Muslimin et al., 2022; Saso et al., 2020).

The implications of these findings are far-reaching. For curriculum developers and policymakers, the study underscores the urgent need to revise biology textbooks to include comprehensive, contextualized, and gender-sensitive sex education content. This is particularly important in a country like Indonesia, where adolescent reproductive health issues are both prevalent and poorly addressed in formal education. By integrating discussions on consent, healthy relationships, reproductive rights, and gender-based violence, textbooks can play a pivotal role in promoting gender equity and safeguarding adolescent health (Holme & Finnigan, 2020; Nkala-Dlamini, 2021; Setiyawan & Lestari, 2020).

For educators, the study highlights the importance of critically engaging with textbook content and supplementing it with additional materials that address its shortcomings. Teachers can play a transformative role by facilitating classroom discussions that challenge gender stereotypes and encourage students to think critically about sexuality and gender relations. Professional development programs should therefore include training on gender-sensitive pedagogy and the use of critical discourse analysis as a tool for evaluating educational materials. This study also offers methodological contributions by demonstrating how CDA can be adapted to the analysis of educational texts. The use of a data extraction grid based on Fairclough's constructs and indicators of gender-sensitive education ensured a systematic and replicable analysis process. This methodological framework can be applied to other subjects and educational materials to assess their alignment with human rights and gender equity principles (Izdebski et al., 2020; Nuraini et al., 2025; Shibuya et al., 2023).

Despite its contributions, the study has several limitations. First, it examined only three textbooks, which, while representative of widely used materials, do not encompass the entire range of biology textbooks available in Indonesia. Second, the focus was limited to the topic of the human reproductive system, excluding other relevant areas such as sexually transmitted infections, gender identity, and reproductive rights. Third, as a qualitative study, the interpretations are inherently subjective, although efforts were made to enhance reliability through intercoder agreement and iterative coding processes. Based on these limitations, future research is recommended to expand the scope of analysis to include a larger and more diverse sample of textbooks, including those used in religious-based and vocational schools. Additionally, analyzing other topics related to sexuality education would provide a more comprehensive understanding of the ideological messages conveyed in Indonesian education. It would also be beneficial to incorporate perspectives from students and teachers through interviews or focus group discussions to assess how textbook content influences classroom practices and student perceptions (D'Angelo et al., 2024; Smith & White, 2024; Tricahyono et al., 2020).

In terms of practical recommendations, curriculum developers should collaborate with gender studies experts, public health professionals, and educators to create textbooks that reflect contemporary understandings of sexuality and gender relations. Educational policymakers should mandate the inclusion of comprehensive, gender-sensitive sexuality education in the national curriculum. Professional development for teachers should focus on equipping them with the skills and knowledge necessary to deliver such content effectively and sensitively. Furthermore, textbook publishers should adopt inclusive editorial policies

that prioritize the representation of diverse gender identities and experiences. Visual content should depict both male and female students in active, decision-making roles related to reproductive health. Textual content should challenge traditional gender norms and promote messages of mutual respect, consent, and shared responsibility (Andini et al., 2023; Mittelmeier et al., 2024; Nasution et al., 2025).

In conclusion, this study underscores the critical role of educational materials in shaping adolescents' understanding of sexuality and gender relations. By exposing the patriarchal discourses embedded within Indonesian high school biology textbooks, the research highlights the need for systemic reforms in sex education. It calls for a comprehensive, inclusive, and contextually relevant approach to sexuality education that empowers young people to make informed, responsible, and respectful decisions about their bodies and relationships (Amanda, 2023; Lukyanchenko, 2023; Malinovska, 2023). This contribution is essential for promoting gender justice and improving adolescent reproductive health outcomes in Indonesia and beyond. This research also reaffirms the value of critical discourse analysis as a methodological tool in educational research. By uncovering the ideological dimensions of educational texts, CDA provides insights into the subtle ways in which social power and inequality are reproduced in school settings. Future studies should continue to apply and refine this approach to ensure that educational materials promote equity, inclusivity, and human rights for all learners.

## 4. CONCLUSION

This study concludes that Indonesian high school biology textbooks continue to reproduce gender bias through language, imagery, and thematic content, shaping students' perceptions of gender roles in science and society. These findings highlight the urgent need for gender-responsive curriculum development and teacher training to foster critical awareness of textbook discourse. Future research should explore classroom interactions with such materials and develop alternative pedagogical resources that promote inclusive and equitable learning environments.

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