Indonesian Journal of Global Health Research
Volume 7 Number 3, June 2025
e-ISSN 2715-1972; p-ISSN 2714-9749
http://jurnal.globalhealthsciencegroup.com/index.php/IJGHR

DISCOURSE ON HUMAN GENETICS RESEARCH IN MASS MEDIA NEWS

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ABSTRACT
The development of genetic research in humans provides new hope for a better quality of life. One of the studies can reveal the molecular mechanism of a disease, the direction of prevention, and its treatment. Online and offline newspapers are one alternative publication for a wider audience. The purpose of this research is to see how the results of genetic research in humans are constructed in media discourse, both in the form of news, features, and news articles. The ideological content will be explored through an analysis of rhetorical elements in news discourse. This research is a qualitative content analysis, using the discourse analysis method. The unit of analysis is news texts about human genetic research published in 5 online newspapers with the highest readers in the period January - December 2024. Reduction was carried out to obtain relevant news samples. The research results show that the results of human genetic research are discussed in health and lifestyle themes with informative and advocative purposes. The news conveys the latest research results, while also providing recommendations for healthy living at the individual level without a complete explanation in a broader social context. Based on the analysis of rhetorical elements, such presentation indicates the existence of a certain ideology at play in the construction of discourse.

Keywords: discourse analysis; human genetic research; mass media; rhetorical elements

How to cite (in APA style)
Trikusumaadi, S. K., Dewi, N., & Widhiyastuti, E. (2025). Discourse on Human Genetics Research in Mass Media News. Indonesian Journal of Global Health Research, 7(3), 55-66. https://doi.org/10.37287/ijghr.v7i3.5606.

INTRODUCTION

The development of genetic research in humans provides new hope for a better quality of life if we take one of the sub-fields of study, such as toxicogenomics and nutrigenomics that have the potential to be the answer to public health problems (Ramdhan, 2014) . This research can reveal the molecular mechanism of a disease, which ultimately determines the direction of its prevention. Of course, the process of pharmaceutical biotherapy is an opportunity included in the development of research under this biotechnology group. The application of manipulation of various biological materials for therapy allows the development of new drugs for deadly diseases (Tjandrawinata, 2016). The academic world packages the research results in several publication media, such as: journals, proceedings, conference papers, or scientific books. On the other hand, online and offline newspapers are an alternative publication of human genetic research results for a wider audience through the news they produce. Online newspapers excel in flexibility of time and place, in addition to multimedia and live streaming features (Rakesh; Krupa, 2022). Although emphasizing the diversity of formats and immediacy, several online news portals still apply high accuracy standards (Maghrifi, 2020). Through online newspapers, the health column is able to communicate values effectively, while facilitating ease and readability (Ngoc et al., 2024). Thus, the public is expected to better understand the essence and urgency of human genetic research through online newspapers.

In the structure of news discourse, journalists use rhetorical elements as a way to emphasize facts (Eriyanto, 2002). This method provides relevance to a number of genetic researches, where rhetoric is used to link a scientific concept to broader social implications. Rhetoric describes a paradigm shift in medicine through a shift in genomic medicine rhetoric, namely from personalized medicine to precision medicine. This shift reflects a broader scientific and social movement in the recommendation of more predictive, preventive, and participatory health care practices (Juengst et al., 2016) . The use of metaphors in genetic research has also influenced perceptions of genetic research. A study of the use of metaphors found that metaphors can describe CRISPR technology as an autonomous agent. This depiction differs from previous rhetoric that emphasized human agency in scientific development (Ceccarelli, 2018). Rhetorical analysis also found bias in the majority of genetic disease studies conducted in Europe. The findings are related to the loss of diversity in the populations used in both empirical examples and theoretical reasons. Based on these findings, it is recommended that human genetic studies should include more diverse populations in order to improve disease risk prediction in global populations (Sirugo et al., 2019). Increasing diversity will improve the accuracy, utility, and acceptability of the use of genetic information for clinical care (Hindorff et al., 2017).

In discussing the implications of genomics on human identity and the environment, rhetoricians also conduct public discourse analysis. In this process, biological and discursive codes, historical data, and considerations of ethical dimensions are integrated in constructing the theme of the re-creation of humans and the earth's biosphere (Condit, 2018). Rhetoricians also often link genetic modification to issues of social and environmental justice. In this approach, genetic changes are linked to structural discrimination, with a focus on marginalized communities affected by environmental factors such as lead poisoning (Zemlicka, 2022). Therefore, ethical considerations are crucial in reviewing genetic research. The human genome has been considered as a common heritage of humanity, but this framework conflicts with individual personal rights (Kabata & Thaldar, 2023). The presence of participants in research can raise ethical issues if associated with their individual rights (Galasso & Geiger, 2023). Participants need to be positioned as leaders to balance conflicting priorities between public and private. In addition to ethical considerations, genetic research also requires transparency and shared commitment among stakeholders (Fedeli et al., 2019). This is especially true considering that the current legal framework is considered inadequate in addressing the paradox of challenges and solutions generated by genetic research (Azamat, 2023). Thus, genetic research can be conducted with maximum benefits and minimal losses.

Rhetorical theory is the main theoretical reference for this research. The basic concept is understood as a methodologically studied way of communication. Unlike natural communication, rhetorical communication has a persuasive nature (Haase, 2020). Rhetorical theory discusses all aspects of the rhetorical situation, namely needs, audience, rhetoric, and context (Littlejohn & Foss, 2009). In explaining the context, rhetorical theory is supported by the Toulmin argumentation model, which consists of claims, support, and warrants in developing argumentation skills. In a study, this contextual element was able to improve argumentation skills, as shown in the production of alternative statements and counter-arguments (Viyanti et al., 2020).Without leaving the classical rhetorical tradition, rhetorical analysis also considers ethos, pathos, and logos, known as the rhetorical triangle. Ethos is related to the character of the speaker, pathos is a way of placing the audience in a certain emotional situation, and logos is related to the availability of evidence to support an argument (Wróbel, 2015). Several media researches still use these three elements of persuasion as their theoretical framework. For example, the analysis of newspaper articles conducted by Madon, et.al (2021) which divides the three elements into subcategories to further show evidence of the existence of each element in the text (Madon et al., 2021).

The division of the three elements is based on their respective characteristics as carried out by Adawiyah, et.al (2019), Logos which refers to "clarity", "conciseness", and "arrangement". "Credibility", "expectations" and "reference" are under Ethos while Pathos is shown in the characteristics of "tone", "emphasis", and "engagement" (Adawiyah et al., 2019). As a note, in analyzing media discourse, the dominant rhetorical element depends on the type of writing published. News refers more to the element of logos, features refer to pathos, and opinion articles use more ethos appeal (Haase, 2020). This research aims to see how the results of human genetic research are constructed in media discourse, both in the form of news, features, and news articles that are published. The construction of discourse will also see the social responsibility for the common interest represented. Furthermore, the ideological content will be explored through an analysis of rhetorical elements in publications about genetic research. The analysis will reveal how the results of human genetic research are still part of the practice of constructing meaning from the dominant ideology.

METHOD

This research is a qualitative descriptive research with a qualitative content analysis approach. Although it does not meet all the requirements of qualitative research, this research has a natural setting, namely phenomena, is descriptive, qualitative data, and uses inductive data analysis (Arikunto, 2013). The qualitative content analysis approach is used because this research focuses on the analysis of written texts, namely media texts (Kriyantono, 2006). To interpret the interests behind the production of media messages, the method used is discourse analysis. With this method, the research does not stop at how a message is presented. Furthermore, it can be seen that there is domination, injustice, or marginalization that is carried out vaguely in written discourse in newspapers (Badara, 2012).Data is taken from articles with the theme of human genetic research from the top 5 online newspapers based on the most readers. The types of articles can be news (hard news), features, or articles published in the period January - December 2024. All collected articles will be reduced, by removing articles that do not specifically publish the results of human genetic research. The collected articles will be analyzed using rhetorical element analysis referring to Toulmin's argumentation, namely: claim, support, and warrant, as well as the three persuasive elements, namely: ethos, pathos, and logos. To see the existence of dominance or dominant ideology in each discourse, the publication text is analyzed using critical discourse analysis tools. The researcher uses Norman Fairclough's critical discourse analysis model, namely seeing the representation and relations contained in subordinate clauses, combinations of subordinate clauses, or series between sentences. Representation is an effort to see how a person, group, or action is displayed in the text. While the relation sees how participants in the media relate and are displayed (Eriyanto, 2001). The validity of the data is obtained by the intersubjectivity agreement approach, namely dialoguing the views or data of a subject with those of other subjects to produce a meeting point between data (Kriyantono, 2006).

RESULT

The researcher used the results of a Reuters report in early 2024 to select the most widely read online mass media in Indonesia. Based on the report, 5 of the top 10 online mass media with the most readers are: Detik.com (50%), Kompas.com (39%), Tribunnews (28%), tvOnesNews.com (26%), and CNNIndonesia.com (25%) (Santika, 2024). Based on a search for the "genetic research" keyword on the five news portals, only 4 news portals displayed articles with the theme of genetic research in the January - December 2024 period. The titles and categories of the articles can be seen in the table below.

Table 1.
Genetics Research Themes in Mass Media Publications
January – December 2024 Period

Media	Date	Title	Category	Desk
Detik.com	31/01/2024	Potential To be a New Pandemic, Geneticists Uncover The Origins of 'Zombie' Virus	News article	Health
Detik.com	26/09/2024	Researchers Develop DNA Capsules to Store Photos and Songs, Why?	Feature	Education/ detik.edu
Detik.com	21/09/2024	Researchers Create Immortal Capsule to Bring Extinct Animals and Plants Back to Life	Feature	Education / detik.edu
Detikhealth	25/09/2024	Study: Rich People More At Risk of Cancer, Poor People Prone to Diabetes	News article	Health
Kompas.com	01/01/2024	Researchers Explain Factors That Influence a Person's Height	News article	Sains
Kompas.com	13/ 02/2024	UI Professor: You Can See If Someone Has Cancer Through Genetic Information	News	Education
Kompas.com	18/05/ 2024	, Yarsi University Collaborates with 5 Countries to Develop Genetic Disease Treatment Research	News	Education
Kompas.com	24/08/2024	Rapid Aging Occurs Between 40 and 60 Years of Age	News article	Health
Kompas.com	24/09/2024	New Study: Rich People Are Prone to Cancer, Poor People Are Prone to Diabetes	News article	Tren
Tribun news	13/02/2024	Genetic Information Helps Treat Cancer Patients More Precisely	News	Health (Health & Corner)
Tribun news	15/11/2024	RSAB Harapan Kita Collaborates with Private Sector to Conduct Research and Development of Thalassemia Genetic Tests in Indonesia	News	Health (Health & Corner)
CNN Indonesia	22/08/2024	Experts Reveal 2 Age Stages When Humans Age Faster	News article	Technology

The data above is reduced to select news, features, and articles that are forms of publication of human genetic research. The results of the reduction are tabulated in a table to map the rhetorical elements. There are 2 main relevant discourses from mass media publications, namely: "socio-economic and disease relationships" published in Kompas.com and detik.com, and "Aging at certain age phases" published in kompas.com, and CNN. By using rhetorical elements, namely: context and rhetorical triangle, the rhetorical elements in each news are in the following table

Table 2.
Rhetorical Elements in Mass Media Publications for the January – December 2024 Period

Media	Title	Rhethoric Elements	
		Context	Rhetorical Triangle
Kompas.com	New Study: Rich People Are Prone to Cancer, Poor People Are Prone to Diabetes	Claim : Socioeconomic status significantly influences health risks, with wealthy people at higher risk of cancer and those with lower incomes at higher risk of diabetes and other health problems. genetic predisposition to disease interacts with socioeconomic factors support (claim support): 1. Citing the findings of a study led by Fiona Hagenbeek, which analyzed health data from around 280,000 Finnish citizens. 2. Statements about how socioeconomic factors influence access to health services, health literacy, and lifestyle choices, and the implications of these factors for disease prevalence.	Ethos: 1. reference to a study conducted by researchers at the University of Helsinki 2. inclusion of direct quotes from Fiona Hagenbeek. Pathos: 1. Highlights disparities in health outcomes by socioeconomic status. 2. Discusses the increased risk of serious health conditions such as cancer and diabetes. 3. raising awareness about the need for equitable

Media	Title	Rhethoric Elements	
		Context	Rhetorical Triangle
		Warrant statement "health risks are not only determined by genetics, but are also significantly influenced by socioeconomic conditions. The evidence presented suggests that the environment and social context in which individuals live can alter their genetic risk profile,	access to health services. Logos: 1. Research statistical data, such as sample size: 280,000 people, 2. specific health outcomes related to different socioeconomic statuses. 3. The implications of the research for health care practice are emphasized.
Detik.com	Study: Rich People More Likely to Get Cancer, Poor People More Likely to Get Diabetes	Claim : Socioeconomic status significantly influences genetic predisposition to various diseases, with wealthy individuals being more susceptible to certain cancers and poor individuals facing a higher risk of other health problems such as diabetes and depression. Support (dukungan atas klaim) : 1. Research findings link wealth to genetic risk for certain cancers (e.g., breast and prostate cancer). 2. Contrasting genetic vulnerabilities are observed in individuals from low socioeconomic backgrounds, such as diabetes and depression. 3. The data set used involved a large sample (280,000 individuals from Finland.) Warrant Research findings that suggest a correlation between genetic predisposition and socioeconomic status. Evidence of how certain diseases are associated with different socioeconomic statuses and scales of research.	Ethos: 1. quoting the lead researcher, Dr. Fiona Hagenbeek, 2. refer to a reputable institution Pathos: 1. touches on the broader implications of health disparities based on socioeconomic status. 2. Mentioning chronic diseases such as cancer and depression as health problems. Logos 1. specific findings from the research (e.g., types of cancer associated with wealth and health problems associated with low socioeconomic status). 2. The use of statistics, such as a sample size of 280,000 people
Kompas.com	Rapid Aging Occurs Between 40 and 60 Years of Age	Claim : Aging occurs non-linearly, with significant biological changes occurring at certain ages (44 and 60 years), rather than gradually over time. Support : 1. refers to a study that tracked molecular changes in participants aged 25-75 years for approximately 1.7 years. 2. research results: dramatic changes in health markers at that age, such as cardiovascular health, immunity, and metabolic function Warrant : evidence from research, which shows that biological aging is not the same but occurs in different phases	Ethos: mention of a leading researcher, Michael Snyder of Stanford University, who led the research Pathos Discussion of a common issue: fear of aging and the health risks associated with it. By highlighting specific ages when changes occur, Logos 1. combining scientific findings and data from research. 2. Use of specific age markers and detailed descriptions of the biological changes that occur at that age.
CNN	Experts Reveal 2 Age	Claim : Human aging increases at the ages of 44 and 60 years, which causes various health risks and	Ethos: citing leading institutions—Stanford University and Nanyang

Media	Title	Rhethoric Elements	
		Context	Rhetorical Triangle
	Stages When Humans Age Faster	changes in metabolic function, thus requiring attention to health management. Support 1. The findings of a study involving 108 participants analyzed molecular changes related to aging. 2. Expert opinion from researchers involved in the study, such as Xiaotao Shen and Michael Snyder. 3. Statistical observations regarding metabolism and health problems that arise around that age. Warrant : evidence presented from scientific studies, which shows that aging is characterized by certain biological changes at certain ages. This basis also supports the statement that individuals should pay attention to their health as they approach this critical period.	Technological University—and referring to experts in genetics and microbiome medicine Pathos: discussion of health risks associated with aging. highlights the challenges of aging: increased susceptibility to disease and changes in physical abilities. Logos 1. logical reasoning is supported by scientific data, such as: specific age milestones, findings about accelerated aging, and health risks associated with that age. Mentions of metabolic changes, expert testimony, and research structure contribute to a logical framework that underscores the article's claims.

In the first discourse on the relationship between socio-economics and disease, the research results are represented as an effort to advocate a nuanced understanding of the Health gap. The gap is represented in the dichotomy of "rich" and "poor", as well as the health implications of each socio-economic condition. The claim that economic status affects the emergence of certain diseases is supported by research data and statements from experts. Based on the type of writing, the element of pathos (emotional content) becomes an important element in the construction of discourse. In this case, the detailed mention of various chronic diseases such as: breast cancer, prostate cancer, diabetes, arthritis, alcoholism, and depression gives emotional content to the discourse.In this discourse, there is a misrepresentation of fair access to health services. The depiction of "rich people are more capable to have better access to health care, understand literacy better, rarely engage in smoking and alcohol abuse" marginalizes the "poor" group. There is even a solution discourse for the poor group for their powerlessness in accessing health care. On the other hand, the behavior of the poor group is associated with risky behavior while the behavior of rich people who are at risk of developing the disease is not shown. Furthermore, the selection of the quote "...in the future, breast cancer screening protocols can be adjusted so that women with genetic risk and high education receive screening earlier or more often than women with genetic risk or low education" shows a discriminatory discourse in health services.

The second discourse shows more informative orientation about the middle and old age period, namely the age of 44 and 60 where aging occurs more rapidly. Furthermore, the article conveys a new awareness that aging does not occur linearly, but occurs explosively at certain ages. The next direction is the emphasis on lifestyle factors at that age. The persuasive strategy on the pathos element is displayed through health risks, including disease susceptibility, fear of aging and the challenges of aging, and changes in physical abilities. The ideological content can be observed in the sentence construction: "lifestyle also has a big influence on the acceleration of aging, for example the habit of smoking, staying up late, or a high-fat diet, rather than just biological changes alone". This sentence provides a strong message that aging does not occur naturally, but is strongly influenced by lifestyle. Without

adequate information about lifestyle itself, lifestyle will be perceived as a power in itself rather than a social reality constructed by certain powers.

DISCUSSION

The number of publications of research results in the mass media is much less than the number of scientific publications of human genetic research in Indonesia in 2024. Based on a search on the Taylor & Francis online portal, 208 results were found for the search keywords: human genetics#Indonesia. If #Indonesia is removed from the search keywords, it is certain that the findings will be greater. This shows that many human genetic research results in journals have not become an agenda for discussion by the media. Regarding genetic studies, a study found that only 22.9% of papers from 3,555 publications of Genome-Wide Association Studies (GWAS) from 2005-2018 received media attention (Morosoli et al., 2024). In the view of Journalism, reporting on human genetic research falls into the realm of science journalism. Scientific journals are indeed a fundamental basis for encoding scientific relevance. However, scientific relevance is only one of several factors that influence the news selection process in scientific journalism. There are still other factors that influence, such as: political relevance, reach (number of people affected), controversy, references to elites, economic relevance, relevance to recipients/society, actuality(Badenschier & Wormer, 2012). These factors are still faced with other factors that are news values in general. In addition, the lack of synchronization between journalists and scientists also affects the lack of reporting of science as news by the media. Journalists complain about the lack of support and cooperation from scientists, while scientists view the work of journalists as indeed focused on disseminating scientific information through the mass media (Mamboleo et al., 2023).

Other research has found that scientific publications that receive attention from popular media are cited more often than those that receive less attention (Anderson et al., 2020). This implies that scientists need to increasingly use popular media to disseminate their scientific work. This collaboration will also reduce the gap in reporting important contextual information in health news (Heston, 2024). On the other hand, digital era media institutions have involved what is reflected in web metrics in determining news value (Kristensen, 2023). Web metrics data is a form of “expected reception”, or close to the concept of relevance to reception, What is needed is to align the news headline or claim submitted with the evidence. This alignment can avoid misleading without reducing news interest (Adams et al., 2019). In terms of news constructing, mass media articles that take GWAS publication news sources are presented in language that is too complicated for the audience to understand. Ethical issues are also rarely mentioned in articles published by the mass media (Morosoli et al., 2020). The findings imply the need for further translation efforts. Similar findings were also found in a study of newspapers in Russia in the period 1990 to 2020. It was stated that communication of genetic science needs to be improved to increase public understanding, and ethical issues need attention (Dolgov, 2023). Other research has found that the mass media misrepresents, or tends to exaggerate, scientific findings (Dempster et al., 2022).. This is certainly in line with media theory about news values being prioritized over scientific integrity. This is certainly in line with media theory about news values being prioritized over scientific integrity.

Through mass media news articles, human genetic research tends to be constructed in discourse as a lifestyle, including health in it. As a lifestyle, health is not an independent theme, but a construction of knowledge that takes into account the influence of social, cultural, economic, and political conditions (Yang et al., 2022). This thematic choice makes genetic research more accessible to a wider audience. In addition, health is also an important commodity in the political realm. A study in western liberal countries shows a trend of government of a party with various ideological backgrounds will encourage the growth of the health care budget around the election period although the realization of less spending will

occur if they remain in power for a long period of time(Herwartz, Helmut; Theilen, 2013). Another study confirms that political ideology has no effect on health care (Cockerham, 2019). In this discourse, news reporting around health interventions often provides unbalanced and overly simplistic information (Oxman et al., 2021). The rhetoric chosen in the news highlights attributes, causes, and risk factors at the individual level as part of the dominant norms in global health practices. The emphasis on personal responsibility without explanation of the broader political economic context represents a depoliticization of the discourse carried out on global health (Kim et al., 2019). Neoliberal ideology plays a role in this methodological individualism rhetoric. The representations in the texts displayed tend to emphasize individual agency, while minimizing the structural constraints that operate (Oleschuk, 2020). In other words, the media will raise awareness of the difficulties of society's life, but the solution is left to each individual.

CONCLUSION

The results of human genetic research are discussed by the mass media in the themes of health and trends/lifestyle with informative and persuasive purposes. Informative is related to scientific novelty on several health phenomena or healthy lifestyles. The persuasive side appears in the form of recommendations to readers regarding healthy lifestyles that need to be carried out. The small number of news compared to scientific journal publications show that scientific journals are only supporters of scientific relevance, one of the factors that influences news value in science journalism. Based on the analysis of rhetorical elements, health risks (especially diseases) and recommendations for a healthy lifestyle tend to be presented as supporting elements for the main claims in the news. The presentation is not supported by an explanation of the social, economic, or broader context, or tends to leave health issues as a personal matter. This misrepresentation of the social context indicates the existence of a liberal ideology at play in the rhetorical elements of media discourse.

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