

# Time Series Based Frequency Analysis of Violence and Criminalization Related Dynamic Mental Health Media News

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**Abstract.** Violence, displaying a dynamic and multivariate nature with different biological, psychodynamic, social and individual factors, is reflected in media texts related to mental health and mental illness which embody numerous variables that are not simple to address and assess. The problematic issues around mental health are not only concerned with the medical aspect of mental problems, including the definition, diagnosis and treatment thereof, but also with respect to negative attitudes of people towards those with psychological problems, which may bring about cases of stigmatization. Media can play a significant role in criminalization of the mentally ill and be instrumental in shaping and changing attitudes towards mental illness. Accordingly, the current study aims to assess the trends in national discourse through media texts by looking into the volume and content of a sample of 496 news stories about mental illness, with a particular focus on bipolar disorder, from 2014 to 2019. Three national daily newspapers constitute the sample addressed in the study where frequency analysis has been performed on the media text dataset in accordance with the changes over the years. The frequency analyses based on time series conducted in the study demonstrate that violence and criminalization have been found to be the most frequently addressed topic among the ones mentioned across the study period. Based on the results derived from the analyses, it is seen that focus of the news media on violence is not proportional to actual rates of violence among the mentally ill. Thus, the research suggests that such a continued emphasis on violence and criminalization may intensify social stigmatization and hinder attempts to seek professional help. All these mental health-related considerations and raising public awareness point to ultimate strategies in public health domain regarding the socially constructed model which significantly affects the benefits of and barriers to action in health-promoting attitudes and behaviors.

**Keywords:** Dynamic mental health media news · Time series · Frequency analysis · Criminalization · Violence · Public health · Public awareness · Bipolar disorder · Affective disorder

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## 1 Introduction

Time-series analysis, having a substantial place in social sciences, preliminarily aims at understanding how patterns change over time allowing researchers to investigate trends and shifts at multiple time points [1]. Frequency distribution, which is a summary of data showing the number of times a particular observation occurs (namely frequency), is employed to organize extensive amounts of data. A frequency distribution is constructed by arranging the data into categories that represent value ranges of the variables at stake [2]. Accordingly, structuring and modeling the quintessentially dynamical changes in the size and volume of content as well as trends of changes makes up integral parts pertaining to various stages of research from data description to data analysis.

Social constructionism, as a theory addressed in sociology, social ontology and communication theory, puts forth that reality can never be stable or self-evident, so reality is not an objective truth but rather a product of activities of humans whose experience is mediated culturally, historically and linguistically [3]. For this reason, a critical standpoint is required to be adopted regarding the taken-for-granted ways of understanding the world and people, which encourages human beings to be critical of the idea that our observations of the world straightforwardly produce its nature [4]. Discourse, being time and culture specific, is subject to change over time, which frequently produces social transformations [5]. Regarding the connection between mental illness and social constructionism as a theoretical position, it can be said that social constructionism has contributed significantly to health and illness in various ways, contending that medical knowledge and practices are socially constructed. It is further argued that psychiatry has no privileged understanding of mental disorder and social as well as cultural contexts need to be emphasized [6]. Even though the biomedical approach which focuses on diagnosis and medication is prevalent in clinical psychiatry, not all psychiatrists adhere to its logic [7]. Hence, alternative perspectives like social constructionism have become common in the context of public and mental health.

In this context, there are quite a huge number of challenges when one considers the dynamics of mental health that interacts between multiple factors and actors as well as the requirement of media production to consider not only discourse manufactured in newsrooms but also other factors like journalistic practices, specific networks, structural contexts with ideological assumptions embedded and technologies [8]. To complicate things further, unlike other health issues, mental illness is at times linked to violence in media portrayals. Mental conditions such as schizophrenia, for instance, often come to media attention in crime settings or court proceedings, which many believe can gratuitously stigmatize not only individuals with that diagnosis but with any mental illness, and may also bring about public safety being placed undue attention in mental health policy [9]. As surveyed by [10], individuals with mental illness became implicitly and explicitly associated with criminality through the process of stigmatization that associated unpredictability, violence and danger with mental illness. In reality, Gunn and Taylor found out in their study [11] that out of 5189 homicide

cases, 61% of the murders were committed by mentally ill people [12]. In addition, emphasis on interpersonal violence in news coverage of mental illness is found to be concerning since most people with mental illness are never violent and around 4% of interpersonal violence in the US is said to be attributable to mental illness [13]. These studies reveal that being mentally ill does not necessarily come to mean that this situation will necessarily lead to criminality or violence. Another point is that with negative stories prevailing around mental problems, it can be stated that the stories rarely cover cases of success, recovery or accomplishment. The study by [14] verifies this particular point by finding out that the most frequently mentioned topic was violence (55%), while only 14% provided a description of successful treatment or recovery from mental illness.

The article [15] deals with news coverage in science journalism and employs a novel input-output analysis for the investigation of over eight million scientific study results published between 2014 and 2018 have been selected by global journalism to a relevant degree. The input-output analysis searches the patterns in the coverage of all scientific results published with regard to related distributions. The study by [16] is concerned with temporal mental health dynamics and social media where the authors describe a set of experiments to build the related system utilizing a methodology of data mining and deploying the system during the COVID-19 pandemic toward strategic decision-making. Another study [17], concerned with mental illness and social media, highlights the recent attempts that examine the potential to leverage social media postings towards the understanding of mental illness among individuals and populations. The study points out the significance of developing tools to identify the onset of depressive disorders toward being more proactive about mental health. Advancements in technologies have enabled computational methods to investigate different types and facets of media. Consequently, respective studies have become rampant like the one by [18] in which the authors perform a comparative computer-based text analysis of three news organizations regarding the COVID-19 issues using MAXQDA software. The study reveals the way the media outlets frame their news using word frequency, multiple words' combination and semantic relationships on 105 news. Another study [19] employs multifractal methods to detect and analyze self-repeating patterns for ensuring regularity and self-similarity in the digital-based complex media dataset and attaining accurate categorization of words in texts by one of the Natural Language Processing (NLP) methods, namely Bidirectional Encoder Representations from Transformers (BERT). The analysis results of the datasets compared by BERT demonstrate that the most optimal result could be achieved by multifractal Bayesian method. Regarding global news items and construction of risk in media, the study [20] provides a quantitative analysis and content analysis to elucidate parameters of risk society-related concepts focusing on economic uncertainty and risk.

In tandem with the tendency to represent mental illnesses in a way which links violence and dangerousness with the mental problem, descriptive studies of the US news media content of the last two decades of the previous millennium show that news stories about mental illness put emphasis on interpersonal

violence with dangerousness seeming to be the most common theme in coverage involving accounts of violent criminal activity committed by people with mental illness [21,22]. The findings in the aforementioned studies are also consistent with those concerning other countries like the UK [23], Spain [24] and Canada [25]. In the light of the previous literature, this study, with a different perspective and setting, examines the content of the recent news coverage related to mental illness and assesses the trends of violence and criminalization over time in Turkish context through a computational application approach.

## 2 Material and Methods

### 2.1 Mental Health Media News Dataset

The newspaper items related to *mental health (with key words including mental health, mental distress, mental disorders, bipolar disorder, depression, depressive, manic and affective disorder)* printed between 2014 and 2019 in the top three highest-circulation daily papers in Turkey as of 2022 (Hürriyet, Sabah and Sözcü) as accessible via electronic newspaper database make up the mental health media news dataset addressed in the study. Out of a total number of 725 news items, 496 items (Hürriyet (n = 218), Sabah (n = 168) and Sözcü (n = 110), respectively) are handled with a focus on violence and criminalization as the related features. The original larger size dataset is a part of the dissertation thesis entitled "News Media Portrayal of Mental Health and Psychological Problems: An Analysis of Daily Newspapers in Turkey". The circulation rates of Hürriyet, Sabah and Sözcü as of March 2022 are 185.655, 179.341 and 153.773, respectively [26]. Table 1 provides the number of news stories covered in the three newspapers mentioned above.

**Table 1.** The number of news stories by newspapers.

| Newspaper | The total number of news items (N) |
|---|---|
| Hürriyet | 218 |
| Sabah | 168 |
| Sözcü | 110 |

### 2.2 Methods

Time series analysis is a particular means employed to analyze a sequence of data points collected over an interval of time. Rather than recoding the data points randomly or intermittently, time series analysis enables the recording of the data points at consistent intervals across a set period of time, which means that this analysis does not only constitute data collection act over time. In addition to this advantage, time series analysis can also show how variables change over time, and time is the crucial variable since it shows how the data adjust over

the course of the data points and the final results. Another noteworthy benefit is related to its provision of an additional source of information and a set order of dependencies between the data [27].

**Time Series Based Frequency Analysis based on Dynamic Mental Health Media News**

Frequency of an event is the number of times the event has occurred in a study or experiment. The description of the characteristics of a set of data belongs to the area of descriptive statistics, and frequency analysis is one part of this area. Frequency distributions are generally employed to describe both nominal and interval data along with ordinal data. Since they are condense and capable of summarizing large amounts of data in applicable formats, they have a facilitating role in graphic presentation of data [28].

Frequencies are often represented in histograms graphically with values of events being plotted to produce a frequency distribution. In mathematical terms, a histogram is an $m$ function that counts the number of observations that fall into discrete categories. $n$ refers to the total number observations (sample) and $k$ refers to the total number of boxes; so $m$ histogram fulfills the following conditions for the calculation as per Eq. (1):

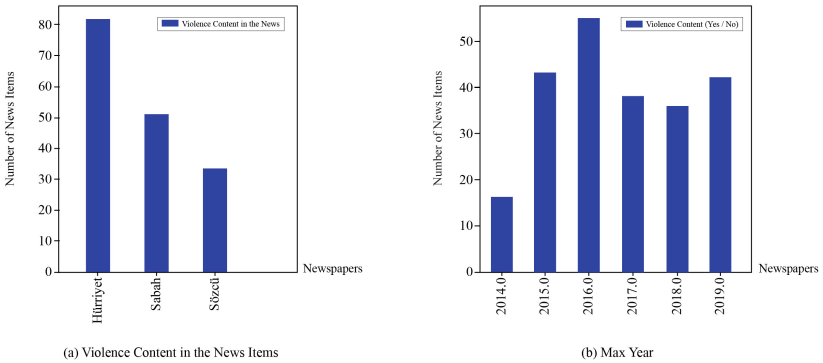
$$n = \sum_{i=1}^{k} m_i \tag{1}$$

## 3 Experimental Results and Discussion

The subsequent stages were followed in the study dataset (media text dataset) made up of repetitive numbers in order to construct the histogram. First, the data were sequenced; then the frequencies were found out. Afterwards, the width of the data group was measured through its frequency and finally, histogram was drawn graphically based on the tables. All the analyses and depictions were performed by Matlab [29] (Table 2).

**Table 2.** Time series based frequency distribution of violence content in news items.

| (a) number of violence content | | (b) year the violence content seems the highest | |
|---|---|---|---|
| Newspaper | Year | Year | Violence content (Yes/No) |
| Hürriyet | 71 | 2014 | 16 |
| Sabah | 45 | 2015 | 43 |
| Sözcü | 22 | 2016 | 55 |
| | | 2017 | 38 |
| | | 2018 | 36 |
| | | 2019 | 42 |




(a) Violence Content in the News Items (b) Max Year

**Fig. 1.** Histogram for the time series based frequency analysis of violence content in the news items per newspaper (a) number of news (b) the year the content seems the highest.

Figure 1 Depicts the frequency analysis of violence content in the news items based on time series in a histogram form.

The results of the frequency analyses derived from histogram distributions reveal that the highest number of criminalization content is covered by Hürriyet and the lowest number by Sözcü (Fig. 1(a), Table 3(a)). The year when the maximum content of criminalization was covered is 2016 and the minimum is 2014 (Fig. 1(b), Table 3(b)).

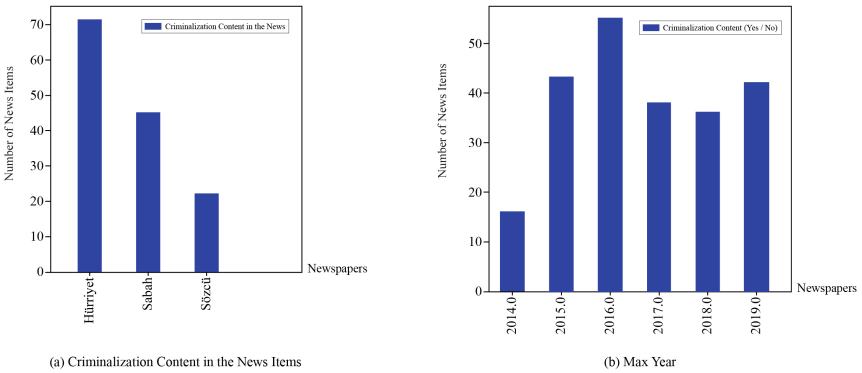
Table 3 provides the frequency distribution of criminalization content in news items based on time series.

**Table 3.** Time series based frequency distribution of violence content in news items (a) number of content (b) year the violence content seems the highest.

| (a) number of violence content | | (b) year the violence content seems the highest | |
|---|---|---|---|
| Newspaper | Year | Year | Violence content (Yes/No) |
| Hürriyet | 71 | 2014 | 16 |
| Sabah | 45 | 2015 | 43 |
| Sözcü | 22 | 2016 | 54 |
| | | 2017 | 37 |
| | | 2018 | 35 |
| | | 2019 | 43 |

The results of the frequency analyses derived from histogram distributions reveal that the highest number of criminalization content is covered by Hürriyet and the lowest number by Sözcü (Fig. 1(a), Table 3(a)). The year when the maximum content of criminalization was covered is 2016 and the minimum is 2014 (Fig. 1(b), Table 3(b)).

Figure 2 presents the frequency analysis of criminalization content in the news items based on time series in histogram.




(a) Criminalization Content in the News Items (b) Max Year

**Fig. 2.** Time series based frequency distribution of criminalization content in news items (a) number of content (b) year the criminalization content seems the highest.

The results of the frequency analyses derived from histogram distributions reveal that the highest number of criminalization content is covered by Hürriyet and the lowest number by Sözcü (Fig. 2(a), Table 3(a)). The year when the maximum content of criminalization was covered is 2016 and the minimum is 2014 (Fig. 2(b), Table 3(b)).

## 4 Conclusions and Future Directions

Time-series analysis holds a significant place in social sciences with an overarching aim of understanding the way patterns change over time, which enables researchers to investigate trends and shifts at multiple time points. Frequency distribution, on the other hand, is used to organize rampant amounts of data and constructed to show the number of times a particular observation occurs to show the value ranges of variables in question. Mental illness associated with violence and criminalization in media coverage is a problematic issue since media coverage has its effects on public beliefs and attitudes toward public health. The present study has assessed the trends in national discourse through media texts by examining the volume and content of a sample of 496 news stories about mental illness from 2014 to 2019. Subsequently, frequency analysis has been performed on the media text dataset in accordance with the changes over the years. The frequency analyses based on time series conducted in the study demonstrate that violence (interpersonal and/or self-directed) and criminalization have been found to be the most frequently addressed topic among the ones mentioned across the study period. The results derived from the analyses reveal that focus of the news media on violence is not proportional to the real rates

of violence among individuals with mental illnesses. The research suggests that such a persistent emphasis on violence and criminalization may intensify social stigmatization, hinder attempts to seek professional help and deterioration in the life quality of individuals suffering from mental health as well as their families and/or acquaintances. The findings of the current study can be used as future directions to guide journalistic practices, training and reporting in terms of news items content. In addition, promoting public awareness can be another future direction to cover the importance of providing accurate accounts of mental illness. All the discussed mental health-related considerations point toward a way regarding the ultimate strategies in public health domain through the socially constructed model that has significant effects on the benefits of and barriers to action in health-promoting attitudes and behaviors.

**Limitations of the Study.** The further analyses conducted have not been presented in this study due to page restrictions.

## References

1. Box-Steffensmeier, J.M., Freeman, J.R., Hitt, M.P., Pevehouse, J.C.: Time Series Analysis for the Social Sciences. Cambridge University Press, Cambridge (2014)
2. Fleming, M.C., Nellis, J.G.: Describing data tables, charts, and graphs. In: Principles of Applied Statistics, 2nd edn., pp. 13–50. Thomson Learning, New York (2000)
3. O'Reilly, M., Lester, J.N.: Introduction the social construction of normality and pathology. In: The Palgrave Handbook of Adult Mental Health, pp. 1–19. Palgrave Macmillan, London (2016)
4. Burr, V.: Social Constructionism, 2nd edn. Routledge, London (2003)
5. Burr1, V., Dick P.: Social constructionism. In: Gough B. (eds.) The Palgrave Handbook of Critical Social Psychology. Palgrave Macmillan, London (2017). https://doi.org/10.1057/978-1-137-51018-1_4
6. Bracken, P., Thomas, P.: Postpsychiatry: a new direction for mental health. Bmj **322**(7288), 724–727 (2001)
7. Rogers, A., Pilgrim, D.: A Sociology of Mental Health and Illness. McGraw-Hill Education, London (2014)
8. Henderson, L., Hilton, S.: The media and public health: where next for critical analysis? Crit. Pub. Health **28**(4), 373–376 (2018)
9. Holland, K.: Making mental health news: Australian journalists' views on news values, sources and reporting challenges. J. Stud. **19**(12), 1767–1785 (2018)
10. Wilcox, S.: Media and the Criminalization of Mental Illness: The Impact of Stigma Reduction Videos (2016)
11. Taylor, P.J., Gunn, J.: Homicides by people with mental illness: myth and reality. Br. J. Psychiatry **174**(1), 9–14 (1999)
12. Murphy, N.A.: The Influence of Media Representations on Mental Health Practitioners. University of Salford, Salford (2015)
13. Swanson, J.W., McGinty, E.E., Fazel, S., Mays, V.M.: Mental illness and reduction of gun violence and suicide: bringing epidemiologic research to policy. Ann. Epidemiol. **25**(5), 366–376 (2015)

14. McGinty, E.E., Kennedy-Hendricks, A., Choksy, S., Barry, C.L.: Trends in news media coverage of mental illness in the United States: 1995–2014. Health Aff. **35**(6), 1121–1129 (2016)
15. Lehmkuhl, M., Promies, N.: Frequency distribution of journalistic attention for scientific studies and scientific sources: an input-output analysis. PLoS One **15**(11), e0241376 (2020)
16. Tabak, T., Purver, M.: Temporal Mental Health Dynamics on Social Media. arXiv preprint arXiv:2008.13121 (2020)
17. De Choudhury, M.: Role of social media in tackling challenges in mental health. In Proceedings of the 2nd International Workshop on Socially-Aware Multimedia, pp. 49–52 (2013)
18. Hossain, A., Wahab, J.A., Khan, M.S.R.: A computer-based text analysis of Al Jazeera, BBC, and CNN news shares on Facebook: framing analysis on Covid-19 issues. SAGE Open **12**(1), 21582440211068496 (2022)
19. Karaca, Y., et al. Multifractal complexity analysis-based dynamic media text categorization models by natural language processing with BERT (Chapter 6). In: Multi-Chaos, Fractal and Multi-Fractional Artificial Intelligence of Different Complex Systems. Elsevier, Amsterdam (2021)
20. Dursun, A.D.: Reconsidering the risk society: its parameters and repercussions evaluated by a statistical model with aspects of different social sciences. In: Gervasi, O., et al. (eds.) ICCSA 2020, Part II. LNCS, vol. 12250, pp. 394–409. Springer, Cham (2020). https://doi.org/10.1007/978-3-030-58802-1_29
21. Wahl, O.E., Wood, A., Richards, R.: Newspaper coverage of mental illness: is it changing? Psychiatr. Rehabil. Skills **6**(1), 9–31 (2002)
22. Wahl, O.F.: Mass media images of mental illness: a review of the literature. J. Commun. Psychol. **20**(4), 343–352 (1992)
23. Philo, G., Secker, J., Platt, S., Henderson, L., McLaughlin, G., Burnside, J.: The impact of the mass media on public images of mental illness: media content and audience belief. Health Educ. J. **53**(3), 271–281 (1994)
24. Aragones, E., López-Muntaner, J., Ceruelo, S., Basora, J.: Reinforcing stigmatization: coverage of mental illness in Spanish newspapers. J. Health Commun. **19**(11), 1248–1258 (2014)
25. Day, D.M., Page, S.: Portrayal of mental illness in Canadian newspapers. Can. J. Psychiatry **31**(9), 813–817 (1986)
26. https://www.medyajans.com/gazete-tirajlari.html
27. Kaplan, D.: The Sage Handbook of Quantitative Methodology for the Social Sciences. Sage Publication, Thousand Oak (2004)
28. Winkler, O.W.: Interpreting Economic and Social Data: A Foundation of Descriptive Statistics. Springer, Heidelberg (2009). https://doi.org/10.1007/978-3-540-68721-4
29. The Mathworks, MATLAB r 2021b. 2021. The MathWorks, Inc., Natick, MA (2021)