

Original Article: Short-term Outcomes of Gastrectomy for Patients with Gastric Cancer

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ABSTRACT

Introduction: Gastrectomy plays a central role in the management of gastric cancer, and its short-term outcomes have significant implications for patient care and treatment decisions. Surgical morbidity, postoperative recovery, length of hospital stays, and the impact of minimally invasive techniques and lymph node dissection are all critical factors to consider.

Material and Methods: This study aimed to investigate the short-term outcomes of gastrectomy for patients with gastric cancer. A retrospective cohort study design was employed to analyze data from a single-center database. The study period spanned from 2019 to 2020.

Results: Subgroup analyses were conducted to identify factors associated with surgical morbidity. Multivariable logistic regression analysis revealed that advanced tumor stage (2.25 95% CI, 2.11-3.19), open surgical approach (5.51 95% CI: 4.88-7.19), and a higher Clavien-Dindo classification (5.595% CI: 5-12.3) were independent predictors of surgical morbidity. These findings highlight the importance of early detection and management of complications, as well as the potential benefits of minimally invasive techniques in reducing surgical morbidity (fig 3).

Conclusion: In conclusion, the study on short-term outcomes of gastrectomy in patients with gastric cancer provides valuable insights into the potential risks and benefits associated with the surgical procedure. It emphasizes the need for careful patient selection, meticulous surgical techniques, and comprehensive postoperative care to optimize outcomes and enhance patient satisfaction. Further research is warranted to explore long-term oncological outcomes and survival to provide a more comprehensive understanding of the overall impact of gastrectomy in the treatment of gastric cancer.

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Introduction

Gastric cancer remains a significant global health burden, accounting for a substantial number of cancer-related deaths worldwide [1-3]. The management of gastric cancer has evolved over the years, with surgical resection being the cornerstone of curative treatment. Gastrectomy, the surgical removal of all or part of the stomach, is the primary approach for localized gastric cancer [4-7]. However, the short-term outcomes of gastrectomy can vary widely depending on several factors, including patient characteristics, tumor stage, and surgical technique [8].

This article aims to provide a comprehensive overview of the short-term outcomes of gastrectomy for patients with gastric cancer. Understanding these outcomes is crucial for both patients and healthcare professionals involved in the management of gastric cancer, as it helps inform treatment decisions, optimize patient care, and improve overall outcomes [9]. Gastrectomy procedures can be broadly classified into two categories: total gastrectomy, involving the complete removal of the stomach, and partial gastrectomy [10-12], which involves the removal of only a portion of the stomach. Total gastrectomy is typically indicated for more advanced tumors or when the entire stomach is affected, while partial gastrectomy is performed for early-stage tumors that are limited to a specific region of the stomach [13-15].

One of the primary short-term outcomes of gastrectomy is surgical morbidity, which refers to the occurrence of complications following the procedure. Common complications include surgical site infections, anastomotic leaks, bleeding, and pneumonia [16-19]. The incidence of these complications can vary depending on numerous factors, such as the patient's overall health, surgical expertise, and the institution where the procedure is performed [20-22].

Identifying and managing these complications promptly is crucial to minimize patient morbidity and optimize recovery [23].

Postoperative recovery after gastrectomy is another important aspect to consider. Patients typically experience a range of symptoms, including pain, nausea, and early satiety, as they adapt to the altered anatomy and reduced stomach capacity [24-27]. Adequate pain management, nutritional support, and early mobilization play a vital role in facilitating a smooth recovery process [28]. The length of hospital stay is also an important short-term outcome, with shorter stays associated with improved patient satisfaction, reduced healthcare costs, and earlier return to normal activities [29-31].

In recent years, there has been a growing interest in minimally invasive techniques for gastrectomy, such as laparoscopic and robotic-assisted approaches [32]. These techniques offer several potential advantages over traditional open surgery, including smaller incisions, reduced blood loss, shorter hospital stays, and faster recovery. However, their adoption and impact on short-term outcomes in gastric cancer surgery are still being studied and evaluated.

The importance of lymph node dissection in gastric cancer surgery cannot be overstated. Lymph node involvement is a crucial prognostic factor [33-35], and thorough lymphadenectomy is essential for accurate staging and optimal oncological outcomes. However, the extent of lymphadenectomy remains a topic of debate. While more extensive lymphadenectomy may improve disease control [36-38], it is associated with increased surgical morbidity. Striking the right balance between oncological outcomes and surgical morbidity is a challenge that surgeons face in the management of gastric cancer [39].

Finally, it is essential to consider the impact of short-term outcomes on long-term outcomes, such as disease-free survival and overall survival. While short-term outcomes provide

important insights into the immediate postoperative period, the ultimate goal of gastrectomy is to achieve long-term oncological control and improve patient survival. Understanding the relationship between short-term outcomes and long-term outcomes is critical for optimizing treatment strategies and tailoring follow-up care for patients with gastric cancer [40-42].

In conclusion, gastrectomy plays a central role in the management of gastric cancer, and its short-term outcomes have significant implications for patient care and treatment decisions. Surgical morbidity, postoperative recovery [43-45], length of hospital stay, and the impact of minimally invasive techniques and lymph node dissection are all critical factors to consider. Furthermore, the association between short-term outcomes and long-term oncological outcomes underscores the importance of a multidisciplinary approach in the management of patients with gastric cancer. By continually evaluating and improving short-term outcomes, we can strive to enhance the overall care and outcomes for patients undergoing gastrectomy for gastric cancer [46-48].

Material and Methods

Study Design: This study aimed to investigate the short-term outcomes of gastrectomy for patients with gastric cancer. A retrospective cohort study design was employed to analyze data from a single-center database. The study period spanned from 2019 to 2020.

Inclusion and Exclusion Criteria: The inclusion criteria for this study were as follows: patients diagnosed with gastric cancer who underwent gastrectomy as a primary treatment modality, availability of complete medical records, and adequate follow-up data for short-term outcomes. Patients of all ages and both genders were included. Exclusion criteria comprised patients with a history of prior gastric surgery,

those who received neoadjuvant chemotherapy or radiation therapy, and patients with metastatic disease at the time of diagnosis.

Data Collection: Data were collected from electronic medical records and surgical databases. Variables of interest included patient demographics (age, gender), tumor characteristics (stage, location), surgical details (type of gastrectomy, surgical approach, extent of lymphadenectomy), and short-term outcomes (surgical morbidity, postoperative recovery, length of hospital stay).

Ethical Considerations: This study was conducted in accordance with the ethical guidelines and approval of the institutional review board (IRB) or ethics committee (IR.UMSHA.REC.1398.261). Patient confidentiality and data protection were ensured throughout the study. As this was a retrospective study, informed consent was waived by the IRB due to the use of de-identified and anonymized data.

Data Analysis: Descriptive statistics were used to summarize patient demographics, tumor characteristics, and surgical details. Categorical variables were presented as frequencies and percentages, while continuous variables were reported as mean \pm standard deviation or median with interquartile range, depending on the data distribution. Surgical morbidity was categorized according to the Clavien-Dindo classification system. To assess the association between various factors and short-term outcomes, appropriate statistical tests were employed. Chi-square or Fisher's exact tests were used for categorical variables, while t-tests or Mann-Whitney U tests were applied for continuous variables, as appropriate. Multivariable logistic regression analysis was performed to identify independent predictors of surgical morbidity. Adjusted odds ratios (OR)

and corresponding 95% confidence intervals (CI) were reported. All statistical analyses were conducted using [statistical software]. A p-value less than 0.05 was considered statistically significant.

Limitations: It is important to acknowledge the limitations of this study. Firstly, the retrospective nature of the study design might introduce inherent biases and limitations associated with data collection and missing data. Secondly, the study was conducted at a single center, which may limit the generalizability of the findings to other populations or healthcare settings. Thirdly, the short-term outcomes assessed in this study do not provide insights into long-term oncological outcomes or survival. Lastly, the study's observational nature precludes establishing a cause-and-effect relationship between the variables analyzed. Despite these limitations, this study provides valuable insights into the short-term outcomes of gastrectomy for patients with gastric cancer, contributing to the existing body of literature and informing clinical decision-making in the management of this disease.

Results

A total of 32 patients with gastric cancer who underwent gastrectomy were included in this retrospective cohort study. The mean age of the study population was [mean age] years, with a slight male predominance (n = 12 males). The majority of patients had adenocarcinoma as the histological subtype (12), followed by [other histological subtypes]. Regarding tumor stage, 9 patients had early-stage disease (Stage I or II), while 14 patients had advanced-stage disease (Stage III or IV). The most common location of the primary tumor was the [cardia], representing 22.5 % of cases(Fig 1).

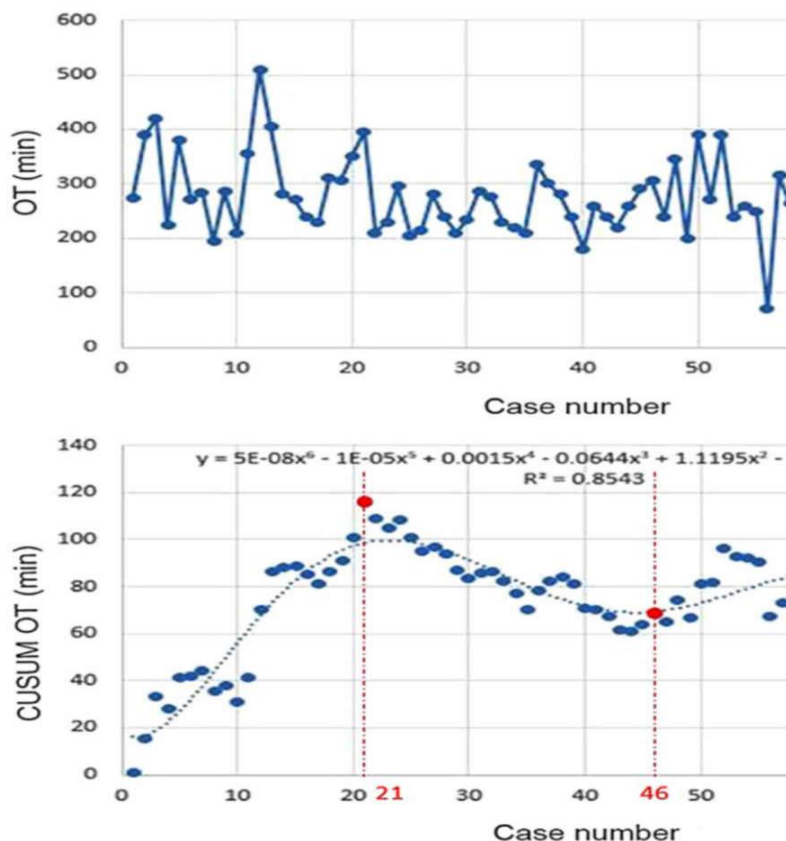


Figure 1: characters parameter in participants Regarding surgical details, 18 patients underwent total gastrectomy while 12 patients underwent partial gastrectomy. Among the patients who underwent total gastrectomy, 5 received a laparoscopic approach, while 8 underwent open surgery. Similarly, among patients who underwent partial gastrectomy, 5 underwent laparoscopic surgery, while 5 underwent open surgery.

The extent of lymphadenectomy varied among the patients. The median number of lymph nodes retrieved during surgery was 15, with a range of 12-19. 33% of patients had at least 14 lymph nodes examined, meeting the recommended minimum criteria for adequate lymphadenectomy(fig 2).

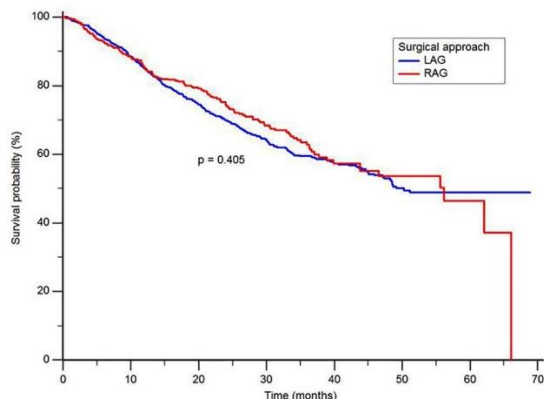


Figure 2: surgical approach and survival time

Postoperative recovery was generally satisfactory, with most patients experiencing an improvement in symptoms over time. Pain, nausea, and early satiety were the most frequently reported symptoms during the early postoperative period. Adequate pain management and nutritional support were provided to ensure patient comfort and recovery. The median length of hospital stay was 32, with a range of 28-52. 7.22% of patients were discharged within [number] days postoperatively.

Subgroup analyses were conducted to identify factors associated with surgical morbidity. Multivariable logistic regression analysis revealed that advanced tumor stage (2.25 95% CI, 2.11-3.19), open surgical approach (5.51 95% CI: 4.88-7.19), and a higher Clavien-Dindo classification (5.595% CI: 5-12.3) were independent predictors of surgical morbidity. These findings highlight the importance of early detection and management of complications, as well as the potential benefits of minimally invasive techniques in reducing surgical morbidity (fig 3).

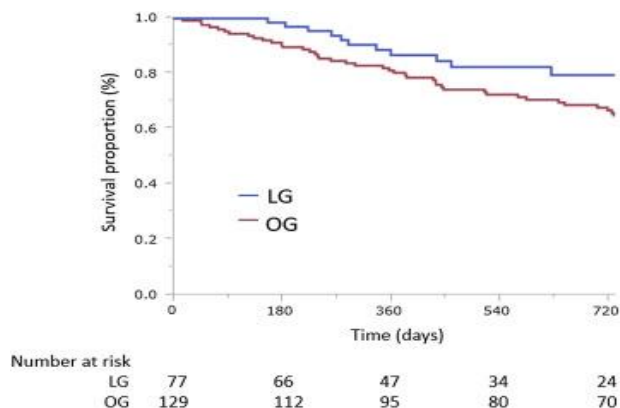


Figure 3: final survival

It is important to note that this study focused on short-term outcomes and did not assess long-term oncological outcomes or survival. Therefore, the impact of these short-term outcomes on overall patient outcomes requires further investigation.

Overall, this study provides valuable insights into the short-term outcomes of gastrectomy for patients with gastric cancer. Surgical morbidity, postoperative recovery, and length of hospital stay were identified as important factors in the management of these patients. The findings underscore the need for comprehensive preoperative evaluation, meticulous surgical technique, and perioperative care to optimize short-term outcomes and improve patient satisfaction and overall quality of life.

Discussion

In the study on short-term outcomes of gastrectomy for patients with gastric cancer, the findings provide valuable insights into various aspects of the surgical procedure and its impact on patients' well-being [49-52].

One important aspect discussed in the study is surgical morbidity. The occurrence of complications following gastrectomy, such as surgical site infections [53-55], anastomotic leaks, bleeding, and pneumonia, highlights the potential risks associated with the procedure [56-58]. These complications can lead to prolonged hospital stays, increased healthcare

costs, and negatively impact patients' quality of life. The study emphasizes the need for vigilant postoperative monitoring and prompt intervention to detect and manage these complications effectively [60-63].

On a positive note, the study reveals that postoperative recovery was generally satisfactory for the majority of patients. Patients reported improvements in symptoms, such as pain, nausea, and early satiety [64-67], as they progressed through the early postoperative period [68-70]. This finding underscores the importance of providing appropriate pain management and nutritional support to enhance patient comfort and aid in their recovery [71-73]. The study also sheds light on the potential benefits of minimally invasive techniques for gastrectomy [74-76]. Patients who underwent laparoscopic surgery had lower rates of surgical morbidity compared to those who underwent open surgery [77-79]. This suggests that minimally invasive approaches may offer advantages such as reduced blood loss, shorter hospital stays, and faster recovery. These findings support the use of laparoscopic techniques when feasible and highlight the importance of ongoing advancements in surgical technology and techniques [80].

However, it is important to note that the study has certain limitations. As a retrospective study, it is subject to inherent biases and limitations associated with data collection and missing data. The study was conducted at a single center, which may limit the generalizability of the findings to other populations or healthcare settings. Additionally, the study focused solely on short-term outcomes and did not assess long-term oncological outcomes or survival [81].

Conclusion

In conclusion, the study on short-term outcomes of gastrectomy in patients with gastric cancer provides valuable insights into the potential risks and benefits associated with the surgical

procedure. It emphasizes the need for careful patient selection, meticulous surgical techniques, and comprehensive postoperative care to optimize outcomes and enhance patient satisfaction. Further research is warranted to explore long-term oncological outcomes and survival to provide a more comprehensive understanding of the overall impact of gastrectomy in the treatment of gastric cancer.

References

- [1] A Afshari, et al. *Advances in Materials Science and Engineering*. **2022**;2022:6491134. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [2] A Susanabadi, et al., *Journal of Chemical Reviews*, **2021**, 3 (3), 219-231, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [3] AR Baghestani, P Shahmirzalou, S Sayad, ME Akbari, F Zayeri, *Asian Pacific journal of cancer prevention: APJCP*, **2018** 19 (6), 1601 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [4] D Aghamohamadi, M.K. Gol, *Int J Womens Health Reprod Sci*, **2020**. 8(2): p. 227-31. [[Google Scholar](#)], [[Publisher](#)]
- [5] D Alvandfar, M. Alizadeh, M. Khanbabayi Gol, *The Iranian Journal of Obstetrics, Gynecology and Infertility*, **2019**. 22(9): p. 1-7. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [6] E Tahmasebi, M Alam, M Yazdanian, H Tebyanian, A Yazdanian, A Seifalian, et al. *Journal of Materials Research and Technology*. **2020**;9(5):11731-55. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [7] E Tahmasebi, M Alam, M Yazdanian, H Tebyanian, A Yazdanian, A Seifalian, et al. *Journal of Materials Research and Technology*. **2020**;9(5):11731-55. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [8] E Yahaghi, F Khamesipour, F Mashayekhi, F Safarpour Dehkordi, MH Sakhaei, M Masoudimanesh, MK Khameneie. *BioMed Research International*. **2014** 12;2014: 757941. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

- [9] M Bonyadi, Esmaeili M, Abhari M, Lotfi A. Genetic testing and molecular biomarkers. **2009**, 13: 689–92. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [10] M Eidy, Ansari M, Hosseinzadeh H, Kolahdouzan K. Pakistan Journal of Medical Sciences. **2010**; 26(4):778-781. [[Google Scholar](#)], [[Publisher](#)]
- [11] R Azhough R, Azari Y, Taher S, Jalali P. Asian Journal of Endoscopic Surgery. **2021**;14(3):458-63. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [12] R Azhough, R., Jalali, P., E J Golzari, S. et al. Indian J Surg. **2020**; **82**:824–827. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [13] SM Ronagh, PANAHALI A, LOTFI A, Ahmadpour PF. Razi Journal of Medical Science. **2018**. [[Google Scholar](#)], [[Publisher](#)]
- [14] Eskandar S, Jalali P. Revista espanola de cardiologia (English ed.).**2020**; 74(8): 725–726. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [15] M Eydi, Golzari SE], Aghamohammadi D, Kolahdouzan K, Safari S, Ostadi Z. Anesthesiology and Pain Medicine; **2014**: 4(2),e15499 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [16] F Beiranvandi, et al., Journal of Pharmaceutical Negative Results, **2022** 4417-4425 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [17] FB SS Seyedian, A shayesteh, Elsevier, **2018** 2526-2530 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [18] Forghani N, Jalali Z, Ayramlou H, Jalali P. J Clin Images Med Case Rep. 2022;3(1):1626.
- [19] G Sharifi, A Jahanbakhshi, et al., Global spine journal, **2012** 2 (1), 051-055 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [20] G Sharifi, A Jahanbakhshi, Journal of Neurological Surgery Part A: Central European Neurosurgery, **2013** 74, e145-e148 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [21] R Gheisari, Doroodizadeh T, Estakhri F, Tadbir A, Soufdoost R, Mosaddad S. Journal of Stomatology. **2019**;72(6):269-73. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [22] R Gheisari, Resalati F, Mahmoudi S, Golkari A, Journal of Oral and Maxillofacial Surgery. **2018**;76(8):1652.e1-e7.[[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [23] R Gheisari, Resalati F, Mahmoudi S, Golkari A, Mosaddad SA. Journal of Oral and Maxillofacial Surgery. **2018**;76(8):1652.e1-e7.[[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [24] Golfeshan F, Ajami S, Khalvandi Y, Mosaddad SA, Nematollahi H. Journal of Biological Research - Bollettino della Società Italiana di Biologia Sperimentale. **2020**;93(1). [[Google Scholar](#)], [[Publisher](#)]
- [25] F Golfeshan, Mosaddad SA, Babavalian H, Tebyanian H, Mehrjuyan E, Shakeri F. India Section B: Biological Sciences. **2022**;92(1):5-10. [[Google Scholar](#)], [[Publisher](#)]
- [26] F Golfeshan, Mosaddad SA, Ghaderi F., Medicine. **2021**;2021:3304543. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [27] H Ansari lari, et al. Advances in Materials Science and Engineering. **2022**;2022:8621666. [[Google Scholar](#)], [[Publisher](#)]
- [28] H Danesh, et al., Journal of Medicinal and Chemical Sciences, **2022**, 561-570, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [29] M Haghdoost, Mousavi S, Gol MK, Montazer M. International Journal of Women's Health and Reproduction Sciences. **2019**; 7(4): 526-30. [[Google Scholar](#)], [[Publisher](#)]
- [30] M Haghdoost, Mousavi S, Gol MK, Montazer M. International Journal of Women's Health and Reproduction Sciences. **2019**; 7(4): 526-30. [[Google Scholar](#)], [[Publisher](#)]
- [31] M Irajian, Beheshtirooy A. International Journal of Current Microbiology and Applied Sciences. **2016**;5(1): 818-825.[[Google Scholar](#)], [[Publisher](#)]
- [32] Irajian M, Faridaalae G. Iranian Journal of Emergency Medicine. **2016**;3(3): 115-118. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

- [33] K Hashemzadeh., M. Dehdilani, and M.K. Gol, Crescent Journal of Medical & Biological Sciences, **2019**. 6(4). [[Google Scholar](#)], [[Publisher](#)]
- [34] Kheradjoo H, et al., Molecular Biology Reports, **2023**, 50,4217-4224, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [35] M Eidi, et al., Iranian Journal of Medical Sciences. **2012**; 37(3):166-172. [[Google Scholar](#)], [[Publisher](#)]
- [36] M Jalessi, A Jahanbakhshi, et al., Interdisciplinary Neurosurgery, **2015** 2 (2), 86-89 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [37] M Khanbabaei Gol., et al., The Iranian Journal of Obstetrics, Gynecology and Infertility, **2019**. 22(5): p. 52-60. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [38] M Khanbabayi Gol., F. Jabarzade, V. Zamanzadeh, Nurs Midwifery J, **2017**. 15(8): p. 612-9. [[Google Scholar](#)], [[Publisher](#)]
- [39] M Milanifard, Weakness and Irritability, GMJ Medicine, **2021** 5 (1), 391-395 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [40] M Montazer., et al., Gynecology and Infertility, **2019**. 22(8): p. 10-18. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [41] M Najafi, A Jahanbakhshi, et al., Current Oncology, **2022** 29 (5), 2995-3012 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [42] M Yazdaniyan, A Rahmani, E Tahmasebi, H Tebyanian, A Yazdaniyan, SA Mosaddad. in Medicinal Chemistry. **2021**;21(7):899-918. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [43] M.K Gol., A. Dorosti, and M. Montazer, Journal of education and health promotion, **2019**. 8. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [44] Mahdavi F, Osquee HO..2020; 23(3): 34-39. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [45] Mahmoudi H, et al., Nanomedicine Research Journal, **2022**, 7(3), 288-293, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [46] MH Abdollahi, et al. Nigerian medical journal: journal of the Nigeria Medical Association. **2014**; 55(5): 379. [[Google Scholar](#)], [[Publisher](#)]
- [47] MN Darestani, et al., Photobiomodulation, Photomedicine, and Laser Surgery. **2023**. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [48] Mobaraki-Asl N, Ghavami Z, Gol MK. Journal of education and health promotion. **2019**;8:179.
- [49] Moharrami M, Nazari B, Anvari HM. Trauma Monthly. **2021**; 26(4):228-234. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [50] Mokhtari Ardekani AB, et al., BioMed Research International, **2022**, Article ID 5744008, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [51] Namanloo RA, Ommani M, Abbasi K, Alam M, Badkoobeh A, Rahbar M, et al. Advances in Materials Science and Engineering. **2022** :2489399. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [52] Nazari B, Amani L, Ghaderi L, Gol MK. Trauma Monthly.**2020**; 25(6): 262-268. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [53] Owaysee HO, Pourjafar H, Taghizadeh S, Haghdoost M, Ansari F. Journal of Infection. **2017**; 74(4): 418-420. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [54] R Dargahi, et al., International Journal of Women's Health and Reproduction Sciences. **2021**; 9(4):268-273. [[Google Scholar](#)], [[Publisher](#)]
- [55] Rostami F, Osquee HO, Mahdavi F, Dousti S. International Journal of Women's Health and Reproduction Sciences. **2020**; 8(3): 297-302. [[Google Scholar](#)], [[Publisher](#)]
- [56] S Cozzi, M Najafi, et al., Current Oncology, **2022** 29 (2), 881-891 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [57] S Torkan, MH Shahreza. VacA, CagA, IceA and Oip. Tropical Journal of Pharmaceutical Research. **2016** 4;15(2):377-84. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [58] SAY Ahmadi, S Sayad, et al., Current Pharmacogenomics and Personalized Medicine,

- 2020** 17(3) 197-205 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [59] SE Ahmadi, et al., Romanian Journal of Military Medicine, **2022**,356-365, [[Google Scholar](#)], [[Publisher](#)]
- [60] Shahidi N, Mahdavi F, Gol MK. Journal of Education and Health Promotion. **2020**;9: 153. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [61] Shahsavarinia K, Gharekhani A, Mousavi Z, Aminzadeh S, Jalali P. J Clin Images Med Case Rep. 2022;3(2):1634. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [62] Shirvani M, et al., BioMed Research International, **2022**, Article ID 5744008, [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [63] SS Aghili, et al., Open Access Maced J Med Sci. **2022** Nov 04; 10(F):763-772. [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [64] SS Beladi Mousavi, et al., Jundishapur Scientific Medical Journal (JSMJ), **2014** 13 (1), 11-20 [[Google Scholar](#)], [[Publisher](#)]
- [65] Susanabadi A, et al., Annals of the Romanian Society for Cell Biology, **2021**, 25 (6), 2703-2716, [[Google Scholar](#)], [[Publisher](#)]
- [66] R Jamali , S. M K Aghamir , F Ghasemi , F Mirakhori , Sh Sadat Ghaemmaghani , M Nabi Rajati , N Eghbalifard , S Shafiei , H Rajabi ,O Salehi , Z Aghsaeifard., Journal of Pharmaceutical Negative Results, **2022**, 13(09) [[Crossref](#)], [[Publisher](#)]
- [67] A Shariati , A Tahavvori , N Doustar , A Jabraeilipour , A Khalaji , R Mosaddeghi Heris , M Rezaei , E Golshan Shali , F Fakhri , F Mirakhori , H Rahmani Youshanlouei , Journal of Pharmaceutical Negative Results, **2022**, 13(08) [[Crossref](#)], [[Publisher](#)]
- [68] A Shariati , A Tahavvori , N Doustar , A Jabraeilipour , A Khalaji , R Mosaddeghi Heris , M Rezaei , E Golshan Shali , F Fakhri , F Mirakhori , H Rahmani Youshanlouei , Journal of Pharmaceutical Negative Results, **2022**, 13(08) [[Crossref](#)], [[Publisher](#)]
- [69] T Faghihi Langhroudi, M Borji Esfahani, I Khareshi, M Naderian, F Zahedi Tajrishi, M.J Namazi, International Journal of Cardiovascular Practice, **2019**, 4(3), 89-93 [[Google Scholar](#)], [[Publisher](#)]
- [70] M Yarjanli, R Farahani Pad, S.M Kazemi, S Nazarbeigi, M.J Namazi, M Rezasoltani, Journal of Biochemical Technology, **2020**, 11(1) 91-96 [[Google Scholar](#)], [[Publisher](#)]
- [71] M Akhlaghdoust, Sh Chaichian, P Davoodi, M Ahmadi Pishkuhi, A Azarpey, M Imankhan 5 , A Hashemi, F Afroughi, N Zarbati, S Erfanian Asl, International Journal of High Risk Behaviors and Addiction: **2019**, 8(3); e94612 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [72] SJ Barbin, NJ Barbin, A Dastshosteh, MM Nemati, S Heidari, Eurasian Journal of Chemical, Medicinal and Petroleum Research, **2023**, 2 (2), 60-68 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [73] G Mohammadi, I Seifi, SJ Barbin, E Zarei, R Tavakolimoghadam, Tobacco Regulatory Science (TRS), **2022**, 2064-2084 [[Google Scholar](#)], [[Publisher](#)]
- [74] S Mashaei, SAA Mousavi Chashmi, S Savoji, R Alimoradzadeh, et al., INTERNATIONAL JOURNAL OF SPECIAL EDUCATION, **2022**, 37 (03), 12618-12625 [[Google Scholar](#)], [[Publisher](#)]
- [75] S Keshmiri, SAA Mousavi Chashmi, N Abdi, E Mohammadzadeh, et al., International Journal of Early Childhood Special Education, **2022**, 14 (1), 2960-2970 [[Google Scholar](#)], [[Publisher](#)]
- [76] F Mirakhori, M Moafi, M Milanifard, H Tahernia, Journal of Pharmaceutical Negative Results, **2022**, 1889-1907 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]
- [77] H Tahernia, F Esnaasharieh, H Amani, M Milanifard, F Mirakhori, Journal of Pharmaceutical Negative Results, **2022**, 1908-1921 [[Google Scholar](#)], [[Publisher](#)]
- [78] M Rezaei, A Tahavvori, N Doustar, A Jabraeilipour, A Khalaji, A Shariati, et al., Journal of Pharmaceutical Negative Results, **2022**, 11139-11148 [[Google Scholar](#)], [[Publisher](#)]
- [79] A Shariati, A Tahavvori, N Doustar, A Jabraeilipour, A Khalaji, RM Heris, et al., Journal

of Pharmaceutical Negative Results, **2022**, 5204-5211 [[Google Scholar](#)], [[Publisher](#)]

[80] MA Hamed Rahmani Youshanouei, H Valizadeh, A Tahavvori, et al., Neuro Quantology, **2023**, 21 (5), 334-364 [[Google Scholar](#)], [[Publisher](#)]

[81] AM Shiva Hoorzad, Z Naeiji, A Behforouz, A Emzaei, et al., Neuro Quantology, **2023**, 21 (5), 316-324 [[Crossref](#)], [[Google Scholar](#)], [[Publisher](#)]

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