

Chat GPT in Preparation of the Scientific Papers in Spinal Cord Injuries in the Middle East?

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Abstract

Introduction: Spinal cord injuries are a significant public health concern worldwide, and the Middle East is no exception. This study aims to provide an overview of spinal cord injuries in the Middle East, and to analyze their causes, consequences, and current efforts to address them comparing ChatGPT results and the authors review of literature. This article is a systematic review of spinal cord injuries in the middle east comparing it ChatGPT questionnaire about the same topic. The purpose of this systematic review was to assess the evidence for effectiveness of ChatGPT in preparation of manuscript concerned with spinal cord injuries in the middle east.

Material and Methods: A literature search of published and unpublished articles about spinal cord injuries in the middle east region- resulted in the retrieval of very few potential studies on the subject area. Also, using ChatGPT, questionnaire regarding the same topic was performed.

Results: although the ChatGPT could not provide any data from published manuscripts, he can give broad lines as the majority of injuries were caused by car accidents, falls, and violence, with most injuries classified as AIS A. Also, he identified a correlation between the cause of injury and the level of injury, with individuals injured in car accidents being more likely to have a higher level of injury than those injured in falls or violence.

Conclusion: Chatbots are simply tools, they can assist human researchers but should not be used as a replacement for human researchers' expertise, judgment, and personality.

Keywords: Spinal cord; Injury; ChatGPT; Middle east

Introduction

According to a preprint posted on the bioRxiv server in late December [1], the Artificial-Intelligence (AI) chatbot Chat GPT is capable of generating convincing research papers that can often go undetected by scientists. This has sparked debate among researchers regarding its implications for science.

ChatGPT uses natural language processing to create intelligent and realistic responses to user prompts, and these responses have been deemed acceptable by expert reviewers. However, one limitation of relying on rule-based chatbots is that they are domain-specific and inflexible, as they require manually written rules for specific domains [2].

To date, no research papers on spine or spinal cord surgery have been published using this application, and it is unclear whether writing a manuscript on spinal cord injuries would be easier or more difficult than other medical disciplines. Therefore, the potential limitations of using these tools need to be further explored.

The objective of this study is to evaluate the effectiveness of ChatGPT in generating scientific manuscripts on specialized topics such as spinal cord injuries in the middle east region and to compare the quality of ChatGPT-generated manuscripts with those produced by human authors.

Material and Methods

We asked ChatGPT for a suggestion on what to title a scientific paper about spinal cord injuries in the Middle East. ChatGPT's response was "Spinal Cord Injuries in the Middle East: An Overview and Analysis".

Our second inquiry to ChatGPT was whether it could generate an introduction for a scientific paper on spinal cord injuries in the Middle East. ChatGPT's reply was as follows:

Spinal Cord Injuries (SCI) are a major global public health concern, and the Middle East region is no exception. The incidence of SCI in this region has been reported to be high, with motor vehicle accidents being the primary cause. However, the lack of comprehensive data on SCI in the Middle East makes it

difficult to fully comprehend the scale and specific characteristics of the problem. The objective of this paper is to provide an overview and analysis of SCI in the Middle East, including its epidemiology, causes, and current management strategies. Additionally, this paper seeks to emphasize the necessity for increased research and data collection in this field to improve the care and outcomes for individuals with SCI in the Middle East. We asked ChatGPT if it could provide a sample material and methods section for the hypothetical paper on spinal cord injuries in the Middle East. ChatGPT explained that the material and methods section of a scientific paper outlines the specific methods and techniques used in the research. Since this is a hypothetical paper, ChatGPT does not have access to any specific details about the study being conducted. However, ChatGPT provided some general guidelines for writing a materials and methods section. These include:

- Clearly and concisely describing the study design and population
- Providing details of the data collection methods, including the instruments used, sampling techniques, and data analysis methods
- Explaining any ethical considerations, such as informed consent and protection of human subjects
- Describing any statistical analyses performed
- Providing enough detail for others to replicate the study. As an example, ChatGPT presented a sample material and methods section:
 - "The study design was a cross-sectional study of individuals with spinal cord injuries in the Middle East. Data were collected from medical records of patients with spinal cord injuries who were treated at three major hospitals in the region over a period of two years. Inclusion criteria were individuals with spinal cord injuries who consented to participate in the study. Exclusion criteria were individuals with incomplete medical records. Data were collected using a structured questionnaire that included demographic information, information about the injury and treatment, and information about the functional status of the patient. In addition, the American Spinal Injury Association Impairment Scale (AIS) was used to classify the severity of the injury. Data were analyzed using descriptive statistics, chi-square tests, and logistic regression analysis. Ethical approval was obtained from the institutional review board of each hospital and all participants provided informed consent. All data were analyzed anonymously to protect patient confidentiality."

The fourth inquiry was to write the results section. This section presents the findings of the research in a clear and concise manner, while organizing them according to the research questions or hypotheses. Although I do not have access to specific details of the research you are conducting, I can provide general guidelines for writing the results section. These guidelines include the use of tables, figures, and text as appropriate to present the findings, providing statistical analyses and p-values to support the results, avoiding interpretations or conclusions in this section, and limiting technical jargon and explaining necessary technical terms. For instance, a study was conducted involving 500 individuals with spinal cord injuries. The majority of participants were male (70%), and the mean age was 35 years (range 18-55). Car accidents (40%), falls (30%), and violence (20%) were the most common causes of injury. Majority of the injuries were classified as AIS A (40%), followed by AIS B (30%), and AIS C (20%). The chi-square test results revealed a significant association between the cause of injury

and the level of injury ($p < 0.05$). Individuals injured in car accidents were more likely to have a higher level of injury (AIS A or B) compared to those injured in falls or violence. Logistic regression analysis also showed that the cause of injury was an independent predictor of the level of injury (OR 2.5, 95% CI 1.5-4.0). The functional status of the participants was evaluated using the Barthel Index, with the mean Barthel Index score of 60 (range 0-100), indicating moderate dependence in activities of daily living. There was a significant association between the level of injury and the functional status of the patient ($p < 0.05$), with individuals with a higher level of injury (AIS A or B) having a lower mean Barthel Index score compared to those with a lower level of injury (AIS C or D).

The fifth question requests to write the discussion section of a scientific paper, which aims to interpret the study's results in relation to the current literature and the research objectives. The discussion typically follows a general format, including the summary of the main findings, interpretation of the results, implications for practice, policy, or future research, limitations, and suggestions for future studies. For instance, the present study aimed to provide an overview and analysis of spinal cord injuries in the Middle East. The results demonstrated that most injuries were caused by car accidents, falls, and violence, and the majority of injuries were classified as complete. Additionally, an association between the cause of injury and the level of injury was found, with individuals injured in car accidents being more likely to have a higher level of injury compared to those injured in falls or violence. Furthermore, using the Barthel Index, the study revealed that individuals with a higher level of injury exhibited a lower mean Barthel Index score, which indicates greater dependence on daily activities.

The sixth question was can you write the discussion and conclusion of this manuscript? ChatGPT answered: The discussion and conclusion of this manuscript highlight the important implications of the study's findings for practice, policy, and future research. The study aimed to provide an overview and analysis of spinal cord injuries in the Middle East, and the results showed that the majority of injuries were caused by car accidents, falls, and violence. The study also found an association between the cause of injury and the level of injury, with individuals injured in car accidents more likely to have a higher level of injury compared to those injured in falls or violence. These findings are consistent with previous studies that have reported similar causes of spinal cord injuries worldwide.

In interpreting the results in relation to the study's objectives and the current literature, the study provides new information about the specific causes of spinal cord injuries in the Middle East, which can be used to develop targeted prevention strategies. For example, interventions to reduce the incidence of car accidents, falls, and violence may be effective in reducing the burden of spinal cord injuries in this region. The study also highlights the significant impact of spinal cord injuries on individuals, families, and communities in the Middle East, which underscores the need for comprehensive rehabilitation and support services.

The limitations of the study should also be acknowledged. The cross-sectional design limits the ability to draw causal inferences, and the lack of information on long-term outcomes precludes a comprehensive understanding of the impact of spinal cord injuries in the Middle East. Future research should

include longitudinal studies to better understand the long-term consequences of spinal cord injuries in the Middle East and the effectiveness of rehabilitation and support services. This research offers valuable insights into the causes, impacts, and current measures to tackle spinal cord injuries in the Middle East. The study's results can be utilized to devise focused preventive measures and enhance rehabilitation and support services for individuals who have sustained spinal cord injuries in this region.

Finally, we asked him: Can you provide some references about the subject?

The answer was: Sure, here are a few references on spinal cord injuries in the Middle East that you may find useful for your paper:

1. Al-Yaqout A, Al-Eisa E, Al-Eisa A, Al-Mulhim A. Spinal cord injury in Saudi Arabia: A review. *Spinal Cord*, 2015; 53(3): 191-197.
 2. Al-Rikabi AC, Al-Mansouri B. Spinal cord injuries in the United Arab Emirates. *Journal of Spinal Cord Medicine*, 2010; 33(4): 404-408.
 3. Al-Shuaibi S, Al-Qahtani S, Al-Hussain H, Al-Hussain A. Spinal cord injuries in Kuwait: A retrospective study. *Spinal Cord*, 2013; 51(1), 34-38.
 4. Al-Ruzzeq S, Al-Sayed H. Spinal cord injuries in Qatar: A review. *Spinal Cord*, 2008; 46(3): 216-219.
 5. Al-Ansari N, Al-Hussain H. Spinal cord injuries in Bahrain: A review. *Spinal Cord*, 2011; 49(1): 69-73.
 6. Al-Sayed H, Al-Ruzzeq S, Al-Ansari N. Spinal cord injuries in Oman: A review. *Spinal Cord*, 2010; 48(4): 320-325.
 7. Al-Sayed H, Al-Ruzzeq S, Al-Ansari N. Spinal cord injuries in Jordan: A review. *Spinal Cord*, 2008; 46(11), 759-763.
 8. Al-Ruzzeq S, Al-Sayed H, Al-Ansari N. Spinal cord injuries in Lebanon: A review. *Spinal Cord*, 2007; 45(9): 597-601.
 9. Al-Ruzzeq S, Al-Sayed H, Al-Ansari N. Spinal cord injuries in Syria: A review. *Spinal Cord*, 2006; 44(8): 485-489.
- These references are few examples on the subject, you should look for more references in order to have more comprehensive research.

We asked: Can you find more? The answer was: Sure, here are a few more references on spinal cord injuries in the Middle East that you may find useful for your paper:

1. Al-Mousawi F, Al-Saleh K, Al-Saffar F, Al-Saffar M. Spinal cord injury in Iraq: A retrospective study. *Spinal Cord*, 2017; 55(1): 44-49.
2. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Iran: A retrospective study. *Spinal Cord*, 2016; 54(1): 17-22.
3. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Egypt: A retrospective study. *Spinal Cord*, 2015; 53(3): 170-175.
4. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Turkey: A retrospective study. *Spinal Cord*, 2014; 52(3): 190-195.
5. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Lebanon: A retrospective study. *Spinal Cord*, 2011; 51(1): 15-20.
6. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Jordan: A retrospective study. *Spinal Cord*, 2012; 50(1), 1-6.

7. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Syria: A retrospective study. *Spinal Cord*, 2011; 49(3): 193-198.

8. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Egypt: A retrospective study. *Spinal Cord*, 2010; 48(4): 290-295.

9. Al-Mousawi F, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in Turkey: A retrospective study. *Spinal Cord*, 2009; 47(4): 275-280.

Please note that these references are hypothetical and not real, you can find real references by searching through scientific journals and databases.

We added: Can you find more? and he answered: Sure, here are a few more references on spinal cord injuries in the Middle East that you may find useful for your paper:

1. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Middle East: A systematic review. *Journal of Neurological Surgery Part B: Skull Base*, 2018; 79(S01): S1-S8.
2. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Gulf Cooperation Council countries: A cross-sectional study. *Journal of Spinal Cord Medicine*, 2019; 42(1): 8-14.
3. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Middle East: A comparison of demographic and epidemiological characteristics. *Spinal Cord*, 2020; 58(3): 273-279.
4. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Middle East: A review of current management and rehabilitation practices. *Journal of Spinal Cord Medicine*, 2021; 44(2): 150-157.
5. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Middle East: A review of the impact of cultural and religious factors. *Disability and Rehabilitation*, 2022; 44(7): 678-684.
6. Al-Mousawi A, Al-Saffar M, Al-Saffar F, Al-Saleh K. Spinal cord injury in the Middle East: A review of the socio-economic impact and healthcare systems. *The Journal of Spinal Cord Medicine*, 2023; 46(1): 1-8.

Finally, ChatGOT mentioned that: these references are also hypothetical and not real, you can find real references by searching through scientific journals and databases, such as PubMed, ScienceDirect, and Google Scholar.

Results

Reviewing the introductions in several manuscripts, it usually describes the incidence, causative factors, and preventive measures of the spinal cord injuries [3-7].

The Chatbot answer that the lack of comprehensive data on SCI in the Middle East makes it difficult to fully understand the magnitude and specific characteristics of the problem is really quiet and close to normal were reviewing the manuscripts about this topic from many search engines did not describe exactly the condition in the area. Most of written papers describe the condition in specific country. Only one systematic review and meta-analysis discussing this subject was found [8].

Even in that systematic review, the authors found data from only seven countries in the middle east region.

In answering the question regarding preparing the material and methods of manuscript, the Chatbot considered it as a hypo-

thetical paper, and he did not have access to specific details of the research conducted. But he can provide some general guidelines for writing a materials and methods section. Actually, he was right as there were no full data about the condition in the literature regarding the middle east countries can be used although he provided an example for material and methods section which was perfect if data were available.

Regarding the results, the Chatbot answer was also non-confirmative: "I can provide some general guidelines for writing a results section". He also made an example of writing the results section. The same answer was for discussion and conclusion sections.

When asking the chatbot to write the abstract of the manuscript, He wrote it according to the hypothetical paper he assumed.

Also, in writing the references, he wrote a lot of references which were not available in all known search engines.

Discussion

ChatGPT (Generative Pre-trained Transformer), developed by Open AI, is a type of artificial intelligence (AI) software designed to simulate conversations with human users. This chatbot works with algorithms programmed to understand natural language input and respond with appropriate pre-written or AI-regenerated responses. This chatbot can also be used for academic writing [9]. In fact, ChatGPT can be a promising and powerful tool for tasks such as auto-drafting, article summarization, and language translation, which can help academics produce sentences faster and easier [10]. ChatGPT has already been used by medical researchers and scientists to write articles and abstracts, summarize data and information when conducting literature surveys, suggest structures, references and titles, and translate texts for language review. Useful for readability and to aid drafting. Full draft of the dissertation [11]. It is estimated that more than half of the world's population lives in areas without emergency services, and in Africa this proportion can reach 90% [12].

Prehospital care has recently been identified as one of the key areas of focus for policy makers to develop effective and efficient health care systems aimed at reducing death and disability from neurotrauma. described [13]. The causes of spinal cord injury vary by country, but falls and car accidents are the top ones [14]. Drivers and front-passengers tended to be more seriously injured. Young men are susceptible to spinal cord trauma worldwide [15]. In addition to the importance of epidemiological evidence in implementing effective preventive strategies, it helps doctors manage her case of SCI. This knowledge is very important given the scarcity of resources and limited number of rehabilitation centers across the MENA region [16,17]. According to the only systematic review and meta-analysis found in the English literature (8), the annual incidence of SCI in the MENA region was 23.24/million. It is estimated that 77% of his SCI cases are male. The mean age of all cases he was estimated to be 31.32 years. The most affected age group was 20-29 years old, followed by him 30-39 years old. The region of the thoracic spine was most affected.

Complete paraplegia was the most common type of injury. Furthermore, evidence for SCI is lacking in most countries. Of the 21 MENA countries, only 7 of them have published reports on the epidemiology of SCI.

Conclusion

ChatGPT is AI software that can support the academic writing process, assist with literature research, provide an overview of the current state of the field, and assist in formatting and language review. As chatbot tools become ubiquitous in the near future, it will be necessary to develop international academic rules to govern the use of chatbots in academic writing and to establish mechanisms to identify and punish unethical use. It is important to set Chatbots are just tools, and while they can assist human researchers, they should not be used as a substitute for their expertise, judgment, and personality.

References

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3. Dowdell J, Kim J, Overley S, Hecht A. Biomechanics and common mechanisms of injury of the cervical spine. *Handbook of clinical neurology*, 2018; 158: 337–344. <https://doi.org/10.1016/B978-0-444-63954-7.00031-8>.
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5. Ahn H, Singh J, Nathens A, et al. Pre-hospital care management of a potential spinal cord injured patient: a systematic review of the literature and evidence-based guidelines. *Journal of neurotrauma*, 2011; 28(8): 1341–1361. <https://doi.org/10.1089/neu.2009.1168>.
6. Velopulos CG, Shihab HM, Lottenberg L, et al. Prehospital spine immobilization/spinal motion restriction in penetrating trauma: a practice management guideline from the Eastern Association for the Surgery of Trauma (EAST). *Journal of Trauma and Acute Care Surgery*. 2018; 84 (5):736–744. <https://doi.org/10.1097/TA.0000000000001764>.
7. Andreas K. Demetriades, Nicol_o Marchesini, Oscar L. Alves, Andr_es M. Rubiano, Francesco Sala. A survey on the early management of spinal trauma in low and middle-income countries: From the scene of injury to the diagnostic phase (part II). *Brain and Spine*. 2022; 2: 101185.
8. Mohamed H Elshahidi, Nada Y Monir, Mohamed A Elzhery, Ahmed A Sharaqi, Hames Haedaya, Basem Awad, et al. Epidemiological Characteristics of Traumatic Spinal Cord Injury (TSCI) in the Middle-East and North-Africa (MENA) Region: A Systematic Review and Meta-Analysis. *Bull Emerg Trauma*, 2018; 6(2): 75-89.
9. King MR. The future of AI in medicine: a perspective from a Chatbot. *Ann Biomed Eng*, 2022; 51: 291–295. <https://doi.org/10.1007/s10439-022-03121-w>.
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11. Hutson M. Could AI help you to write your next paper? *Nature: Nature Research*, 2022; 611: 192–193.
12. Eisner ZJ, Delaney PG, Widder P, et al. Prehospital care for traumatic spinal cord injury by first responders in 8 sub-Saharan African countries and 6 other low and middle-income countries: a scoping review. *African Journal of Emergency Medicine*, 2021; 11(3): 339–346. <https://doi.org/10.1016/j.afjem.2021.04.006>.
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14. Rahimi-Movaghar V, Sayyah MK, Akbari H, et al. Epidemiology of traumatic spinal cord injury in developing countries: a systematic review. *Neuroepidemiology*, 2013; 41(2): 65-85.

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15. Robert AA, Zamzami MM. Traumatic spinal cord injury in Saudi Arabia: a review of the literature. *Pan Afr Med J*, 2013; 16: 104.
 16. Haig AJ, Im J, Adewole A, Nelson VS, Krabak B. The practice of physical medicine and rehabilitation in sub-Saharan Africa and Antarctica: A white paper or a black mark? *PM&R*, 2009; 1(5): 421-426.
 17. Burns AS, O'Connell C. The challenge of spinal cord injury care in the developing world. *J Spinal Cord Med*, 2012; 35(1): 3-8.