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Pouring cold water on fake news – a qualitative review of misinformation related to burns first aid

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Abstract

Health misinformation is pervasive on the internet and social media, and can have wide-ranging and devastating repercussions. Burn injuries are highly prevalent, especially in resource-poor countries with less rigorous health and safety regulations and reduced access to quality healthcare, and especially among the pediatric population who rely on caregivers to tend to their injuries. Correct first aid is crucial to improving burn outcomes and avoiding further complications. The aim of this study was to qualitatively assess the content of misinformation related to burns online. A literature search was conducted on PubMed using search terms ‘burns’ OR ‘burn injury’ OR ‘burns trauma’ OR ‘major burns’ AND ‘first aid’ AND ‘conspiracy’ OR ‘disinformation’ OR ‘misinformation’ OR ‘fake news’. Combinations of these terms were searched via Google, YouTube, Facebook, Instagram, TikTok and PubMed. Key areas of misinformation included unfounded use of ‘natural’ remedies, injudicious use of antibiotics, omission of key steps of first aid, and errors in specific details of first aid. Clinicians should be aware of misinformation available online related to first aid for burns, be aware that patients presenting with burns may have caused further injury with insufficient first aid or inappropriate home remedies, and lead public health campaigns to educate on the initial emergency management of burns.

Key words

Burns; first aid; misinformation; disinformation; fake news, home remedies.

Introduction

Burn injuries represent a huge biomedical burden. According to the WHO, an estimated 180,000 deaths a year are caused by burns, while non-fatal burn injuries are a leading cause of morbidity (1). Over two-thirds of people will initially search the internet for medical guidance (2) and the use of the internet as a resource for information and education continues to grow. Material posted on social media does not undergo scientific review, and consequently the quality of medical information on the internet is highly variable. Appropriate first aid is essential to the management of burns. The “golden hour” following a burn injury is so important that proper management during this interval can save lives, reduce severity, shorten hospital stays and improve functional and cosmetic outcomes (3). Twenty minutes of cool running water has been proven to be the most effective first aid intervention in improving burn outcomes (4), associated with faster re-epithelialization, decreased odds of full thickness depth and hospital admission, and reduced skin grafting (5). Conversely, incorrect management can have serious and long-term effects. Little is known about the specific content of misinformation regarding burns first aid online. The aim of this project was to conduct a qualitative review of misinformation available online on first aid for burn injuries.

Materials and Methods

A literature search on PubMed was conducted in December 2022 using search terms ‘burns’ OR ‘burn injury’ OR ‘burns trauma’ OR ‘major burns’ AND ‘first aid’ AND ‘conspiracy’ OR ‘disinformation’ OR ‘misinformation’ OR ‘fake news’. This identified 31 abstracts which were assessed for inclusion by author AOL and COC. Eligible papers were first identified by the titles and abstracts and then full text papers were

retrieved. Six papers were deemed appropriate for inclusion based on reference to burns first aid- related misinformation (Table 1). Further searches on Google, Twitter, YouTube, Facebook, Instagram and TikTok using combinations of the above search terms were also carried out in December 2022. The first 20 pages for each search were reviewed. Categories of misinformation points were defined, and based on these, broader themes were established (Fig 1).

Results

Key areas of misinformation identified included unfounded use of natural remedies, injudicious use of antibiotics, omission of key steps of first aid, and errors in specific details of first aid.

Natural remedies

Natural remedies recommended for burn first-aid included butter, egg white, ice, cold tea bags, turmeric, onions, salt, and yellow mustard. While some of these remedies are simply unhelpful, some may cause further injury to the already compromised tissue. In addition, the time wasted in acquisition and application of unhelpful materials on a burn in a time-sensitive emergency also has the potential to cause harm by distracting from the important and effective steps in burns first aid. One study from Turkey found that 51% of patients with burns had treated the burn with inappropriate remedies such as toothpaste, tomato paste, ice, raw egg white and potato (6). A quarter had applied ice directly to the skin at the time of a burn, which can cause intense vasoconstriction in the affected tissue and progression of thermal injury (7), as well as increased burn depth and pain (8). A study from Cork, Ireland, showed that 65% of parents believed that ice was useful in the emergency management of burns

(9). Egg white was frequently touted as an effective step in burn first aid. Raw egg white can contain Salmonella or serve as a culture medium for micro-organisms, thus increasing the risk of infection (10). Besides the harmful local effects these substances can have, there is also potential for a systemic response to the applied material. Anaphylaxis to egg has been reported in an infant following application of raw egg to a burn (11). Another suggested home therapy was oil such as lavender oil, calendula oil, or coconut oil. There is no firm evidence to support the use of oils of any kind in first aid for burns. Several sources incorrectly claimed that onion juice applied immediately to a burn “calms the pain and prevents blistering.” Another method reported to prevent the formation of blisters was application of yellow mustard. Some resources reported that aloe vera and onion juice would prevent infection of the burn site. Toothpaste was also recommended as a method of relieving a burn, although it may in fact be harmful for burns, as it contains abrasives and detergents. Due to the high frequency of toothpaste being applied to burns, Colgate posted an information piece on their website urging people not to use toothpaste on burn injuries (12).

Antibiotic use

Multiple sources incorrectly recommended application of antibiotics in first aid for burns. However, superficial and partial thickness burns do not require antibiotic prophylaxis (13). Overuse of antibiotics contributes to antibiotic resistance (14), and antimicrobial resistance is a major issue facing modern medicine. Topical antibiotic application will probably not directly harm the injured tissue but may contribute to antimicrobial resistance.

Omission of key points of first aid

Many websites and videos provided some accurate information on burns first aid, but the omission of key steps rendered them unreliable. For example, the need to remove jewelry and clothing (if not adherent to the burn) from affected limbs was frequently not cited. Clothing can retain heat and jewelry may restrict blood flow to the area when edema occurs. Furthermore, several sources included the need to dress the wound but did not specify the type of dressing (i.e., a non-adherent film or a mesh gauze). The correct dressing can decrease the risk of infection, promote moist wound healing, and prevent conversion to a deeper burn (4). Many sources correctly stated that the burn must be held under running water. Unfortunately, the optimal water temperature and duration of cooling were not specified in a considerable number of web pages and videos. The Jackson burn wound model highlights the importance of the 'zone of stasis.' The preservation of this area is known to be critical in limiting progression of burn depth (15). Holding the burn under running water for 20 minutes provides the best chance of preserving the zone of stasis. Many sources failed to mention that the water used to cool the burn must be clean, such as potable tap water. Cases of severe necrotizing infection have been reported in patients who used contaminated water on a burn injury (16). This information is critical as 90% of burns occur in developing countries where water supplies may not be sanitary.

Errors in specific details

Several websites proposed an incorrect duration of cooling, some as short as 20 seconds. One webpage recommended to avoid water completely in second degree burns as it would "cause infection to spread." This is not true if clean water is used. Another suggested immersing the burn in water for five minutes. A TikTok user mistakenly suggested immersing the burn in ice water, with a video showing their 14-

month-old baby sitting with their arm in iced water up to the elbow. This is not a recommended method for cooling and increases the risk of hypothermia, especially in young children. Hypothermia has been associated with increased mortality in burns patients (17).

Discussion

The spread of false and misleading health information has increased substantially in recent years. [18] In particular, since the Covid pandemic, there has been an explosion of health-related misinformation and disinformation. [19] Misinformation regarding burns first aid is ubiquitous online. False methods of managing burns have the potential to cause further harm, delay appropriate management, and in severe cases cause a systemic adverse reaction. At best, some of these unsubstantiated home remedies are useless. However, some of these interventions may aggravate the injury, increase the risk of infection, or lead to hypothermia. The unsupported recommendation of routine use of antibiotics is unhelpful and hinders the struggle against antimicrobial resistance. While many online sources provided some correct information, the frequent omission of key steps and errors in the finer details spoiled their reliability. It is important for medical organizations to produce resources with reliable information that can be accessed rapidly in an emergency. Our group has shown that educational interventions such as videos can substantially improve knowledge levels regarding first aid for burns (9). Limitations of this study included the inability to review all vast resources for burns first aid on the internet, so some points of misinformation may have been missed, and that only sources written in English were reviewed.

Conclusion

Clinicians should be aware of online misinformation related to first aid for burns and routinely ask patients if they have applied any substances to the injured area, as patients presenting with burns may have caused further injury with insufficient first aid or inappropriate home remedies which they came across while hurriedly searching the internet immediately after the burn occurred. Healthcare workers involved in burn care should lead public health campaigns to highlight the essential first aid steps when dealing with a burn, and produce easily accessible media so that patients can obtain appropriate advice and instruction in the midst of an emergency. Burns experts who maintain a professional social media presence should also be prepared to combat incorrect information to optimize care. The management of burns is time-sensitive and performing unnecessary steps that delay appropriate care have the potential to cause harm. It is important that sources outlining the steps in burns first aid include the essential components of the cooling process: duration, temperature and time frame.

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Table

Reference	Misinformation Content
Butler DP, Perry F, Shah Z, et al. The quality of video information on burn first aid available on YouTube. *Burns*. 2013;39(5):856-859. doi:10.1016/j.burns.2012.10.017	This study evaluated the clinical accuracy and delivery of information on burns first aid available on YouTube. A score out of 20 was assigned to each video. The average score was 8.5/20, indicating that the quality of educational content available on burns first aid was poor.
Tiller G, Rea S, Silla R, et al. Burns first aid information on the Internet. *Burns*. 2006;32(7):897-901. doi:10.1016/j.burns.2006.02.020	The aim of this study was to evaluate burns first aid information on the internet. 36 of the 47 sources reviewed were deemed to be of very poor quality.
Gurbuz K, Demir M, Das K. A Survey of YouTube Videos as a Source of Useful/Unuseful Information in the Field of the Prevention and Management of Burn Injuries: A Cross-sectional Analysis of the English Language Content. *J Burn Care Res*. 2022;43(4):971-976. doi:10.1093/jbcr/irab231	This study aimed to determine whether YouTube videos were useful as an information resource for burn injury management. 20.8% contained unhelpful/misleading information.
Karaoz B. First-aid home treatment of burns among children and some implications at Milas, Turkey. J Emerg	This descriptive study aimed to measure the proportion of parents who had managed pediatric burns

Nurs. 2010;36(2):111-114. doi:10.1016/j.jen.2009.12.018	inappropriately. Over half (51%, 27/53 participants) were found to have applied inappropriate remedies.
Kattan AE, AlShomer F, Alhujayri AK, et al. Current knowledge of burn injury first aid practices and applied traditional remedies: a nationwide survey. *Burns Trauma*. 2016;4:37. Published 2016 Nov 2. doi:10.1186/s41038-016-0063-7	This internet-based survey assessed the public's knowledge of first aid practices and home remedies applied to burn injuries. Most (77.4%) participants knew of/implemented inappropriate home remedies.
Parizh D, Effendi M, Dale E, et al. Assessing the Quality and Reliability of Patient Information Regarding First-Aid for Acute Burns on YouTube. *J Burn Care Res*. 2021;42(2):228-231. doi:10.1093/jbcr/iraa135	This study reviewed the quality and reliability of patient information regarding first aid for burns on YouTube. It found that some videos recommended directly harmful methods, risking further tissue damage.

Table 1. Studies identified from PubMed literature search relevant to misinformation related to burns first aid.

Figure

Figure 1. Themes from online misinformation related to burns first aid identified by literature and search engine review. Images from (from top): talkchick.com, mirror.co.uk, conkote.com, ffxfirerescue.wordpress.com

BURNS FIRST AID MISINFORMATION

HOME REMEDIES



INAPPROPRIATE ANTIBIOTICS



FIRST AID ERRORS

