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# Pattern of spider bites and the influence of media reports of spider bites on calls received at the Tygerberg Poison Information Centre, South Africa

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## Abstract

Various factors play a role in the medical effects of spiders on humans, like journalism. Therefore this study aimed to determine the influence of media reports on calls received at the Tygerberg Poison Information Centre. A retrospective analysis of the database was conducted from January 2010 – December 2013. Media reports were obtained from a web search and the archives of all major South African newspapers and the media group 'Media24'. Calls pertaining to spider bites were compared 30 days prior to and 30 days after publication of articles covering spider bites. Only 2.6% of the calls received related to spider bites. Most of these calls (72.5%) were received from the general public. Spiders were witnessed in a third of suspected spider bite cases of which only 11.6% were identified. Most patients presented with local swelling (25.7%), pain (18.3%) and redness (17.1%). Antivenom was advised in 5.1% of cases. Only articles in nationally distributed newspapers/magazines caused an increase in call volume. History pertaining spider bite is often unreliable. Necrotic arachnidism is over-diagnosed and is often a convenient diagnosis for unexplained local tissue or dermal problems. Most articles were sensationalised and not verified. Nationwide media reports on spider bites raised the number of calls to the centre. Poison centres should be prepared for such a possible influx in calls. The diagnosis of spider bites should only be made with substantial evidence to help debunk the myth surrounding spider bites.

**Keywords:** media, spider, poison, information

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## 1. Introduction

There is currently more than 45 000 spider species listed on the World Spider Catalogue, but only a few are important for health and medical care.[1,2] Medically important spiders occurring in South Africa can roughly be categorized as either cytotoxic or neurotoxic.[3] Cytotoxic spiders are mainly represented by the sac spider (genus *Cheiracanthium)* and violin or recluse spiders (genus *Loxosceles*); while the genus *Latrodectus* (button/widow spiders) are neurotoxic spiders.[3] In addition, painful bites susceptible to infection can be caused by baboon spiders (family: Theraphosidae) and the wandering or rain spiders (genus *Palystes*).[3]

Humans have feared spiders for centuries and this has led to numerous myths about spiders and their bites.[4] These myths also include the unfairly labelling of spiders as the culprit in various diseases.[5–7] More than 100 years ago, Browning already noted "*that if a person discovers a local inflammation which cannot be accounted for in a satisfactory manner, and will say with the utmost confidence that it is a spider bite*".[8] The epidemiologic analysis of spider bites has been made difficult by several factors including suspected versus definite bites, spiders not identified by qualified arachnologists, and dermal-like lesions that are misdiagnosed as spider bites.[9–11]

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There are various factors beyond medicine and arachnology that play a role in the medical effects of spiders on humans; one of them being journalism.[12] It is widely recognized that exposure to media sources such as newspapers, magazine articles and the world wide web influence people's behaviour and reactions to the point that they believe they might have a certain disease.[13] Media coverage can be useful;[14] however, there is also concern with regards to their inaccurate reporting and the focus on rare events.[15]

The field of toxicology has also not been spared from the influence of media reports. The extensive media coverage of a sensational ethylene glycol murder in the USA is a perfect example. The Georgia Poison Center in Atlanta dealt with only one ethylene glycol case in the 19 months prior to the first media report. Five suicide cases were subsequently identified in the month after the first media reports; while the use of ethylene glycol in suicide cases raised to 10 per month during the time period with the most media coverage.[16]

Hawton *et al* investigated the influence of paracetamol (acetaminophen) overdose after a television episode of *Casualty*. They compared the overdose incidents in the three weeks prior to the viewing of the specific episode to the three weeks thereafter. Increases of 17% and 9% were observed in the first and second weeks after the broadcast of the episode. A questionnaire completed by patients indicated that the specific episode did influence their decision to commit suicide; it also influenced their choice of substance used (the number of patients who were *Casualty* viewers and self-poisoned actually doubled).[17]

Poison information centres should be aware of the influence of the media and the internet on the general public and of how this information could influence their reactions. Access to the internet often leads to self-diagnosis where any bite is considered a spider bite, even if the spider hasn't been seen. This study describes the pattern of spider bites and the influence of media reports of spider bites on calls received at the Tygerberg Poison Information Centre, South Africa.

# 2. Methods

## 2.1 Study design

A retrospective analysis of the Tygerberg Poison Information Centre database was conducted. This study was approved by the Health Research Ethics Committee of the Stellenbosch University (Ref: S13/04/088).

## 2.2 Study setting

The Tygerberg Poison Information Centre (TPIC) is situated in the Division of Clinical Pharmacology, Faculty of Medicine and Health Sciences on the Tygerberg Campus of Stellenbosch University. The TPIC provides a 24 hour consultant based nationwide service to both healthcare professionals and the general public. The TPIC receives about 6000 calls a year of which almost 80% are from three provinces (Gauteng, Kwazulu Natal and the Western Cape), hosting 55% of the South African population.[18] All the calls received by the TPIC are routinely recorded and logged onto an electronic database (INTOX Data Management System).[19]

## 2.3 Study population

All the data in the TPIC database was analysed for the period 1 January 2010 till 31 December 2013. All cases related to spider bites during this period were extracted for further analyses.

## 2.4 Data collection and management

Media reports for the period 1 January 2010 till 31 December 2013 were obtained via a web search on Google using "spider", "spider bites" and "South Africa" as search terms. Archives of Media 24 publications (a leading publishing house, http://www.media24.com/) and other major newspapers were also searched. Articles were only included if a spider bite to a patient had been reported in the article.

An article was regarded as national if it was published simultaneously in a newspaper in 2 or more provinces of South Africa or in a magazine or newspaper that is distributed nationwide. Articles published on the same day but in different newspapers or magazines were analysed as one publication if it related to the same incident.

Variables extracted from the TPIC consultation forms included: date, caller and patient demographics (age, sex, geographical location), location of the bite on the body, local and systemic effects, whether a spider was seen and/or identified, and the advice given to the caller. Spider bite calls included actual and suspected bites in humans and animals as well as general requests for information on spiders. Identification of spiders was accepted if it was done by experts in the field using the description of the spider, patients' symptoms, or a submitted photo. Data was entered onto a Microsoft Excel spreadsheet on a password protected work computer.

## 3. Statistical analysis

Summary statistics were used to describe all variables. All calls pertaining to spider bites in humans were compared between 30 days before and 30 days after the publication date. STATISTICA® version 12 (StatSoft Inc.; www.statsoft.com.) was used to analyse the data. Student's t-test was used to compare continuous variables in two independent groups with a normal distribution and the Mann Whitney U test (Wilcoxon rank sum test) for non-parametric distributions. A 5% level of confidence was used to determine whether differences were significant or not.

## 4. Results

The TPIC received 25 510 calls during the 4-year study period of which 661 calls (2.6%) related to spider bites (annual mean = 165.3; 2010 n=137 (20.7%); 2011 n=140 (21.2%); 2012 n=211 (31.9%), 2013 n=173 (26.2%).

Most calls were received from the general public (n=479, 72.5%); followed by government hospitals (n=82, 12.4%); private healthcare facilities (n=56, 8.5%); general practitioners (n=43, 6.5%); and one (0.2%) from a veterinary facility. More than 50% of the calls originated in the Western Cape (Table 1).

The majority of spider bites occurred during the warmer months of the year: 160 (24.4%) during spring (September – October); 191 (28.9%) during summer (December – February); 203 (30.7%) during autumn (March – May); and 106 (16%) during winter (June – August).

Six hundred and forty four calls (97.4%) were related to humans, 14 (2.1%) were general requests and 3 (0.5%) pertained to animals. Most bites occurred on the extremities (Table 2).

A spider was witnessed in 225 cases (34.9%) and could be identified in only 77 cases (11.6%). Most of the spiders identified (n=41, 53.2%) belong to the Latrodectus group (button spiders). The other identified spiders included rain spiders (n=9, 13.4%), baboon spiders (n=8, 11.9%), violin spiders (n=5, 7.5%), and sac spiders (n=3, 4.5%).

Local swelling was the most frequently reported complaint (n=170, 25.7%), followed by pain (n=121, 18.3%) and redness (n=113, 17.1%). At the time of the call 152 patients (23%) were already taking antibiotics, while

**Table 1.** Geographical distribution of calls related to spider bites with the corresponding number of articles published from 1 January 2010 to 31 December 2013.

| Provinces | Number of Calls | % | Number of articles | % |
|---|---|---|---|---|
| Western Cape | 380 | 57.5% | 18 | 51.4% |
| Gauteng | 123 | 18.6% | 7 | 20% |
| Free State | 14 | 2.1% | 8 | 22.9% |
| Other | 144 | 21.8% | 2 | 5.7% |
| **Total** | **661** | **100%** | **35** | **100%** |

**Table 2.** Gender and age distribution of calls with the location of the suspected bite on the body from 1 January 2010 to 31 December 2013

| Gender | n | % | Location | n | % |
|---|---|---|---|---|---|
| Female | 352 | 54.66% | Leg | 101 | 15.70% |
| Male | 287 | 44.57% | Hand | 62 | 9.60% |
| Not documented | 5 | 0.78% | Trunk | 53 | 9.20% |
| **Total** | **644** | **100%** | Arm | 59 | 8.20% |
| **Age** | | | Foot | 43 | 6.70% |
| Adult (≥20 yrs) | 516 | 80.10% | Head | 31 | 4.80% |
| Adolescent (15-19yrs) | 43 | 6.70% | Neck | 24 | 3.70% |
| Child (5-14yrs) | 31 | 4.80% | Not documented | 271 | 42.10% |
| Toddler (1-4yrs) | 38 | 5.90% | **Total** | **644** | **100%** |
| Infant (<1yrs) | 4 | 0.60% | | | |
| Not documented | 12 | 1.90% | | | |
| **Total** | **644** | **100%** | | | |

371 (57.6%) were advised to consult a general practitioner to assess the need for antibiotics. The use of antivenom was advised in 34 cases (5.1%) of neurotoxic spider bites.

Thirty five media reports were published on 25 different days. More than half of the articles (n=20, 57.1%) were published during 2012 (2010 n=5, 14.3%; 2011 n=5, 14.3%; 2013 n=5, 14.3%). In only 3 articles an expert was contacted or referred to in the media reports. The number of calls received in the 30 days following the publication date (n=397, median=16 calls per article, range 5 to 46) was not significantly more than the number of calls received in the 30 days prior to the publication date (n=336, median=14 calls per article, range 4 to 22) (p=0.216).

There were seven nationally distributed publications. A statistically significant difference was found between the number of calls during the 30 days prior to the publication date (n=88, median=13 calls per article, range 8 to 21) and the number of calls received in the 30 days after the publication date (n=162, median=22 calls per article, range 13 to 46) (p=0.03). The median difference between the periods before and after a nationally distributed publication was 9 calls.

## 5. Discussion

Spider bites were not commonly reported. A small percentage (2.6%) of the total number of calls received over the four year study period related to spider bites. This is similar to international trends where less than 2% of calls to poison information centres involved spider bites.[20,21]

Spiders were witnessed in a third of suspected spider bite cases, but the spider could be identified in only 11.6% of cases. This trend also occurs internationally, where most suspected spider bite cases (>70%) are attributed to unknown spiders.[22,23] The low witnessing rate could indicate that spiders have been unfairly labelled as the culprit in many diseases.

Local swelling, pain and redness were reported by most patients; correlating with previously published data.[3,24]Although these symptoms form part of the clinical syndrome related to bites of cytotoxic spiders (necrotic arachnidism), it is non-specific and occurs in many other illnesses. [24,25] Violin spiders (*Loxosceles*) and sac spiders (*Cheiracanthium*) are the only two medically important cytotoxic spiders in South Africa and it seems that they have been unfairly blamed for many cutaneous findings as the only available evidence is usually an oral report by the patient. Of note is that the history is often unreliable, and that a spider in the vicinity does not equal a spider bite.[26] Furthermore, physicians should be very wary to attribute a skin lesion to presumptive necrotic arachnidism in an area in which the spiders are not endemic.[25] Necrotic arachnidism is completely over-diagnosed and if there is no history of a witnessed bite, the investigations and diagnosis must focus on other important causes of dermal necrotic ulcers.[26]

Buttons spiders (*Latrodectus species*) are the only medically important neurotoxic spiders in South Africa. The symptoms that were most often encountered in confirmed black button spider bites included pain, sweating, severe muscle pain, anxiousness and weakness; whereas symptoms in brown button spider bites were much milder and found to be mostly paraesthesia. These symptoms contribute to the clinical syndrome known as latrodectism and were similar to the symptoms described in the literature.[2,3,9]

There is currently only one spider antivenom available in South Africa and it is only effective for the neurotoxic envenomation of the genus Latrodectus (black and brown button spiders). The advice to give antivenom was therefore limited to only 5% of calls on suspected spider bite cases. This low figure of antivenom administration is comparable to previously published reports.[27,28]

Calls relating to spider bites only increased significantly after articles were published in newspapers or magazines that have a national distribution. Most of these articles were sensationalised with facts that were not verified. Inaccurate media reports resulted in misinformation been given to the public and this raises concerns as to the quality of information available to the public. Examples of misinformation published included the following statements: "the analysis of puss specific for spider bite" (there is no such laboratory tests available in South Africa), "doctors identifying the wound as that of a spider" (there is no published information available linking a specific wound to a specific spider bite), "poison of the spider moved through the body and attacked the internal organs" (spider venoms are proteins which are metabolized at the bite site)[3] and "spider bite is the cause of amputation of the limb" (no identification of the spider was stated). In all of the articles it was reported that a spider was seldom seen. It was mostly assumed that the bite was due to that of a spider. Symptoms described in the articles were mostly non-descriptive for

example "pain", "abscess forming" and "puss coming out of the wound". Other symptoms described were "loss of vision", "hallucinations" and "affected speech" which are not symptoms normally associated with spider bites.[2,24,29] A large percentage of the public use the media as an important source of information and half-truths or attention focussed on rare fatal cases will only help to fuel the mythology surrounding spider bites. The public believe what they read in media articles to such an extent that they believe that all skin lesions are spider bites even if no bite was witnessed.

We acknowledge possible limitations that could have influenced the results of our study. Data from poison information centres only relates to voluntary spontaneous reporting and no attempt was made to collect data from nearby healthcare practitioners, healthcare facilities or other poison information centres regarding the incidence of suspected spider bite cases. Furthermore, only a few selected publications were searched and could have led to an underestimation of the effect of media reports on presentations of possible spider bites. The data is also dependant on the quality of information received from the caller and various components of the calls could easily have been misinterpreted.

Nationwide media reports on spider bites did raise calls to the TPIC with regards to spider bites. Poison centres should ideally be forewarned in order to adapt available resources. Widespread myths on spider bites have led to the belief that spiders are to blame for much of the human suffering. Poison Centres should become involved in educating the general public to the fact that very few spiders are poisonous. The medical communities can help debunking the myth by limiting the diagnosis of spider bites without substantial evidence.

## 6. Conflict of Interest

None Declared

## 7. References


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