

## 4th International Conference on Forensic Sciences, Forensic Medicine and Criminology 2023 (INFOMECEC 4.0)

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Received: 24 August 2023; Revised: 17 March 2024; Accepted: 2 April 2024; Published: 3 April 2024  
DOI <https://doi.org/10.28916/lsm.8.1.2024.135>

### ABSTRACT

The INFOMECEC 2023 organized by the Management and Science University (MSU) is proud to celebrate the 4th anniversary of the International Conference on Forensic Science, Forensic Medicine, and Criminology. This is a premier gathering of experts from around the world who will be sharing their knowledge and expertise, exchange ideas, and discuss the latest advancements and techniques in the field. The conference features a diverse range of topics related to forensic science, forensic medicine, and criminology, including forensic pathology, forensic toxicology, forensic DNA analysis, crime scene investigation, forensic psychology, and criminal profiling, among others. Participants will have the opportunity to attend keynote presentations, poster sessions, and network with colleagues and peers from academia, government, and industry. The conference is an excellent platform for researchers, practitioners, and students to present their research findings and gain valuable feedback from experts in the field. Overall, the International Conference on Forensic Science, Forensic Medicine, and Criminology is an essential event for anyone involved in the fields of forensic science, forensic medicine, and criminology, providing an opportunity to stay up-to-date with the latest trends and developments, and contribute to the advancement of the field.

**Keywords:** *Crime prevention; digital forensics; victimology; investigative techniques and international conference*

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## ABSTRACTS

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# Stature determination from hands and feet anthropometry for identification in the general population of Khyber Pakhtunkhwa, Pakistan.

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## Abstract

The aim of this study was to develop regression models for estimating stature based on the correlation between height and hand/foot dimensions in the general population of Khyber Pakhtunkhwa, Pakistan. A total of 164 participants (82 males and 82 females) between the ages of 21 and 60 from Peshawar Medical College were included in the study. Healthy individuals without any hand or foot deformities were selected, after obtaining their informed consent prior to participation. Length and breadth measurements of hands and feet and height were recorded using a Vernier caliper and measuring tape respectively. The collected data were analyzed using the Statistical Package for Social Sciences (SPSS). Regression equations were developed, and Karl Pearson's correlation coefficient was calculated for different hand and foot dimensions. Multiplication factors were determined based on the mean values of hand and foot dimensions. Statistical significance was assessed using Student's t-test, with a significance level set at  $p < 0.05$ . In Pakistan, it's the first-ever study performed to devise regression models for stature estimation. The results showed that all measurements were significantly higher in males compared to females. Consequently, regression formulae were established to estimate stature using hands and feet anthropometry in the KPK population of Pakistan. In both the sexes, correlation coefficients for length measurements were higher than that of breadth measurements. In males, the highest correlation was observed to be exhibited by right hand length while in females, the highest correlation was observed by left foot length.

**Keywords:** Anthropometry; forensic; Pakistan; gender and stature

# Bibliometric analysis of zinc status in public health to provide insight into new research trends

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## Abstract

The connection between zinc, public health, and forensic chemistry lies in understanding the relationship between zinc and human health. Researchers and public health professionals can work to develop strategies for providing valuable evidence in criminal investigations by studying the benefits and toxicity of this trace element in public health. Thus, examining the research frameworks and trends in academic publications about the role of zinc in public health, the current study seeks to give a research road map for future research. The improved bibliographical outputs acquired from the Web of Science (WoS) database only contain journal articles published between 1978 and 2022. Results based on WoS criteria, such as disciplinary heterogeneity, publications over time, times cited, and citation reports, are included in the first part. After that, VoSViewer software is used for bibliometric analysis in the second segment, which includes a complete study of co-authorship among researchers, organisations, and nations as well as a count of all bibliographic databases among papers. The research has 7158 authors who have contributed to 1730 articles, including 339 with publications that have appeared more than three times. The last part addresses the research's faults and merits in terms of zinc status, public health, and prospective future paths. Based on the analysis, "Keen, C.L." is the researcher most in demand, with more papers and knowledge on zinc status in public health. Since the USA has the largest percentage of publications with the most citations and collaborates with the rest of the world, with the University of California, Davis as the top institution, the USA has been the centre of research on the status of zinc in public health. To raise zinc status and safeguard public health, potential research may be cooperatively planned based on trending subjects using co-occurrence network mapping and bibliographic couplings.

**Keywords:** Zinc; public health; bibliometric; Web of Science and USA

# Clandestine burial crime scene investigation with real case study

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## Abstract

Forensic science starts from the crime scene. The forensic crime scene investigator must solve the mystery based on the physical evidence left by the perpetrator at the scene. Currently, criminals are so intelligent as to avoid leaving the evidence at the scenes. The dead body of a victim is important evidence in homicide cases and the homicide victim is concealed in settings such as wells, pits, sinkholes or other confined subterranean spaces. From my crime scene experience, clandestine burial is the first choice of many murderers to conceal the victim's body. Locating homicide victims' clandestine graves is one of the most important and difficult challenges for investigators. A witness statement is an important source to obtain information to locate the suspected burial site. But in concealment incidences, mostly the victims are buried superficially since the perpetrators try to leave the place as quickly as possible. A clandestine grave is defined as an unrecorded burial, often in a remote location and normally dug below 1 m depth below ground level. Instances wherein the victim is found buried either naked or with the dress or wrapped. Once the burial scene has been identified as having forensically significant evidence, it should be documented. I am herewith sharing my crime scene experience on "the burial scene investigation" as investigated in India to understand the "crime concealment act" and the identification of the primary crime scene. A primary crime scene is the place of the crime committed while the burial place is the secondary crime scene. As an expert witness, I have presented my testimony in various courts of law and the Honourable Judge accepted the forensic way of investigation and sentenced the offenders.

**Keywords:** *Crime scene investigation; crime concealment; secondary crime scene; burial investigation and case study*

# Geometric morphometric and volumetric analysis of frontal sinus for biological profiling amongst Malaysians: A radiograph and CT scan study

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## Abstract

Biological profiling is necessary for skeletonised remains. In cases of fragmented skeletons, the resiliency of frontal sinus (FS) suggests its potential for establishing biological identity. The traditionally used linear measurement is less reliable, whereas two-dimensional (2D) geometric morphometric (GM) is efficient in characterising shape. As the non-homologous FS pattern limits the utilisation of GM on 3D FS model, volumetric analysis allows comprehensive structural evaluation of 3D FS model. Therefore, we aimed to evaluate the 2D-GM and volumetric measurement on FS in relation to sex, race, and age group among Malaysians. A total of 453 lateral skull radiographs and 393 head computed tomography (CT) scans comprising males and females of Malay, Chinese and Indian aged  $\geq 20$  years old were retrieved. For 2D-GM, eight 2D landmarks were applied to the skull radiographs, outlining the FS using TPSDig2. The 2D-GM was performed using MorphoJ. For volumetric analysis, 3D FS models were reconstructed from CT scans using 3DSlicer and volume was computed. GM showed significant FS morphological differences among sexes and races ( $p < 0.05$ ), with 80.6% sex and 57.4% race classification accuracy. No significant result was found between age groups ( $p > 0.05$ ), with 53.5% classification rate. Meanwhile, the volume differences showed statistical significance among sexes and age groups ( $p < 0.05$ ), specifically between young versus old adults. Race demonstrated no significant volume difference ( $p > 0.05$ ). The 2D-GM on lateral skull radiographs showed FS as a valuable tool for sex identification, and volume of 3D FS may be useful for sex and age estimation among Malaysians. To our best knowledge, this is the first such study looking at the FS for profiling among the Malaysian population.

**Keywords:** Forensic anthropology; frontal sinus; geometric morphometric; Malaysian population and volumetric analysis

# Characterization of the frontal sinus pneumatization pattern among Malaysian adults by multidetector computed tomography (MDCT)

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## Abstract

Frontal sinus measurements have been studied among different groups of populations a tool for gender, racial and personal identification. The aim of the present research is to study the frontal sinus pneumatization and measurements among the Malaysian population. This study included 60 multidetector computed tomography (MDCT) scans of bilateral frontal sinus images for Malaysian individuals above age of 25 years old and have no pathological condition related to the frontal sinus or prior surgery. The studied measurements include the width and depth of the frontal sinus. About 26.66% of the studied sample have variations in frontal sinus development (15% of the studied sample have non pneumatization of the frontal sinus in both sides, 10% has right-side non-pneumatization, and 1.66% has left-side non-pneumatization. Among those who are having both side pneumatization of the frontal sinus, there is a significant gender variation in the measurements of frontal depth (FD) (P 0.042), right width (RW) (P 0.033) and left width (LW) (P 0.033). Meanwhile there is no significant racial variations in the measurements of FD (P 0.819), RW (P 0.718) and LW (P 0.270). FD among those with both sides pneumatization  $10.54 \pm 3.39$  mm and  $8.32 \pm 2.23$  mm among those with Right side non pneumatization. Among those with non-pneumatization of the right frontal sinus, the FD is  $8.32 \pm 2.23$  mm and the LW is  $30.78 \pm 6.50$  mm.

**Conclusion:** about 26.66 of the Malaysian population have variations in the pneumatization of the frontal sinus. Non-pneumatization of the frontal sinus is commoner in the right side. Although the results of the study show significant gender but not racial variations in the frontal sinus measurements among Malaysian populations, yet a bigger sample study with equal number of participants from each ethnic group is recommended.

**Keywords:** Malaysia, frontal sinus; pneumatization and MDCT

# Optimizing crime scene management: Enhancing evidence collection and preservation for effective criminal investigations

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## Abstract

Crime scene management is a critical component of criminal investigations, playing a crucial role in collecting and preserving evidence. This paper presents the findings of a comprehensive research study conducted through interviews and surveys, aiming to enhance our understanding of crime scene management practices and identify areas for improvement. The study involved interviews with experienced crime scene investigators and surveys distributed to law enforcement agencies across multiple jurisdictions. The results revealed several key insights, highlighting the need for effective crime scene management to ensure the integrity and reliability of evidence. The interviews shed light on the challenges faced by investigators, such as limited training opportunities and resource constraints, which can impact evidence collection and preservation. The survey responses provided valuable perspectives on the current state of crime scene management, emphasizing the importance of standardized protocols, enhanced coordination among stakeholders, and the integration of advanced technologies. These findings underscore the urgent need for proactive measures to optimize crime scene management practices, ensuring the accurate and efficient processing of evidence for effective criminal investigations. By incorporating these research insights, policymakers and law enforcement agencies can implement evidence-based strategies to strengthen crime scene management protocols and enhance the overall quality of investigations.

**Keywords:** *Crime scene management; evidence collection; preservation; optimizing and criminal investigations*



# The presence of non-human DNA in human samples and its influence in tampering forensic human identification

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## Abstract

Non-human samples mixture with human biological remains retrieved from crime scenes could produce false-positive results in DNA fingerprinting of human forensic identification. Thus, this study aims to determine the amplification possibility of non-human samples such as bacteria, mammals and insects with human mitochondrial DNA (mtDNA) primers. Nonhuman samples were obtained from relevant authorities upon request. The designed human mtDNA primers at twelve (12) regions were tested with *Escherichia coli* (*E.coli*), *Staphylococcus aureus* (*S.aureus*), *Canis lupus familiaris* (dog), *Felis catus* (cat), *Macaca fascicularis*, *Spiniphora genitalis* (larva) and Formicidae (ant). 9947A female human mtDNA were used as positive control. The presence of amplification was confirmed by directly visualizing the DNA band under UV transilluminator after gel electrophoresis. Non-specific amplification of *E. coli*, *S. aureus*, dog and cat samples were seen at five (5) mtDNA regions of 11488 to 11790, 14948 to 15206, 903 to 1227, 8507 to 8947 and 16062 to 16355. However, the human mtDNA primers did not form non-specific amplification towards *Macaca fascicularis*, larva and ant. The presence of non-specific amplification couldn't be specifically rule out by specificity of designed primers, contamination or sequence similarity with human mtDNA. Nevertheless, the annealing temperature was modified with differences by  $\pm 0.1^{\circ}\text{C}$  to  $\pm 0.2^{\circ}\text{C}$  that removed non-specific binding in non-human samples. Thus, slight modification in annealing temperature had increased the non-specificity of human mtDNA primers towards non-human samples without the need for sophisticated reoptimization.

**Keywords:** Mitochondrial DNA; forensic human identification; bacteria; mammals and insects

# Methods and complexities in human age estimation within the forensic context

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## Abstract

Age estimation, particularly in cases when there are no suspects or matched DNA profiles in the national DNA databases, can significantly aid police investigations by reducing the number of likely suspects. In situations involving legal challenges, such as immigration, child pornography, the legal status of those accused of criminal responsibility, and the age progression of missing persons, determining the age of the living would be essential. Comparatively, when identifying unidentified deceased individuals or decomposing human remains, determining the age generates a biological profile to facilitate identification. This review covers the widely adopted techniques used all over the world for forensic age estimation as well as the complexities involved in determining a person's age, whether they are alive or dead. The commonly used techniques for age estimation include radiographic examination of the teeth development and teeth eruption, morphological biometric data analysis, skeletal development and degeneration examination and DNA methylation analysis. According to the studies reviewed, all the approaches are regarded as acceptable, but their levels of accuracy vary. Research revealed that the discussed complexities which includes not applying population-specific standards, lack of professional training and expertise of assessors, cognitive and confirmation bias and ethical implications were widespread. The synthesis of upcoming research will aid forensic scientists in navigating its complexity and limitations to provide more accurate age estimations techniques.

**Keywords:** *Age prediction; forensic techniques; identification; profiling and review*

# Analysis of paracetamol in medicinal illegal product using fourier transform infrared (FTIR) spectroscopy and gas chromatography mass spectrometry (GC-MS)

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## Abstract

Counterfeit medicines are medications that are intentionally and unlawfully mislabelled with regard to their authenticity and production. This also includes medications that do not contain active ingredients, the wrong dosage of active ingredients, a false active ingredient, an increase in the quantity of a toxin, and counterfeit packaging. Unfortunately, there has always been counterfeit medicine on the market, produced by an irresponsible manufacturer who profits from minimal manufacturing costs. Multiple health risks, including unanticipated reactions, associated complications, and mortality, can result from ingesting counterfeit medicines containing toxic or substituted ingredients. Given their similarities in appearance and packaging, it can be difficult to distinguish between authentic and counterfeit medicines based on their outward appearance. Moreover, this cannot reveal the drug's constituents. This study sought to compare whether ATR-FTIR can replace more complex instruments such as GCMS or HPLC for the positive identification of acetaminophen in authentic and counterfeit paracetamol-brand medications. This was accomplished by analysing the same sample with both instruments and identifying areas of agreement and disagreement. Both instruments analysed five paracetamol samples, consisting of one authentic sample and four disputed samples. Two of the four suspected samples (S3 and S5) were found to be devoid of paracetamol, while the remaining two samples contained a reduced amount. Using the ATR-FTIR technique, the paracetamol samples (S2 and S4) containing a reduced amount of acetaminophen exhibited the same pattern and transmission peaks that correspond to the functional groups of acetaminophen and other excipients, but with diminished intensities. Using the ATR-FTIR method, counterfeit paracetamol can be identified based on data comparisons. Reduced or incorrect dosages of counterfeit paracetamol can result in positive identification; therefore, comparison with an authentic sample is essential. ATR-FTIR proved to be a less expensive, quicker, and more practical method of analysis.

**Keywords:** Counterfeit medicines; acetaminophen and ATR-FTIR

# Applications of onychology in forensic cases and profiling investigation

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## Abstract

Forensic onychology is the study of fingernails and toenails with the potential to yield important information for criminal investigations. Fingernails play a significant part in forensic and criminal investigations as tangible evidence. This is because of their special potential to deposit biological material, poisons, and medicines. In forensic toxicology, fingernail clippings are used in testing for anabolic steroid levels in athletes facing doping allegations such as the presence of cannabinoids, methadone, amphetamine-type stimulants, and cocaine. Forensic onychology also plays a role in victim or suspect identification. For instance, broken fingernail plates have frequently been utilised in identification by comparing nail ridge patterns. The need of group classification in investigations is that investigators can utilise information like a suspect's sex or race description to narrow their search to people who fit that description. An unidentified decedent's recent life history can be reconstructed using chronological information obtained from the fact that nails grow more or less constantly and at known rates. This reconstructed record can help with victim identification and also has uses in investigations of terrorism and human trafficking. In multiple fatality occurrences, it can also quicken the processes and procedures of disaster victim identification (DVI).

**Keywords:** *Criminal investigation; fingernails; forensic onychology; profiling and toxicology*

# Analysis of firecrackers in pre-blast and post-blast using fourier transform infrared (FTIR) spectroscopy and scanning electron microscopy-energy dispersive spectroscopy (SEM-EDS)

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## Abstract

Firecrackers are small explosive devices typically used for amusement during festivities. Firecrackers are intended to produce a loud commotion and a flash of light, but are not intended to cause severe damage. Due to their accessibility and low cost, firecrackers are frequently utilised as Improvised Explosive Devices (IED) components. The explosive power of the firecracker can be amplified when used in an IED, resulting in an explosion that is much more powerful. This may result in severe injuries, death, and extensive property damage. The incorporation of firecrackers into IEDs is not a new phenomenon. Numerous terrorist attacks and acts of violence throughout the globe have involved the use of firecrackers. This study aims to identify the potential components of pre- and post-blast firecrackers in five different types of fireworks available in the market (S1-S5). Two non-destructive instruments, ATR-FTIR and SEM-EDS, were utilised for this purpose. Since fireworks components typically consist of metals, the SEM-EDS technique is superior to ATR-FTIR. However, due to the simplicity and low cost of the ATR-FTIR technique, it may be advantageous to investigate its use as a guide for post-blast analysis. Results from ATR-FTIR indicate a modest difference between pre- and post-blast for all samples, except for samples S3 and S4, where the changes are substantial. Due to the nature of the samples, only post-blast samples were subjected to SEM-EDS. Nonetheless, the results of this analysis were reassuring. Based on EDS data, the oxygen donor and fuel for each type of firecrackers were identified. Additional ingredients such as binder, colouring agent and whistling effect agent were also identified. Although these are post-blast samples, these crucial details can still be identified and lead investigators to the correct type of firecrackers. The combination of ATR-FTIR and SEM-EDS is advantageous because FTIR alone can lead to incorrect conclusions.

**Keywords:** Firecrackers in IED; post-blast investigation; SEM-EDS and ATR-FTIR

# **An effective method using Chi-square technique to improve the ownership identification in EISB watermarking scheme**

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## **Abstract**

Robust watermarking is a challenging area specially in the face of watermarking attacks. In fact, most of robust schemes can withstand under some kinds of attacks. Meanwhile, there are some semi-robust techniques such as EISB (Enhanced Intermediate Significant Bit) that are not robust enough, but they employ a statistical approach for ownership identification so that the statistical information of the extracted watermark can be used for ownership identification. In this paper, we proposed a statistical method for ownership identification using Chi-square distance technique. We conducted an experiment using different arbitrary image watermarks and the standard image, Lena. The results of the experiment revealed that even when the attacked watermarks could not be used for authentication, the EISB approach by utilizing the proposed method can successfully authenticate the attacked watermarked image. In conclusion, the proposed method was able to identify the attacked watermarked image even after a severe attack.

**Keywords:** *Information technology; cyber security; watermarking; robustness and Chi-square*

# Exploring the impact of search engines on addressing challenges in digital forensics evidence review

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## Abstract

Digital forensic science branches apply various scientific techniques and principles to determine scientifically proven facts, achieving their goal. The constant advancement of digital technology poses a greater challenge when retrieving data from devices or performing digital inquiries. The reason is that as new technologies emerge, older devices and systems can quickly become obsolete and no longer receive support. New technology like Swift is causing a crisis in digital forensics. The progress made in the last decade is becoming outdated. These are happening in many other areas too. Moreover, this generates an increase in the development of tools and procedures that facilitate investigations and analysis. Most articles that have been published tend to emphasize only the superficial aspects of Digital Forensics, failing to explore its depths. Although each paper allows practitioners to introduce new developments and advancements in Digital Forensics, the technical aspects of the field are not sufficiently covered. Although topics and methods are abundance, many papers in evidence acquisition focus on data management techniques. One notable challenge is the difficulty in retrieving data from the cloud. The study carefully analyzes previous research and highlights the many challenges digital forensics has faced in its history. To bridge this divide, a qualitative research analysis was conducted in Digital Forensics, which uncovered the primary technical challenges of classification. Our findings serve as typical examples to simplify these investigations. However, to add more value to future studies, it is essential to include more detailed information.

**Keywords:** *Forensic sciences; digital forensics; classification; digital forensic challenges and internet of things*

# Nicotine: The harmful tobacco substance

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## **Abstract**

Nicotine originates from the tobacco plants called the *Nicotiana* species, which are part of the nightshade plant family. People smoke cigarettes that contain nicotine to give them the psychoactive properties. This review discusses the advantages and disadvantages associated with nicotine consumption. Nicotine has been demonstrated to improve well-being, elicit arousal or relaxation, promote a state of alertness, and reduce anxiety. It is a highly addictive and toxic substance that stimulates dopamine release in the same area of the brain. It might cause a rise in blood pressure, an increase in heart rate, and artery-narrowing vessels. In addition, nicotine may lead to artery wall hardening, that leads to myocardial infarction. Further, the reward pathway in the brain function to provide good feeling can be affected by nicotine. Nicotinic receptors on neurons are activated when nicotine attaches to their receptors during inhalation of that single cigarette, and this awakens the brain's reward system. Dopamine is released as the reward pathway is engaged, making one feel cosy and content. However, nicotine in particular may be harmful when the reward pathway is repeatedly stimulated excessively.

**Keywords:** *Addiction; dopamine; drugs; smoking and stimulant*



# Effect of soaking time on cyanide concentration in cassava (*Manihot esculanta*, Crantz) leaves and their soaking water

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## Abstract

Cassava (*Manihot esculenta*, Crantz) contains cyanogenic glycosides, that can release cyanide when the leaves are processed. This study investigated the effect of soaking on the cyanide concentration of cassava leaves and their soaking water. The detection of cyanide concentration in the leaf is important for preventing acute and subacute cyanide poisoning from consuming cassava leaves that have not been processed correctly. The soaking process were conducted by submerging 2 g of cassava leaves in 50 mg of water at different times: 1, 3, 10, 15, and 24 hours. The results showed that soaking significantly decreased the cyanide concentration in the leaves. Soaking reduced the cyanide concentration in the leaves by an average of 80% in the first hour, and the concentration continued to decrease as time went on. Cyanide leached out of the leaves into the soaking water. The cyanide concentration in the soaking water increased as the soaking time increased. The experimental data were also analyzed using kinetics models to depict the leaching process. These findings suggest that soaking is an effective way to reduce the cyanide concentration in cassava leaves. This could help to reduce the risk of cyanide poisoning and make cassava leaves a safer feed source.

**Keywords:** Cyanide; cassava leaves; soaking water and kinetics

# **Anthropometric comparative study for nasal morphology between Malaysians and Indonesians**

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## **Abstract**

Human facial features are different from each other. The features are frequently drawn to attention, particularly the set of three prominences that offer a profile feature, such as the lips, nose, and chin. Besides that, the nose is located at the center of the face and is one of the most essential features. Nose or nasal morphology is one of the human features that can be applied to identify ancestry, sexual dimorphism, and age in anthropological studies. This research was carried out on the Malay population in Selangor and the Indonesians to investigate the differences in both groups. The sample consisted of 212 Malays who reside in Selangor, including Indonesians whose age range between 18 and 77, also the sample was taken by measuring some parameters of nasal morphological characteristics, such as the distance between endocanthion points (EN-EN), the distance of nasal bony base width (BB), interalar distance (AL-AL), and others. As a result, it indicated that the nasal characteristics could be used to distinguish Malaysians from Indonesians with statistical significance (t-test,  $p < 0.05$ ). It was also found that the differences in sexual dimorphism are statistically significant (t-test,  $P < 0.05$ ). Furthermore, The P value of the ANOVA test between ranges of age showed a significance value of ( $P < 0.05$ ). To conclude, it is evident that nasal morphology has statistical significance for ancestry, sexual dimorphism, and age discrimination.

**Keywords:** *Anthropology; human facial; nasal morphological; Malay and Indonesia*

# The effects of tropical weathering on the volatile organic profile of kerosene

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## Abstract

Arson, the intentional and malicious act of propagating a fire, often involves the use of ignitable liquids such as kerosene. There is a time gap between fire extinguishment and the collection of fire debris. During this time, kerosene experiences weathering, causing evaporation and degradation of its volatiles that poses a threat to the accuracy of analysis and result interpretation. The objective of this study is to investigate and compare the volatile residues of weathered kerosene under indoor (room temperature) and outdoor conditions. 10 mL of kerosene was weathered indoors with a continuous stream of nitrogen as an aid, and outdoors, under tropical conditions. Sampling was conducted over specified weathered percentage from 10% to 75%. The weathered samples were then subjected to passive headspace extraction using activated carbon tablet (ACT) for 4 hours at 85°C before desorption with pentane for subsequent gas chromatography-mass spectrometry (GC-MS) analysis. The volatile organic profile of weathered kerosene was analysed using specified target compounds; *n*-alkylbenzenes and *n*-alkanes to confirm the presence or absence of kerosene. *n*-alkylbenzenes (C<sub>2</sub> and C<sub>3</sub>) weathered significantly upon reaching 75% weathering for indoors whereas the outdoors showed an increase in abundance at 25% and 75% where some were undetectable after 50% weathering. All *n*-alkanes from weathered kerosene indoors and outdoors recorded a decrease in abundance at 10%. A contrast was observed whilst comparing indoor and outdoor weathered kerosene samples for *n*-alkanes after 10% weathering where a decrease in either sample pictured the latter, an increase in the other. C<sub>10</sub> to C<sub>13</sub> alkanes weathered indoors began degrading but C<sub>14</sub>-C<sub>17</sub> alkanes pictured an increase for both conditions at 75%. The results obtained from the study demonstrate that over a prolonged weathered percentage of kerosene there is a contrast observed between both conditions which shows that environmental and chemical factors such as temperature, and the loss of lower molecular compounds plays a huge role in dictating the presence of kerosene.

**Keywords:** Arson; tropical weathering and ignitable liquids

# Hair analysis in forensic investigation

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## Abstract

The study of hair in forensic settings is known as forensic trichology. In many forensic science applications, hair shaft analysis is becoming more and more crucial. Human scalp hair is mostly made of keratin, which contains all 21 amino acids, but in extremely varied ratios. This is detrimental to the identification of the biological gender of a person when he or she is either the victim or the suspect at a crime scene. Hair plays an important role in forensic and criminal investigations as trace evidence due to its pertinent ability to have DNA material, drug deposition as well as chemical composites within. In forensic toxicology, for instance, to ascertain whether someone has been abusing drugs for a long period, hair follicle drug testing can be implemented. Besides that, hair evidence can be present as both complete and incomplete in terms of the presence of the hair bulb, thus being subjected to different kinds of analysis such as DNA for the former and chemical testing for the latter. The need for hair analysis in investigations is that forensic personnel can utilize information gathered to narrow down their search to people who fit the description.

**Keywords:** *Amino acid; trichology; toxicology; forensic investigation and identification*

# Cyberbullying trend of research in Southeast Asia: A review

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## Abstract

Cyberbullying is a global phenomenon involving digital technologies to harass, intimidate, or harm others. Most literature on cyberbullying originated from Western countries, and emerging studies were observed in non-Western counterparts, such as Asia. Geographical, and cultural differences between these regions explained the prevalence and various factors perpetuating cyberbullying in Southeast Asia. Therefore, this review critically examines the trend of cyberbullying research in Southeast Asia focusing on the prevalence and criminogenic factors in cyberbullying. Employing a variety of research studies, surveys, and scholarly articles, this review aims to shed light on the multifaceted nature of cyberbullying and its effects on individuals and communities. A literature search was done on various established research databases such as Google Scholar, Science Direct, and ResearchGate for cyberbullying studies conducted in Asia between 2011 and 2022. Specific keywords were used to identify relevant articles for screening. The search generated twenty research articles. This review includes the final eleven research publications after screening for titles and abstracts. Content analysis was performed to generate themes on cyberbullying research in the Southeast Asia region. The findings indicate the majority were cross-sectional research using self-reporting questionnaires among younger cohorts as part of their studies. Findings highlighted that cyberbullying incidence not only occurred in the younger generation but rising after high school and even in workplace. Factors like self-esteem, aggression and empathy were identified as antecedents of cyberbullying. Internet features like anonymity and affordability, make users feel dissociated from their acts online, tend to feel less responsible for their behaviour, whereby enabling and amplifying cyberbullying incidents, emphasizing the need for a holistic understanding of the issue. Overall, this review provides, comprehensive overview of the prevalence, identified factors and challenges related to cyberbullying. By increasing awareness of the issue and proposing evidence-based solutions, it contributes to the ongoing dialogue surrounding cyberbullying and insights for researchers, practitioners, and policymakers seeking to create a safer, inclusive digital environment.

**Keywords:** *Cyberbullying; psychological; behavioral; young adults and Southeast Asia*

# FTIR study of nicotine content in e-cigarette smokers' fingernails

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## Abstract

For detecting drugs and drug users' prior behaviours, body fluids and tissues, such as saliva, perspiration, hair, and fingernails, are receiving a lot of interest. Particularly relevant for drug tests are fingernails since they might show whether a person has been exposed to drugs during the past six months. Therefore, the focus of this study is to examine fingernails to find nicotine from electronic cigarettes. The tobacco industry has been revolutionized by the widespread usage of electronic cigarettes (also known as "e-cigarettes") around the world. In contrast to a traditional cigarette, an e-cigarette offers a more contemporary method of smoking by heating e-liquid, which comes in a variety of flavours to suit the user's preferences. Fingernails from e-cigarette users and non-users will be collected, and cotinine will be employed as a biomarker. After sample preparation, the fingernails were broken down over night in order to be analysed with the Fourier Transform Infrared (FTIR) apparatus, which scans with infrared light to transfer the data from the sample into a spectrum. The spectral data analysis shows that samples of e-cigarette users' fingernails contain nicotine at specific wavelengths. Overall, the findings do support the idea that nicotine may be detected in the body using fingernails.

**Keywords:** *Fingernails; e-cigarette; nicotine; Fourier Transform Infrared and cotinine*

# Validity and psychometric properties of online victim precipitation scale among Malaysian young adults

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## Abstract

The threat of online abuse continues to be a global concern, specifically on how safe the digital environment for individuals is. Relevant to this is the need to understand victim precipitation in applied criminology, urging for a reliable and valid assessment tool in place. Unfortunately, there is no valid and reliable victim precipitation scale available in the Malay language for online settings. As such, the present study aimed to validate the Malay version of the Online Victim Precipitation Scale (OVPS-M) to assess the extent to which individuals contribute to their victimization experiences in the online context. The items of OVPS-M were created based on the literature search highlighting significant risk factors and behaviours precipitating cyberbullying. A back-to-back translation was done followed by content and face validities to ensure item relevancy and textual construct. Subsequently, construct validity and reliability analysis were carried out to establish the psychometric properties of OVPS-M. This involved the recruitment of 78 young adults through the convenience sampling method. The construct and factorial validity were performed via Exploratory Factor Analysis (EFA) using Principal Axis Factoring with Varimax rotation. Reliability testing was performed to determine the internal consistency of items using Cronbach's Alpha coefficient method ( $\alpha$ ). EFA revealed a three-factorial structure: precipitation, provocation, and facilitation. These three factors consisted of 28 items with a total variance of 58.6%. Reliability analysis indicated satisfactory internal consistency for all factors, with Cronbach's alpha coefficients exceeding 0.70. The findings of this study provide empirical evidence supporting the validity and reliability of the OVPS-M as a comprehensive tool for assessing victim precipitation in the online environment among the Malaysian population. The availability of this validated scale will enable researchers, practitioners, and policymakers to identify individuals' contributions to online victimization experiences, allowing for the development of targeted interventions and prevention strategies.

**Keywords:** *Online victimisation; psychometric properties; victim precipitation and validation*

# Determining insurance claim authenticity with forensic application and tools: A case study

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## **Abstract**

Insurance is typically a contract between the insurer and the policy holder, which provides financial protection to the policyholder from a significant but uncertain financial loss. There is an increasing trend of insurance fraud through various types of modus operandi especially in the motor insurance industry lately. To determine the authenticity of a claim, the application of forensic knowledge and scientific methodologies are crucial for claim investigations. With the advancement of technology, application of digital tools is able to assist to ascertain the authenticity and liability of a claim as the intention behind fraudulent claims are often for monetary benefits. Motor vehicle accidents are often orchestrated for this purpose. Forensic consultants and claims investigators are appointed by insurer to gather evidences to establish the legitimacy of the accident. The investigation team of C.S. Tang Adjusters Sdn Bhd were assigned to investigate the authenticity of a claim involving a vehicle which had fallen into a monsoon drain, landing in an upside-down position after attempting to avoid an unknown lorry which encroached into the driver's travel path. The claim was investigated using scientific approach where physical evidence was gathered through detailed scene examination and vehicle damage assessment, which was later analyzed using stereomicroscopy, hydrostatic lock test, and accident reconstruction and simulation software such as Virtual Crash 3 to determine the accident authenticity. In this case study, data were gathered and documented via photography and crash simulation with the aid of scientific tools to determine the authenticity of the claim. This case study shows that application of forensic knowledge is crucial to determine claim authenticity and deter fraudsters which will help prevent future crime.

**Keywords:** *Insurance fraud; motor vehicle; forensic science; forensic physical evidence and scientific tools*



# A trend analysis of internet fraud victimisation and its impacts on victims

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## **Abstract**

Internet fraud has become a significant concern in the digital age, affecting individuals, businesses, and societies at large. Perpetrators of online scams employ various techniques to deceive and defraud unsuspecting victims, resulting in significant financial losses. However, the consequences of internet fraud extend beyond monetary implications, as victims often experience profound psychological impacts. This study reviews the psychological effects of internet fraud on victims, with a particular focus on their subsequent inclination towards retaliation. A literature search was done on Internet fraud victimisation on research databases for related articles from 2013-2023 to ascertain the trend of research in a decade. A total of fifty two articles were included in this review, in which most research was conducted in India, Malaysia and Japan. Most Internet fraud research focused on phishing, identity theft, online threats, online privacy and data protection, cybersecurity education and awareness. Findings revealed that victim experienced psychological manipulation, emotional distress, trust issues, shame and stigma following the fraud incident. In conclusion, internet fraud not only inflicts financial harm but also leaves victims grappling with profound psychological consequences. The desire for retaliation can be a natural response to the sense of violation experienced by victims. To mitigate these effects, a multifaceted approach is needed, including psychological support for victims, improved cybersecurity measures, and comprehensive public awareness campaigns. By addressing both the financial and psychological impacts of internet fraud, we can strive towards a safer and more resilient digital landscape for individuals and society as a whole.

**Keywords:** *Cyber victims; cybervictimisation; internet fraud and psychological impact*

# Determine the source of origin and possible causes of fire with forensic application in vehicle fire claims: A case study

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## Abstract

The automotive industry is constantly shifting gears, from popular demand, safety innovations, and technological advances keep the vehicles in an ever-changing mode of emergence and functionality. The major systems of an automobile are comprised of the engine system, fuel system, transmission system, exhaust system, and electrical system which could be possible heat sources contributing to the initiation of fire. A fire tetrahedron is categorized as four distinct elements assumed for combustion: heat, fuel, oxygen, and also chemical chain reaction. The manner in which a fire is initiated and spread depends on many complex factors such as the vehicle the nature of fuel load, surface area, distribution of fuel load throughout the vehicle as well as ventilation. The prevalence of insurance fraud has been growing steadily over recent years in the motor vehicle industry as monetary gains will be benefited by the claimant. Determining the area of origin and the possible cause of the fire would be critical to comment on the liability of the insurance claim. C. S. Tang Adjusters Sdn Bhd was assigned to conduct an Own Damage Investigation to investigate a commercial vehicle that caught on fire whilst being parked at the side of the road without the engine ignition on. The main objective of a fire investigation is to determine the cause and origin of the fire. Fire origin is determined through analysis of the fire pattern exhibited on the vehicle, degree of rusting, and metal oxidation color band. As recommended by the National Fire Association (NFPA), the cause of the fire was determined using an elimination process considering all the possible causes present at the area of origin, backed up with the scientific analysis of evidence. For the present case, evidence is analyzed with the aid of a stereo microscope to look for the presence of arc beading, suggesting an occurrence of electrical short-circuiting at the area of origin. The methodology employed in motor vehicle fire investigation is a systematic scientific approach that has been in practice by fire investigators to determine the cause and origin of the fire. It was then concluded that the claim had been repudiated upon examining the affected copper wires does not originate from the defaulted wires of the vehicle. An unauthorized aftermarket installation would be repudiated based on the policy clause unless the vehicle had purchased additional endorsement in accordance to the insurance policy coverage.

**Keywords:** *Insurance fraud; motor vehicle; forensic science; fire investigation; fire pattern and fire damage*

# Elucidating the effect of tropical weathering on the volatile organic profile of gasoline

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## Abstract

Detecting ignitable liquid residues is crucial in confirming arson. Gasoline, commonly used due to its affordability, accessibility, and ignitability undergoes weathering during and after fires, altering its volatile organic profile through evaporation caused by high temperatures. Insufficient data on gasoline weathering in tropical countries hampers accurate arson investigations by local forensic practitioners. This study aims to elucidate the effect of tropical weathering on the volatile organic profiles of gasoline. 10 mL of neat gasoline in triplicates were exposed to indoor weathering at room temperature (under nitrogen stream) and outdoor until weathered percentages of 0 – 95% were obtained. Subsequently, 20  $\mu$ L of the respective weathered samples were placed onto a kimwipe in an aluminum can, and passive headspace extraction was performed using an activated charcoal tablet. The samples were then incubated at 85°C for 4 hours and desorbed into pentane for analysis using gas chromatography mass spectrometry (GCMS). Target compounds (C1-C4 n-alkylbenzene) such as toluene, xylenes, ethyl toluene, and trimethylbenzene group must be present to confirm the presence of gasoline. In this study, indoor weathering at a temperature of 25°C exhibited a faster progression (2 days) compared to outdoor weathering (10 days) under a mean temperature of 33°C. Result showed that all target compounds were positively identified for all stages of weathering, both indoor and outdoor. A notable distinction between indoor and outdoor weathering was seen in the weathering patterns of C1-alkylbenzene (toluene). Indoors, toluene exhibited a decrease in abundance starting at 90% weathering, whereas no such decline was observed outdoors. However, all the C2-C4 n-alkylbenzene target compounds displayed a consistent increase in abundance as weathering progressed for both indoor and outdoor. These findings indicate that volatile organic compounds of gasoline undergo varying rates of weathering in different environments, with tropical climates exerting an influence in their weathering patterns.

**Keywords:** *Ignitable liquid residues; gasoline; tropical weathering; arson and gas chromatography mass spectroscopy*

**Citation:**

Mohd Yusof, M. J., Abu Bakar, N., Zainol Abidin, N., Yu, K. X., Kue, C. S., Abdullah, N. F., & Sampath Rajan, S. (2024). 4th International Conference on Forensic Sciences, Forensic Medicine and Criminology 2023 (INFOMECE 4.0). *Life Sciences, Medicine and Biomedicine*, 8(1).  
<https://doi.org/10.28916/lsm.8.1.2024.135>



**Life Sciences, Medicine and Biomedicine**  
ISSN: 2600-7207

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