

## Introduction

In a confined or poorly ventilated spaces, O<sub>2</sub> supply is limited.

During the fire, incomplete combustion results in a significant CO production.

## Case Outline

A 54-year-old man dead in a rented room.

The very small room.  
Single closed window.

During the night, the temperature was -10°C.

The body was found on a chair, leaning towards the table (Figure 1).



## The Autopsy

No signs of injuries.  
Moderate putrefaction.

The skin, mucosae, and internal organs had reddish-pink discoloration (Fig. 2).

Mold on the face, in the nose and mouth (Figure 3).

The fingers of the left hand were mummified.



PMI – c. 2 weeks



- *Cardiomegaly*  
(440 g)
- *Moderate atherosclerosis*
- *Fatty Liver*

## Toxicology

- COHb – 50%
- BAC – 1.13 mg/L

## Conclusion

The COHb resistance to putrefaction is of great value in determining the cause and manner of death.

It helps ruling out a seemingly natural death or death of unknown cause as accidental.

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# ASSOCIATION BETWEEN ATHEROMATOSIS AND HYPOTHYROIDISM: A BRIEF REPORT

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## Introduction

- The correlation between atheromatosis and hypothyroidism: topic frequently debated in literature.
- The aim of this study: Analyze the *possible correlation between sudden cardio-vascular death, atheromathosis, and hypothyroidism*

## Methods

- Observational study on *sudden death* March-July 2023

- Exclusion criteria: violent death, postmortem interval > 72 hours, undetermined cause
- **Group 1:** sudden deaths from cardiovascular causes (SCVD)
- **Group 2:** sudden deaths from other causes (SOD)
- **Main variables:** -TSH on a peripheral blood sample (rapid kit, cut-off 5μUI/L).

Figure 1. TSH kit



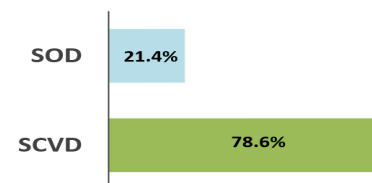
- degree of carotid and coronary atheromatosis.

## Results

**28 cases included:**

20 M (71.4%), 8 F (28.6%)

Figure 2. SCVD vs. SOD



TSH > cut-off: 2 cases  
Figure 3. TSH cut-off and carotid atheromatosis

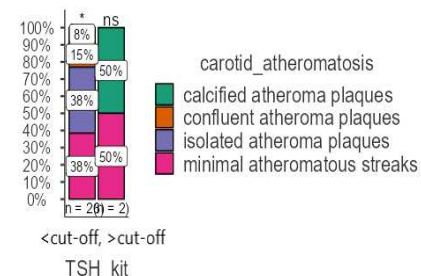
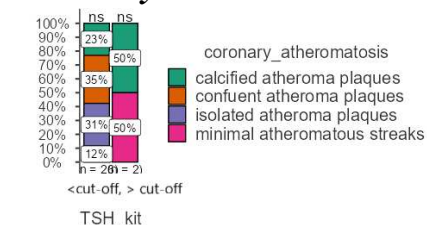
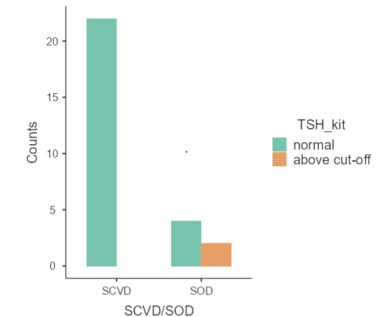


Figure 4. TSH cut-off and coronary atheromatosis



Associations not statistically significant

Figure 5. TSH cut-off and SCVD vs. SOD



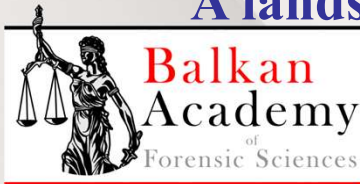
## Conclusions

The positive association between carotid atheromatosis and hypothyroidism or hypothyroidism and SCVD was not observed in the present pilot study

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# A landscape of Molecular Methods in Forensic Investigations



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## Introduction

- Rapid advancements in science and technology demonstrate that there is no limits of molecular biology application in scientific field
- In Forensic Science- improved genetic diagnostic methods - Accuracy, Sensitivity and Validity
- Revolutionized —especially in the field of genetic identification (human, animal, plant, tissue types, biological fluids, etc.)
- To diagnosed relationship and investigate the suspicion
- Advance molecular methods are now expanded to pathophysiological analysis beyond the category of human identifications
- Age prediction Primary drivers of aging are:
  - Telomere length (biological age ) Represent repetitive (5'TTAGGG 3') n sequences shorten by 50–200 bp
  - DNA methylation (Chronological age)
- age-associated CpGs are specific in tissue
- Post-mortem Interval
  - Measurement of degradation of genetic material as an indicator of PMI
- Sudden natural death
  - Coronary artery disease
  - Cases related to cardiac and non-cardiac causes: cardiovascular disease
  - Epilepsy serious neurological disorders,
  - Rare hereditary diseases

## Methods

Various studies were evaluated in reference to genetic based investigation for:

### 1. Age prediction

#### ▪ Telomere Age

- The Terminal Restriction Fragment (TRF) method
- Quantitative polymerase chain reaction (PCR) assay

#### ▪ DNA Methylation

Methodologies of gene specific number of CpG sites on cell types are:

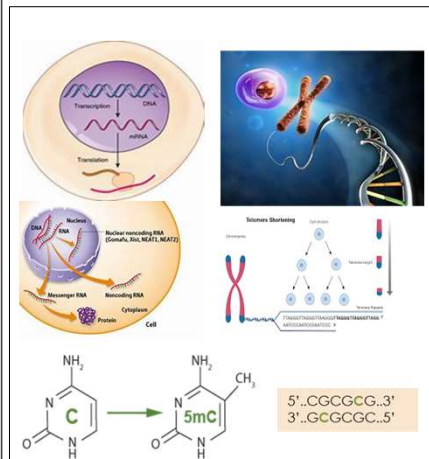
- Bisulfide conversion pyro sequencing,
- Quantitative polymerase chain reaction (qPCR)

### 2. Post-mortem Interval

- Quantitative real-time PCR (mRNA)

### 3. Sudden Natural Death

- Sanger sequencing analysis for targeted variation



## Results

### Leukocyte Telomere length (LTL) based studies as disease biomarkers

- LTL was <5kb ; 6.1Kb ,[high risk] is a reasonable cut-off point to define a critically short LTL. (90 -105 years in blood )

### Telomere length (TL) based studies for age prediction forensic application

- significant correlation in TL and Age : useful complementary method (15-85yrs in tooth)

### Age-Related DNA methylation- based studies for age prediction

- Accuracy are  $\pm 6.08$  years by MAD in deceased (24-86yrs in blood)
- Accuracy are  $\pm 5.35$  years by MAD in living (1-95yrs in blood )- genetic markers-ELOVL2, FHL2, EDARADD, PDE4C, C1 or f132,
- Accuracy mean absolute error (MEA) of 1.5-2.13 years ( 22-70yrs in erupted 3<sup>rd</sup> molar pulp)-genetic marker ELOVL2, FHL2, NPTX2, KLF14, SCGN

### Post-mortem degradation of RNA markers for PMI estimation

- $\beta$  actin correlate well with prolonged PMI in heart and liver: PMI- 6h-71h
- Expression levels of LCE1C were decreased with increasing the time interval in time-dependent manner in Skin :PMI-5days
- 28SrRNA correlation PMI in Brain, lung, skeletal muscle & liver up to 3days

### Genetic investigation for Sudden Natural Death

- Coronary artery Disease-expression of gene /increased proliferation of macrophages Variant may predicts stroke (CDKN2 (9p21), CDKN2B(9p21.3))
- Cardiomyopathy- gene-disease curation, had definitive or moderate evidence for ARVC, and these genes accounted for nearly all pathogenic/likely pathogenic ARVC variants (PKP2, DSP, DSG2, DSC2, JUP, TMEM43, PLN, and DES)
- Hypertension- shown cause differences in blood pressure response to antihypertensive drugs - gene are risk factors for hypertension -associated with high renal function
- Sudden explained death in epilepsy-Genes associated with Long QT syndromes (LQTS), such as KCNQ1, KCNH2, and SCN5A, are common causes of epilepsy.

## Conclusions

- Role of Molecular biology methods has been generous to clarifying pathophysiological changes in death processing
- These methods could be applicable as an auxiliary technique to diagnose the forensic pathology leading up to death in post-mortem samples.
- It is suggested that such methods can be included into routine death investigations.
- A training programs could be executed in forensic medicine for assessment of death according to autopsy and laboratory findings which may transform to diagnostics investigation.

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# FORENSIC EVIDENCE OF EXTREME VIOLENCE IN A CASE OF MATRICIDE

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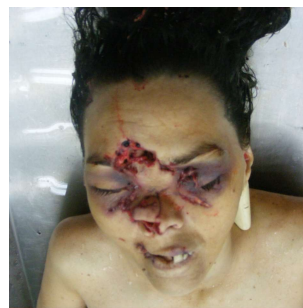
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## Introduction

When it comes to crimes committed by children, murder is a rare phenomenon, and when it occurs it causes surprise, horror, anger, rejection and questions such as „what are the factors that contribute to such an act of extreme aggression?” or „what is the psychopathological background in such cases?”. The most disturbing crimes committed by children are considered to be matricide and patricide.

## Methods

We present the case of a 13-year-old minor who killed his mother in a manner denoting extreme violence, with a history of attempted patricide at the age of 12. The socio-familial environment, that had a major influence on the evolution of events in the direction of the crime, is remarkable.



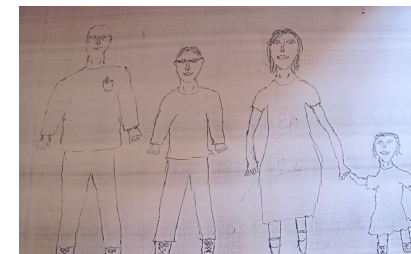
*Figure 1*

## Results

The attack was of extreme violence - powerful, multiple blows with a hammer to the head and face. The injuries were of similar intensity to those of murders committed by adults. The psychiatric exam revealed an above-average intelligence, allowing the planning of post-crime acts, but the socio-familial environment proved to be an unfavourable one, with a life marked by poverty, psychiatric and criminal family antecedents, and a relationship between the parents that was devoid of affection.

## Conclusions

The minor suffered from a behavioural disorder that led to an antisocial act (matricide), amid family emotional abuse. In the context of the conflict situation within the family and as a result of the prolonged emotional abuse to which the minor was subjected, he acted impulsively and took action.



*Figure 2*

# CORRELATIONS BETWEEN PARENTING STYLE AND CHILD ABUSE

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## Introduction

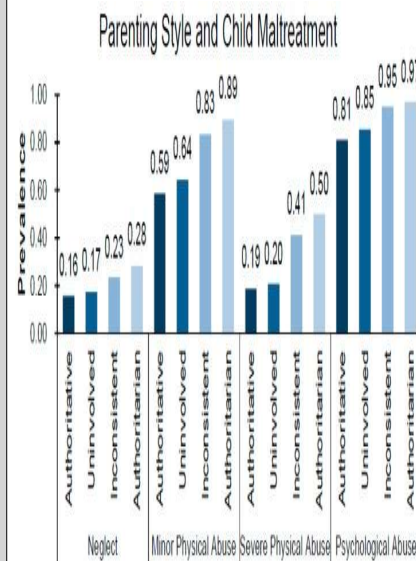
Many studies show that greater child abuse risk is evident when parents engage in more parent-child aggression, severe physical discipline and psychological aggression. Parental child abuse risk can be estimated by evaluating parent reports of harsh, aggressive parenting behaviors exhibited during parent-child conflict. This paper attempts to analyze the patterns of attachment between child and parents as a basis of further child abuse.

## Methods

The sample was comprised of parents engaged in a retrospective study monitoring abuse risk, with over involving families with more sociodemographic risks (i.e.,  $\leq 150\%$  of the federal poverty line, receipt of federal assistance,  $\leq$  high school education, single parenthood,  $\leq$  age 18). The participants were analyzed through forensic psychiatric expertise conducted for the needs of the court.

## Results

The results summarized the attachment difficulties in maltreating families into: rejection, role reversal, and the multigenerational transmission of unresolved trauma.



## Conclusions

Study proves the significance of mothers' and fathers' parenting style history on their own child abuse risk and psychological parent child aggression, and parenting style across the transition to parenthood.

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## Introduction

Traumatic bonding involves a strong emotional bond between an individual and their abuser or captor, often in cases of partner violence. Victims may develop loyalty, attachment, and dependency, making it hard to leave. It is important to recognize and understand this bond in order to provide appropriate support and intervention for individuals experiencing intimate partner violence (Dutton&Painter,1993). The available literature regarding the progression of traumatic bonding is limited, and the elements that play a role in the establishment and perpetuation of traumatic bonding remain undisclosed.

## Methods

A thorough review of the scholarly literature was conducted in order to fully explore the phenomena of trauma bonding at ipv situations. Searches in credible academic databases were used to carefully choose peer-reviewed papers. The search criteria were limited to articles published in English between 2018 and 2022. The key terms used in the search were "Trauma Bonding" and "Stockholm Syndrome." Extensive study and screening were undertaken on this topic, resulting in the inclusion of 9 articles out of the 147 initially identified through the search process. These nine publications were chosen as the most pertinent and important contributions to the study's aims.

## Results

### Emotional Commitment and Traumatic Bonding:

Victims find it difficult to leave the abusive relationship because of this bond, which is defined by a combination of love, fear, and dependency (Kosch, 2018; Simonic&Osewska, 2019)

### Societal Constructs and Influence:

Societal misconceptions, worries about one's reputation following a divorce, and the fear of social exposure were found to be important deterrents for victims to seek assistance (Warda et al, 2022;Sani& Pereira, 2020)

### Victims' Psychology:

Psychological effects of trauma bond on victims, including feelings of helplessness, self-blame, denial, and skewed self-perception (Bhat, 2021; Ahmad, 2018; Lahav, 2021; Effiong, 2021).

### Stockholm Syndrome and Traumatic Bond Difference

Stockholm Syndrome is most commonly associated with instances of captivity in which the victim has no prior contact with the captor. Traumatic Bonding, on the other hand, is more common in pre-existing relationships where abuse becomes a habit and the bond deepens over time owing to the cyclical nature of reward and punishment (Kosh, 2018; Ahmad, 2018).

## Conclusions

Traumatic bonding, while bearing similarities to Stockholm syndrome, is a separate concept. Stockholm syndrome originally described the emotional connection that certain kidnapping victims formed with their captors, which sometimes endured even after their release or escape (Graham et al., 1995). The term "Stockholm syndrome" has evolved over time to encompass a broader range of individuals and circumstances, including victims of intimate partner violence (IPV). Past research has employed the terms "Stockholm syndrome" and "traumatic bonding" interchangeably. The research on Intimate Partner Abuse (IPV) and traumatic bonding that were evaluated indicate the significant emotional and psychological obstacles that victims endure. Increasing research on this subject is important for the well-being of victims.

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## Introduction

- Intimate partner violence (IPV) is defined as intentional harmful behavior directed towards a romantic partner.
- It can manifest in various forms, including physical, emotional, sexual, economical, or psychological abuse. The primary motivation behind perpetrators' actions is to exert control over their partners and establish dominance within the relationship.
- Research on IPV has demonstrated that multiple risk factors, including but not limited to societal norms, poverty, alcohol use, and traditional masculinity, contribute to the escalation of such violence.
- Victimization risk is more frequent among people with disabilities which is physical, emotional or developmental.
- Prevalence of victimization among people with mental illness is the highest rate level in the victims of IPV with disabilities.
- Women with schizophrenia, borderline personality disorders faced IPV more than the other disorders.
- Among these risk factors, the presence of mental illness emerges as a significant contributor to victimization.
- Studies have unveiled that women with mental illness experience higher rates of violence. This study aims to comprehensively review the existing literature concerning the role of women's mental health status as a risk factor for IPV victimization to inspire psychosocial programs and approaches that help to prevent.

## Methods

The research draws on open-access articles sourced through 'scholar.google.com' using keywords such as 'intimate partner violence' (IPV), 'domestic violence' (DV), and 'mental illness' (MI). Only original research papers in English have been included in this study. Study included three studies which analyze the causality between mental illness and IPV.

## Results

The findings of this research suggest that women with mental illness are more prone to engaging in unhealthy relationships, largely due to impaired cognitive functioning resulting from their mental health conditions. Additionally, other risk factors, such as low socioeconomic status, early-age marriage, and pregnancy, further exacerbate their vulnerability. Notably, the demographic profile of mentally ill IPV victims often differs from that of non-mentally ill victims. A specific study indicated that the most prevalent forms of IPV experienced by mentally ill individuals are emotional abuse, followed by physical abuse and control.

## Conclusions

- In conclusion, while limited research has been conducted on the relation between mental health status and IPV risk, the existing studies emphasize that there is a significant causality between the two factor bidirectionally.
- As the mental illness increase the risk of being victim of IPV, IPV also result in mental illness in victims.
- Studies showed that it is sometimes hard to discriminate the which one is the first. Yet, the other factors like poverty, childhood traumas also correlated with both IPV and mental illness. So, mental illness and IPV relation is complex that need further studies for better understanding of sole effect of mental illness.

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## Introduction

Prisons are integral components of the global criminal justice system, housing approximately 9 million individuals worldwide.

Within penal institutions, prisoners face heightened risks of acquiring HIV, HBV, and HCV, especially those engaging in high-risk behaviors such as intravenous drug use.

Consequently, prisons can serve as potential hubs for the spread of infections. In the Republic of North Macedonia, the penitentiary system hosts a significant proportion of drug addicts among its inmates, warranting the necessity for comprehensive and continuous treatment interventions.

The primary objective of this research is to highlight the percentage representation of drug addicts among the total incarcerated population in Bitola Prison during the year 2022, alongside an assessment of their healthcare provisions.

## Methods

The research aims to showcase the prevalence of drug addicts among the convicts who served sentences at Bitola Prison in 2022, along with the healthcare services provided to them.

The study analyzed data from the health care sector within the prison.

## Results

According to reports from the health care sector at Bitola Prison, a total of 159 individuals completed prison sentences in the year 2022.

Among them, 61 were identified as drug addicts, accounting for 38.3% of the inmate population.

Notably, 32 individuals (52.4%) received treatment involving Buprenorphine, while 29 (47.6%) underwent methadone treatment.

## Conclusions

The healthcare and substitution therapy for convicted individuals struggling with drug addiction in Bitola Prison align with established protocols for their treatment. These interventions are effectively executed by medical personnel employed within the prisons healthcare sector.

This research underscores the importance of tailored healthcare strategies to address the unique needs of prisoners grappling with substance abuse.



# DISTRIBUTION OF INJURY DEATHS IN REPUBLIC OF NORTH MACEDONIA

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## Introduction

Injuries – both unintentional and violence-related take the lives of 4.4 million people around the world each year and constitute nearly 8% of all deaths. For people age 5-29 years, 3 of the top 5 causes of death are injury-related, namely road traffic injuries, homicide and suicide. The aim of this research study was to present the amount of injury deaths and their distribution in Republic of North Macedonia in the period of 2019 to 2021.

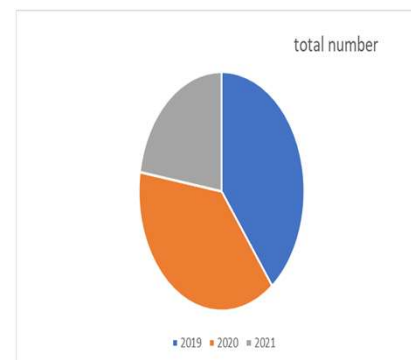
## Methods

A retrospective analysis of the number of registered injury deaths caused by external causes, localization of injuries, burns, frostbites, and poisonings by drugs, medicaments and biological substances has been conducted for the period between 2019-2021. The data has been collected by “Mortality in Republic of North Macedonia”- publication issued by the Public Healthcare Institute.

## Results

According to ICD-10 in 2019 and 2020 the highest percentage of injury deaths are classified as “other and unspecified effects of external causes” (21% and 27%) and in 2021 the highest percentage is classified as “injuries to the hip and thighs” (32.05%).

Figure 1 Total number of deaths



## Conclusions

There is solid scientific evidence for what is proven to prevent injuries (and acts of violence) as well as to treat their effects in many contexts. Injuries are predictable and preventable.

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# Unveiling Neonatal and Perinatal Mortality Trends in Bitola: A Four-Year Study Spanning 2019-2022

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## Introduction

Evaluating neonatal and perinatal mortality rates serve as a fundamental gauge of healthcare system performance and socioeconomic advancement.

This study addresses the challenge of providing comprehensive care for newborns, an exceptionally vulnerable population, making it a prime focal point of global health policy. The research objectives center on analyzing neonatal and perinatal mortality rates among infants delivered at the Clinical Hospital in Bitola over the period spanning 2019 to 2022.

## Methods

Methodologically grounded in a retrospective cross-sectional analysis, the study delves into mortality data pertaining to neonates born at the Clinical Hospital in Bitola across four consecutive years. These findings are contextualized within the broader framework of total births during the same time frame.

Methodical data collection from the Neonatal Departments repository at the Clinical Hospital facilitated a comprehensive overview of neonatal outcomes throughout the specified duration.

## Results

The outcomes illuminate that out of 2498 newborns delivered, 2481 (99.32%) experienced live births, while 17 (0.68%) were recorded as stillborn. The cumulative perinatal mortality rate for the stipulated period stands at 9.27‰, signifying 9.3 stillborn infants and early post-birth mortalities per thousand live births.

Concurrently, the neonatal mortality rate is calculated at 2.42‰, representing 2.4 neonatal deaths within the initial 28 days of life per thousand live births.

## Conclusions

Comparative analysis against analogous statistics in European counterparts underscores relatively higher perinatal and neonatal mortality rates within the Clinical Hospital in Bitola during the designated timeframe. These findings accentuate the urgency for targeted state interventions to curtail neonatal and perinatal mortalities.

## References

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