Research Article

Attorneys' awareness of forensic science: A survey conducted in Lebanon

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ARTICLEINFO	ABSTRACT	E-ISSN: 2961-3809
KEYWORDS *attorneys awareness, forensics, Lebanon, needs, views*	Forensics is the application of science to serve the law. Many forensic evidence types are used in the criminal justice system like DNA, toxicology, GSR, fingerprint, and firearm. To better implement forensic investigation procedures, the attorneys' awareness of forensic science is vital. Thus, this study evaluates the level of awareness among Lebanese attorneys. A cross-sectional study was conducted with over 60 Lebanese lawyers of both genders residing in the five governorates. The survey questionnaire was well designed and carried on from May 2022 to October 2022 with an 83% as responsive rate. The participants' characteristics were studied as well as their views and needs to investigate their relative association through an independent t-test. Accordingly, it revealed that the majority of the participants were unaware of forensic science notions. As to the participants' features, results showed that there is a significant difference in technology advances awareness among participants who underwent past training and those who did not. However, there is no significant difference in the participants' intention to participate in future trainings with 85% of the volunteers are willing to participate in future trainings. In addition, DNA evidence was picked as the preferred topic to be covered in the upcoming training due mainly to its high accuracy. Although this survey identified that Lebanese lawyers who accomplished past training were more aware of some forensics concepts, larger sample size is needed. Thus, it is very early to decisively predict the level of forensics awareness among Lebanese attorneys. In conclusion, training to increase Lebanese attorneys' awareness regarding the importance of forensics is necessary. 	

INTRODUCTION

The application of science to matters of law is what defines forensic science (Shen & Vieira, 2016). While its main target is to ensure the achievement of justice in all communities, the forensics concept is still widely enigmatic (Yadav, 2017). Within forensic science, the forensic scientist's goal resides in collecting, examining, and evaluating physical evidence (Amankwaa & McCartney, 2018). Once recognized and well-handled, the physical evidence offers the best prospect for providing reliable information about the crime under investigation (Hall et al., 2014). On the other hand, crime labs include several departments dealing with different forensic evidence such as DNA, toxicology & drug analysis, fingerprint, ballistics, digital, and GSR (Dhabal et al., 2022; Divakar, 2017; Hennessy et al., 2013; Kaushal & Kaushal, 2011; Mishra et al., 2020; Smith & Bluth, 2016).

Besides, modern laws in the criminal justice system are the result of social, ethical, and legal considerations (Weiss & Laporte, 2018). Whether general or local, it combines different types of law regulations such as civil and criminal; with the latter one dealing with different categories of crime such as violent crime (murder, rape..), property crime (robbery, intimidation..), and high-technology crime (fraud, blackmail..) (Peterson et al., 2012). While the local laws state the admissibility of the evidence collected at the crime scene, the established ethical principles guarantee that human privacy and basic rights are well respected (Gamero et al., 2007; Bitzer et al., 2019). To detect the current strengths and weaknesses of forensics in support of justice, channels of communication are needed between law enforcement officers, forensic scientists, lawyers, and judges (Regan, 2017). There is a lack of research culture in forensic science due to the little collaboration between them (McEwen & Regoeczi, 2015). Therefore, forensic science awareness among lawyers is crucially needed to obtain a more efficient criminal justice system (Kloosterman et al., 2015). Moreover, to assure better implementation of forensic investigation procedures, increased concern about the attorneys' views and needs regarding forensic-based investigations should be addressed (Edmond, 2015).

In this context, many queries are legitimate to be asked: What is the level of understanding of forensic science within the criminal justice system among lawyers? How can it be improved? Is the current training appropriate? (Saferstein, 2006). To answer these questions, many studies worldwide tended to evaluate to what extent attorneys are aware of the relative association between forensics and the law (Garrett & Mitchell, 2016; Garrett et al., 2021; Kessler, 2010). In Lebanon, the attorneys' syndicate was first established in 1919 in the capital Beirut. Also, since 1971, a law journal called "Al-Adl" is published quarterly through it (www.bba.org.lb, 2022). Till the present day, studies of Lebanese attorneys' perspectives concerning forensics were not conducted yet. Thus, this study aims to estimate the level of awareness among the Lebanese attorney community by assessing their views and needs regarding forensic science.

METHODS

Study design

From May 2022 to October 2022, 60 Lebanese attorneys were randomly selected to participate in this research. The volunteers in this cross-sectional study were from both genders and residing in the five Lebanese governorates (the capital Beirut, Mount Lebanon, Bekaa, North and South Lebanon). A letter of invitation, written consent, and an anonymous questionnaire composed the English language survey this study is based on (Appendices A, B, C). The invitation letter elucidates well the study objectives, urging thus the participants to sign the informed consent. The volunteers' general characteristics, as well as their views and needs statements, were collected by a well-designed questionnaire. All the data were kept confidential while the data collector in charge was replying to the volunteers' inquiries without affecting their answers. "Charter of ethics and guiding principles of scientific research in Lebanon" designed by the national council for scientific research was implemented in this study (Hamze et al., 2016).

Participants Characteristics

The first domain of the questionnaire covered the socio-demographic status of the volunteers. Data regarding their gender, age, residency, type of attorney, number of cases involving forensic evidence, past training number, and duration of past training were collected.

Instrument

Views-based questions

The views domain of the questionnaire consisted of eight statements. The first four statements questioned the participants if they were aware of the crime lab procedures, the technology advances, the statistical methods, and the ethical requirements. The participants had to choose among "unfamiliar", "average knowledge", or "very familiar" options. A "very familiar" and "average knowledge" responses concerning the technology advances will be scored one and an "unfamiliar" response will be scored zero. Then, the volunteers' views regarding both the reliability of the forensic evidence and which forensic evidence is the most reliable were the focus of two other statements. Furthermore, the last two statements dealt with the participants' views concerning forensic evidence resources availability and which forensic evidence resource is the most identifiable. They replied by picking an answer from a specific set of options.

Needs-based questions

The needs domain of the questionnaire was composed of two statements. The first statement discussed the intention of the volunteers to participate in forensic evidence training. The answers were "not interested", "it depends", or "very interested". A "very interested" and "it depends" response will be scored one and a "not interested" response will be scored zero. The second statement included only those interested in future training. It asked which forensic evidence topic would they prefer to be covered at training among "DNA", "Toxicology", "Fingerprint", "Firearm", "GSR", "Digital", "Shoeprint", "Font emulation", or "other" options.

Statistical Analysis

Both descriptive and analytic statistics are shown in this study. The frequencies as well as the percentages of the descriptive statistics are presented in this test. As for the analytic statistics, it was applied in this research to highlight the associations between first the participant characteristics and their views and second the participant characteristics and their needs. Data were observed and analyzed using the independent t-test. Results with p value equal or less than 0.05 ($p < 0.05$) were considered significant.

RESULTS AND DISCUSSION

Responsive rate

The initial total number of study surveys was 72. Nevertheless, 12 individuals expressed their willingness not to participate anymore due mainly to their lack of time thus they were excluded from the study. The remaining 60 volunteers had completed the survey leading to a survey responsive rate of 83%.

Participants' characteristics

Concerning the volunteers' residency, the higher distribution percentage over the five Lebanese governorates was obtained for the Mount Lebanon governorate (68.33%). The four other distribution percentages were from the highest to the lowest: the North governorate (11.66%), the Capital Beirut (8.33%), the South governorate (6.66%), and finally the Bekaa governorate (5%). As for gender, men

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constituted slightly more than two-thirds of the sample (71.66%) versus almost one-third of the sample for women (28.33%). Regarding their age, the majority of the participants were in the 44 to 54 range (41.66%), succeeded by the 34 to 44 range (30%), then the 24 to 34 range (20%), and finally the 54 to 64 range (8.33%). When dealing with the type of attorney feature, 73.33% of the volunteers picked both the defense and the prosecution choices. While participants who chose the "defense" were 23.33%, participants who chose the "prosecution" comprised only 3.33% of the sample. Meanwhile, the number of cases involving forensic evidence that Lebanese attorneys handled was under study. Our results showed the following findings: 46.66 % of the participants had less than 5 cases; 23.33% had more than 10 cases; 16.66% had between 5 and 10 cases, and 13.33% had no such cases at all. In addition, another important characteristic under study was the number of past training Lebanese attorneys underwent. Accordingly, the majority of the participants (85%) had no training at all. Moreover, 13.33% of the volunteers had less than 5 training, and 1.66% had between 5 and 10 pieces of training, with no one having more than 10 training. From the total of the 9 participants that accomplished past training, the ones with a past training duration of 1 day and 2 to 7 days constituted respectively 66.66 % and 22.22% of the sample. The lowest percentage was obtained for volunteers having more than 1 week as past training duration (11.11%). Table 1 represents the participants' features.

Table 1. The participants socio-demographic status

Participants characteristics	n (%)
Gender	
Male	43 (71.66%)
Female	17 (28.33%)
Age	
24- 34<	12 (20%)
≤34-44 <	18 (30%)
≤44-54<	25 (41.66%)
≤54-64≤	5 (8.33%)
Residency	
Beirut	5 (8.33%)
Mount Lebanon	41 (68.33%)
South	4 (6.66%)
North	7 (11.66%)
Bekaa	3 (5%)
Type of attorney	
Defence	14 (23.33%)
Prosecution	2 (3.33%)
Defence & Prosecution	44 (73.33%)

Number of cases	
0	8 (13.33%)
1-5<	28 (46.66%)
≤5-10<	10 (16.66%)
≥10	14 (23.33%)
Past training number	
0	51 (85%)
1-5<	8 (13.33%)
≤5-10<	1 (1.66%)
≥ 10	0
Duration of past trainings	
1 day	6/9 (66.66%)
2-7	2/9 (22.22%)
>1 week	1/9 (11.11%)

(n: Frequency; %: Percentage)

Views statements responses

As for the crime laboratory procedures awareness, this study showed that 71.66% of participants were not aware of these procedures while 23.33% had average knowledge and 5% were very familiar with its concept. As a result, only 28.33% of the volunteers were aware of the crime laboratory procedures. In addition, this test revealed that 73.33% of participants were not familiar with the technological advances while 23.33% answered with "average knowledge" and 3% were very familiar. Therefore, the technology advances awareness was detected among only 26.33% of participants. Furthermore, the results elucidated that 82% of volunteers were not aware of statistical methods; with 15% answering with "average knowledge" and 3% were very familiar. Thereby, the statistical methods were recognized by only 18% of participants. While 56.66% of volunteers were unfamiliar with the ethical requirements, this percentage was 28.33% for the "average knowledge" answer and 15% for the "very familiar" answer. This indicates that 42.33% were well-informed concerning the ethical requirements.

On the other hand, two-thirds of the study participants (66.66%) thought that the forensic evidence is very reliable; "somewhat" was chosen by 25% of participants, and 8.33% considered it not reliable at all due to some public sector trust issues, fraud concerns, and uncontrolled crime scene allegations...Apart from the volunteers who don't trust the forensic evidence, 26 volunteers considered all forms of forensic evidence trustworthy. The DNA forensic evidence was chosen by 20 participants followed by the fingerprint forensic evidence chosen by 5 participants, then the font emulation forensic evidence was chosen by 1 participant. Moreover, 2 participants chose both DNA and fingerprint forensic evidence and 1 participant chose both DNA and digital forensic evidence. Thus, the obtained results showed that DNA is the most reliable forensic evidence. Furthermore, when asked about the forensic resources availability, 53.33% of the participants responded negatively; 36.66% declared that they had average availability, and 10% announced that they had easy access to such resources. Concerning the most identifiable resources for forensic evidence, almost equal distribution was obtained with 33.33% for the scientific research articles, 31.66% for the expert's testimony, and 25% for the private educational programs. In addition, 8.33% of participants had chosen both the scientific research articles and the expert's testimony, and 1.66% of participants

had chosen both the expert's testimony and the private educational programs. The responses to some views statements are shown in Table 2.

Table 2. Responses to some views statements

Some Views statements responses	Unfamiliar n (%)	Average knowledge n (%)	Very familiar n (%)
Are you aware of the crime lab procedures?	43 (71.66%)	14 (23.33%)	3 (5%)
Are you aware of the technology advances?	44 (73.33%)	14 (23.33%)	2 (3%)
Are you aware of the statistical methods?	49 (81.66%)	9 (15%)	2 (3%)
Are you aware of the ethical requirements?	34 (56.66%)	17 (28.33%)	9 (15%)

(n: Frequency; %: Percentage)

Needs statements responses

Concerning the participants' willingness to participate in training covering forensic evidence, the results showed that slightly more than half of the participants were very interested (56.66%). The "it depends" choice was picked by 28.33% of the volunteers that justified their answer as being training time &/or location dependent. A low percentage of 15% showed no interest at all in such training therefore these 9 participants were excluded from the question regarding which forensic evidence topic is preferred to be covered at the training. From the remaining 51 participants, more than two-thirds (85.10%) chose all the forensic evidence as candidate topics. Moreover, DNA forensic evidence and font emulation were chosen apart by 4.25% and 2.12% of participants respectively. Finally, 4.25% of volunteers chose three forms of forensic evidence: DNA, toxicology, and digital; 2.12% of volunteers chose two forms of forensic evidence: DNA and font emulation; and 2.12% of volunteers chose two other forms of forensic evidence: DNA and fingerprint. Based on the above results, DNA is the forensic evidence topic preferred the most to be covered at training. The responses to needs statements are listed in Table 3 and Table 4.

Table 3. Responses to forensic evidence training needs statements

Forensic evidence training	Not interested n (%)	it depends n (%)	Very interested n (%)
Do you like to participate in a training concernin forensic evidence?	9 (15%)	17 (28.33%)	34 (56.66%)

(n: Frequency; %: Percentage)

Table 4. Responses to forensic evidence training topic needs statements

Forensic evidence training topic	Which forensic evidence topic preferred to be covered at training? n (%)
All forensic evidences	40 (85.10%)
DNA	2 (4.25%)
Toxicology	-
Fingerprint	-
Firearm	-
GSR	-
Digital	1 (2.12%)
Shoeprint	-
Font emulation	-
Other:	
DNA + Toxicology + Digital	2 (4.25%)
DNA + Font emulation	1 (2.12%)
DNA + Fingerprint	1 (2.12%)

(n: Frequency; %: Percentage)

Views and needs correlated responses to participant characteristics

The associations between the forensic evidence views and the Lebanese attorneys' characteristics as well as the forensic evidence needs and the Lebanese attorneys' characteristics were under study. The participants' characteristics of past training are limited to only two groups: "yes" (9 participants) and "no" (51 participants). The relationships between the comprehension of technology advance awareness as well as the intention to participate in future training versus participants' characteristics were illustrated in Table 5.

Table 5. Statistical significance of views and needs answers related to participant characteristics

Past training	Technology advances awareness	Future training interest
yes no	$p = 0.004^*$	$p = 0.606$

*(p: p value; *: statistically significant at < 0.05)*

Nowadays, the forensics concept understanding by the attorneys had been the center of attention of several studies worldwide (Bridge & Freeman, 2019; www.turing.ac.uk, 2018). The objective of this present study is to describe the status of Lebanese attorneys' awareness of forensic science by assessing their corresponding views and needs. Concerning the views, the results showed that the majority of the Lebanese attorneys were unfamiliar with the forensics notions. A clear index was illustrated by the 73.33% of Lebanese lawyers that were unaware of the technological advances. This low level of awareness is highly associated with the lack of past training. This fact is supported by the significant difference in technology advances awareness among participants that underwent past training and those who did not. These outcomes are explained by the fact that forensic science is relatively a new field in Lebanon. Moreover, forensic major in Lebanon is limited to only a few experts and universities. Regarding the needs, a high percentage of 85% of Lebanese attorneys are willing to participate in future training. These findings are correlated to the fact that there is no significant difference between participants that underwent past training and those who did not. Since DNA-based evidence is often left at the crime scene, and due to its power of discrimination, DNA evidence is regarded as an important investigative tool in courts (van Oorschot et al., 2010). Thus, according to this study's results, DNA evidence was chosen to be the most preferred topic to be covered in the upcoming training.

One of the suggested solutions this paper presents is the need for forensic science awareness training prepared by experts and targeting Lebanese lawyers. In this context, the data collector in charge has organized a few awareness sessions for some Lebanese attorneys as a sort of solution for this dilemma. By deduction, this study has partially fulfilled its mission by enhancing the forensics awareness level among Lebanese lawyers. In addition, efforts should be focused on making scientific forensic evidence resources such as research articles more available and easier to access. Accordingly, this step would help in minimizing the potential "CSI effect". This media growing unrealistic expectations of forensic evidence among attorneys and jurors are decisively affecting negatively the trial track (Hawkins & Scherr, 2017; Ley et al., 2010). Yet, another solution lies in the use of private educational programs since research is written in scientific terms which can be complicated for the non-scientific audience. This approach could be applied for simplifying how the scientific method is used to solve forensic problems, describing the different jobs done by the expert they consult, informing how the crime labs are organized, and easily explaining the development of forensic science. These suggestions' goal is to raise Lebanese attorneys' awareness and thus help in minimizing the loss of forensic evidence value in the justice system. Nevertheless, one of the limitations this study has encountered is the need for a larger sample size.

CONLCUSION AND RECOMMENDATION

The evaluation of to what extent Lebanese attorneys are aware of the relative association between the law and forensics is assumed to be helpful from the fact that forensics disciplines are recently the basis of many judicial decisions. As consequence, a strategy aimed to increase the Lebanese attorneys' awareness regarding the importance of forensic science is necessary to decrease the frequent gaps in their personal views and fulfill their needs in future training.

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Appendix A

Letter of invitation

Study: Attorneys awareness of forensic science: A survey conducted in Lebanon

Dear Mrs/Mr,

You are invited to take part in the study entitled: "Attorneys awareness of forensic science: A survey conducted in Lebanon". The researcher is conducting this survey in the purpose of estimating the level of awareness of forensics among the Lebanese attorneys. Before you decide, i would like you to understand why this research is undergoing. Forensic science is the application of science in order to serve the law. The evaluation of to how extent Lebanese attorneys are aware of this relative association between the law and the forensics is assumed to be helpful from the fact that forensics disciplines are nowadays the basis of many judicial decisions.

If you decide to take part in this study the researcher will get in touch with you so you can easily fulfill the questionnaire. The amount of time this questionnaire would take is no more than ten minutes.

I seek your help with this study. I therefore provided you with the needed informations explaining the aim of this study. Please take time to read it carefully. For further information you can contact the researcher in charge (Paula Romanos at 70/180709).

Thank you for your help

Appendix B

Informed Consent Form

- **Title:** Attorneys awareness of forensic science: A survey conducted in Lebanon

- **Data Collector:** Paula Romanos

Aim of the study:
- The purpose of this study is to evaluate the forensics awareness among Lebanese attorneys.
- We assume that approximately 100 individual will participate in this study.

Procedure:
- You will be asked to answer a questionnaire concerning your socio-demographic situation, forensics knowledge and perception.
- This procedure will be accomplished by an online survey or one session taking maximum 10 minutes duration.

Risks:
- There are no risks from participating in this study.

Benefits:
- There are no benefits to you from participating in this study.
- This study may benefit the society elucidating the level of Lebanese attorneys awareness concerning forensics.

Voluntary Participation:
- Your participation in this study is entirely voluntary: You choose whether to participate. If you decide not to participate, there are no penalties.

Confidentiality:
- Any study records that identify you will be kept confidential.

Compensation:
- You will not receive any payment or other compensation for participating in this study.

Inquiries:
- You can ask questions about this research study now or at any time during the study, by talking to the researcher working with you (Paula Romanos at 70/180709).

WHAT YOUR SIGNATURE MEANS:

Your signature below means that you understand the information in this consent form. Your signature also means that you agree to participate in this study.

By signing this consent form, you have waived any legal rights you would have as a participant in a research study.

Participant's Signature:

Date:

Appendix C

Questionnaire

This document is an anonymous questionnaire about the voluntary recruitment of Lebanese attorneys to answer questions involved in the study titled: 'Attorneys awareness of forensic science: A survey conducted in Lebanon'. For any questions please contact the researcher in charge Paula Romanos using this phone number: 70/180709.

1 - Gender: ❏ Female ❏ Male

2 - Age: ❏ 24-34 < ❏ ≤ 34-44 < ❏ ≤ 44-54 < ❏ ≤ 54-64 ≤

3 - Residency: ❏ Beirut ❏ Mount Lebanon ❏ South ❏ North ❏ Bekaa

4- Type of attorney: ❏ Defence ❏ Prosecution

5- Number of cases involving a forensic evidence: ❏ 0 ❏ 1-5 < ❏ ≤ 5-10 < ❏ ≥ 10

6- Number of past trainings: ❏ 0 ❏ 1-5 < ❏ ≤ 5-10 < ❏ ≥ 10

7- Duration of past trainings: ❏ 1 day ❏ ≤ 2-7 ≤ ❏ > 1 week

8- Crime lab procedures awareness: ❏ Unfamiliar ❏ Average knowledge ❏ Very familiar

9- Technology advances awareness: ❏ Unfamiliar ❏ Average knowledge ❏ Very familiar

10- Statistical methods awareness: ❏ Unfamiliar ❏ Average knowledge ❏ Very familiar

11- Ethical requirements awareness: ❏ Unfamiliar ❏ Average knowledge ❏ Very familiar

12- How reliable is the forensic evidence?

❏ Unreliable ❏ Somewhat reliable ❏ Very reliable

13- What is the most reliable form of forensic evidence?

❏ DNA evidence ❏ Toxicology evidence ❏ Fingerprints ❏ Firearms ❏ GSR

❏ Digital evidence ❏ Shoeprint ❏ Font emulation ❏ Other, please specify:....................

14- Are forensic evidence resources available?

❏ Not available ❏ Average availability ❏ Very available

15- What are the most identifiable resources for forensic evidence?

❏ Scientific research articles ❏ Experts testimony ❏ Private educational programs ❏Other, specify...

16- Do you like to participate in a training concerning the forensic evidence?

❑ Not interested   ❑ It depends, please specify……..   ❑ Very interested

17- If interested, which forensic evidence topic prefered to be covered at training?

❑ DNA   ❑ Toxicology   ❑ Fingerprints   ❑ Firearms   ❑ GSR

❑ Digital   ❑ Shoeprint   ❑ Font emulation   ❑ Other, please specify :……………………