

Original article**Knowledge, Attitude and Practice of an Egyptian Physicians Sample towards Dealing with Medico-legal Cases and Forensic Evidence**

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ABSTRACT

Introduction: A medico-legal case (MLC) is one of the most challenging clinical cases encountered by physicians during their daily work. Handling violence, poisonings, and multiple injury cases indicate the important role of physicians in

examining such injuries before changing their features through surgical intervention or recovery.

Aim of the work: to assess knowledge, attitude, and practice of an Egyptian physicians' sample towards dealing with MLC and forensic evidence. **Participants and methods:** A cross-sectional study using an anonymous electronic questionnaire was conducted on a convenience sample. The questionnaire included demographic and training characteristics, knowledge, attitude, and practice in dealing with MLC and forensic evidence and common challenges. **Results:** The respondents were 145 Egyptian physicians and 83% of them did not receive any postgraduate forensic training. Based on Bloom's cutoff score, the participants had fair knowledge (50.3%), a positive attitude (67.6 %) and 80% had poor practice. No significant associations were found between the knowledge and the attitude scores with all studied variables. Age group >50 was found to be associated with positive attitude better than other age groups while poor practice was observed in age group (20-30 years). Physicians with previous postgraduate forensic training had better knowledge, more positive attitude, and better practice scores than those without such training. There were considerable challenges faced by physicians during dealing with MLCs, such as pressure from relatives (92.4%), psychological stress (89.7%), and proper dealing with forensic evidence (89%). **Conclusion:** Despite that most of the participants in this study had positive attitude score towards dealing with MLCs, only half of them had fair knowledge and 80% had poor practice. **Recommendations:** To integrate forensic education at the postgraduate level and take measures to ensure proper handling, documentation, and reporting of MLCs and forensic evidence at medical institutes to protect patient rights.

Keywords: Forensic evidence, medico-legal case, Egyptian physicians.

I. INTRODUCTION:

A medico-legal case (MLC) is one of the most challenging clinical cases encountered by healthcare workers during their daily routine work (Madadin et al., 2021). MLC which is "any case of injury or illness, etc., in which inspections by law-enforcement authorities are crucial to determine liability for such injury or illness" forms a vital aspect in the medical practice context (Mokhtar et al., 2018; Gurpur et al., 2019). Obviously, numerous MLCs arrive at the hospitals, including poisonings, burns, accidents, physical or sexual assault, falls, criminal violence injuries, and others (Brahmankar and Sharma, 2017; Madadin et al., 2021). Unreported MLCs could be admitted directly to the hospital, and after obtaining a thorough history and examination of the patient, the physician will decide the need to refer such cases to legal authorities, while some other cases could be referred to the physician by the legal authorities to gather medical opinion to help in the administration of justice. Thus, patients' forensic requirements should be properly dealt with by the medical team (Ozsaker et al., 2020; Rahmqvist Linnarsson et al., 2015; Zaki et al., 2019). Avoiding and fearing to deal with MLC by physicians is well documented. Accordingly, regardless of specialty, attaining adequate medico-legal knowledge is critical for all medical practitioners to overcome their MLC phobia (Gurpur et al., 2019; Singh et al., 2019).

Medical professionals contribute to justice establishment by aiding the court to make sound legal decisions based on appropriate medical knowledge. A health care practitioner who works with MLC might

be summoned to testify in court for a variety of reasons. It might be concerned with providing treatment to patients of a malpractice lawsuit, or a civil/criminal legal situation, or an allegation of physical or sexual abuse, or providing expert testimony. Without the proper training, this may be a scary encounter (Kotze et al., 2014; Mokhtar et al., 2018).

On the other hand, primary medical reports may be the sole technical record upon which the court depends without the need for medical professional verbal testimony. This demonstrates the significance of meticulous documentation (Mokhtar et al., 2018). There is a significant disparity between hospitals and forensic reports all throughout the world, which might be ascribed to the medical team's emphasis on preserving patients' lives. As a result, in such tense situations, limited documentation is expected (Zaki et al., 2018).

The notion of trace evidence, developed by Edmund Locard 1920, has transformed how law enforcement and scientists handle crime investigation. According to Edmund Locard, leaving no evidence at the site of a crime should be inconceivable. Theorists further elaborated on this remark by claiming that the offender enters the crime scene with something and departs with something, which both may be utilized as forensic evidence. A physician is competent to seek for forensic evidence by conducting a physical examination and gathering biological evidence on the patient's body (Ozsaker et al., 2020; Kotze, Brits, and Botes, 2014).

Although today's forensic science technological advances have broadened the materials that may be retrieved and examined

for forensic purposes (Smith, Bull, and Holliday, 2011), only properly gathered, conserved, stored, and transferred materials have merit as forensic evidence. Accordingly, attending physicians are responsible for spotting medico-legal concerns and understanding how to handle medico-legal situations properly, which includes prompt thorough documentation and proper dealing with the chain of forensic evidence (Zaki et al., 2018). Therefore, we aimed to assess the knowledge, attitude, and practice of a sample of Egyptian physicians towards dealing with medico-legal cases and forensic evidence.

II. PARTICIPANTS AND METHODS:

II.1 Study sample:

A cross-sectional questionnaire study was conducted on a convenience sample of Egyptian physicians. The sample size was calculated by using an Open Epi (Open-Source Epidemiologic Statistics for Public Health) version 3, open-source calculator to determine the sample size. The following criteria were set: 94.2% positive attitude for the doctors to be aware of proper MLC handling (Mokhtar et al., 2018), a confidence level of 99%, and limit of precision of 5%, with a design effect of 1.0. The estimated sample size was 145 Egyptian physicians.

II.2 Study tool:

We developed an electronic questionnaire guided by previous literature and the questionnaire was conducted in English language (Henderson, Harada, and Amar, 2012; Sheikh et al., 2012; Mokhtar et al., 2018; Murphy, 2018; Zaki et al., 2018; 2019; Ozsaker et al., 2020). The questionnaire was distributed by sending the google form link via social media.

The questionnaire consists of the following five sections:

Section I: Basic demographic and professional characteristics, including age, gender, current job title, highest qualification, primary specialty, experience years, workplace, previous attending of postgraduate forensic education/training, previous dealing with MLCs, writing ML reports, and experiencing courtroom testimony.

Section II: Physicians' knowledge about certain ML aspects. This section included 29 items and participants were asked to respond to knowledge items as (Yes/No/Do not know).

Section III: Physicians' attitudes towards certain ML issues and towards attending future learning opportunities in forensics and was assessed using a five-point Likert scale (Norman, 2010). For each of 13 statements, respondents were asked to state their level of agreement, from "1-strongly disagree, 2-disagree, 3-not sure, 4-agree and 5-strongly agree".

Section IV: Physicians' practice regarding dealing with MLC and forensic evidence. This section included 8 questions related to practices and was assessed using Yes/No questions to whether they performed the mentioned practice.

Section V: Challenges faced by physicians during dealing with MLC and forensic evidence.

II.3 Questionnaire validation:

To assess the content validity, we distributed the questionnaire to three experts with knowledge and expertise in forensic medicine. No elimination of any items or modifications was required. We performed a

pilot testing of the questionnaire among 20 Egyptian physicians and modifications were made for a better understanding of the questionnaire. Regarding reliability, the overall Cronbach alpha showed a high level of internal consistency for our questionnaire.

II.4 Statistical analysis:

Data from the questionnaire were coded, entered, and analyzed using a basic statistics program: statistical package for social sciences (SPSS) software version 26. The data were summarized using descriptive statistics. For categorical variables, data were represented as frequencies (n) and percentages (%). Independent variables were sociodemographic data. Regarding dependent variables, participants were asked to respond to the 29 knowledge items as either yes or no, with an additional “Do not know” option. Incorrect or don't know responses were given a score of zero, and correct answers were assigned a score of one. The total score for knowledge ranged from zero to 29. Scoring for the attitude section was as follows: positive attitude statements were given a score of 1 for “strongly disagree” to 5 for “strongly agree” while the negative attitude statements were scored as follows; 1 for “strongly agree” to 5 for “strongly disagree”. Scores were calculated by averaging respondents' answers to the thirteen statements. Total scores ranged from 13 to 65. The practice was scored as one for answers that reflected good practice while a score of zero was given for answers that reflected poor practice. The total score ranged from zero to eight, with an 8 score indicating the best practice. The median was sought for knowledge, attitude, and practice scores.

Original Bloom's cut-off points, 80.0%–100.0%, 60.0%–79.0%, and $\leq 59.0\%$, were adapted to categorize knowledge, attitude, and practice, each into three levels (Akalu, Ayelign, and Molla, 2020).

- The knowledge score varied from (range: 0–29). The overall knowledge score was categorized into good if the score was between (24–29) 80 and 100%, fair if the score was between (18–23) 60 and 79%, and poor if the score was less than 60% (0–17 scores).
- The attitude score varied from (range: 13–65). The overall attitude score was categorized into positive if the score was between (52–65) 80 and 100%, neutral if the score was between (39–51) 60 and 79%, and negative if the score was less than 60% (13–38).
- The practice score varied from (range: 0–8). The overall practice score was categorized into good if the score was between 80 and 100% (6.4–8), fair if the score was between 60 and 79% (4.8–6.3), and poor if the score was less than 60% (0–4.7)

The chi-square test was used to determine the association between the independent variables (age, gender, current job title, highest qualification, primary specialty, years of experience, workplace, and previous postgraduate Forensic education/training) and the dependent variables (scores for knowledge, attitudes, and practice). Statistical significance was defined as a p-value of (< 0.05).

II.5 Ethical considerations

Ethical approval from the Research Ethics committee (REC) of Faculty of Medicine, Suez Canal University, Egypt was obtained

(Reference number; 4688). Informed consent was obtained from all participants. Completing the questionnaire and submitting it denoted the voluntary consent to participation in the study. A detailed participant's information sheet was written at the beginning of the questionnaire to explain the purpose of the research, potential benefits, risks, ensuring that participation is voluntary and that he/she has the right to refuse participation or to withdraw without any reasons and without any negative consequences. Confidentiality was ensured by keeping the questionnaire anonymous and avoiding mentioning any identifying features of the participants.

III. RESULTS

There were 145 physicians who responded and completed questionnaires on the online survey. The questionnaires of respondents were analyzed. Table (1) shows the demographic and professional characteristics of the respondent physicians. Data revealed that 59.3% were in the age group of >30–40 years, and most respondents (77.9%) were females. Specialists represented 42.1%, followed by consultants (33.1%), and finally residents (24.8%). About 45% of participants have a master's degree, and 28.3% have a doctorate degree. Approximately 39% of participants were emergency physicians, followed by internal medicine physicians (24.8%), then family physicians and surgeons (11.7%) for each, then obstetricians (6.9%), and finally pediatricians (5.5%). More than half of the participants (56.6%) worked at university hospitals. The highest frequency of physicians (32.4%) had years of work experience ranging from >10–15 years.

Figure (1) summarizes the status of physicians' postgraduate forensic training. Only 17% received postgraduate formal forensic education/training. As regards specific postgraduate forensic education/training, only 16.6% of participants received postgraduate specific forensic training on dealing with MLCs, followed by 14.5% who were trained on writing death certificates.

Figure (2) shows that less than half of the respondent physicians (42%) had previous experience in dealing with MLCs and forensic evidence, from which quarrel assaults represented the most common cases (10%), followed by poisoning and drug intoxication cases (9.7%), then domestic violence cases (8.3%), and child abuse cases (6.9%). Only 8.3% of respondent physicians experienced previous courtroom testimony for MLCs, while 6.2% experienced previous courtroom testimony for malpractice suits. About half of the physicians (49.7%) stated that they have experience in writing primary ML reports of injuries. As regards the items that physicians were keen to fulfill during writing the primary ML report of injuries, most physicians (95.4%) chose the date of the examination, followed by the detailed description of the injury (92%), then the physician's signature and the general appearance of the patients represented 85.1% for each. While the least items usually completed by the physicians were photographic documentation of injuries (34.5%), patients' past medical history (39.1%), and companions of an incompetent patient (40.2%) (Figure 3).

Exploring physicians' knowledge regarding recognizing MLCs revealed that the top

victims considered as MLCs by the physicians were victims of sexual assaults (92.4%), and child abuse (91.7%), followed by victims of suicide or suicidal attempts, and

gunshot injuries victims representing 86.9% for each. While the least victims considered as MLCs by the physicians were pedestrian accidents victims (49%) (Figure 4).

Table 1: Demographic data of physicians (N= 145).

Demographic data		n	%
Age	20–30 years	37	25.5%
	>30–40 years	86	59.3%
	>40–50 years	16	11.0%
	>50 year	6	4.1%
Gender	Male	32	22.1%
	Female	113	77.9%
Current job title	Resident	36	24.8%
	Specialist	61	42.1%
	Consultant	48	33.1%
Qualification	Bachelor degree	32	22.1%
	Master degree	65	44.8%
	Doctorate degree	41	28.3%
	Fellowship	7	4.8%
Specialty	Emergency Medicine	57	39.3%
	Family medicine	17	11.7%
	Internal medicine	36	24.8%
	Surgery	17	11.7%
	Obstetrics	10	6.9%
	Pediatrics	8	5.5%
Hospital category	University hospital	82	56.6%
	Ministry of health hospital/Center	50	34.5%
	Military hospital	3	2.1%
	Private sector	4	2.8%
	Health insurance organization	6	4.1%
Experience years	< 5 years	35	24.1%
	5–10 years	41	28.3%
	>10–15 years	47	32.4%
	>15 years	22	15.2%

n= number, N=total number

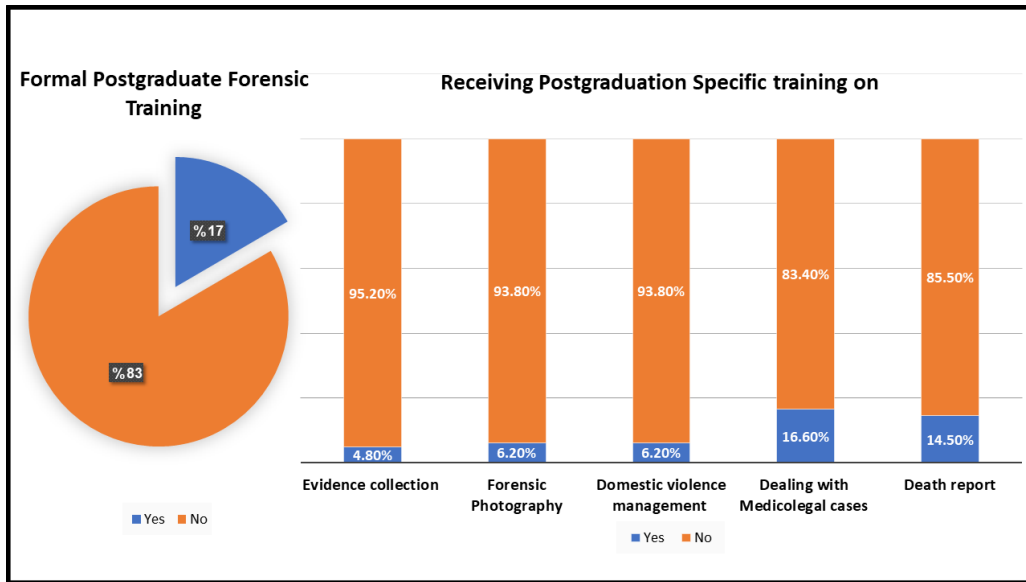


Figure 1: Postgraduate forensic education/training status of the respondent physicians (N= 145).

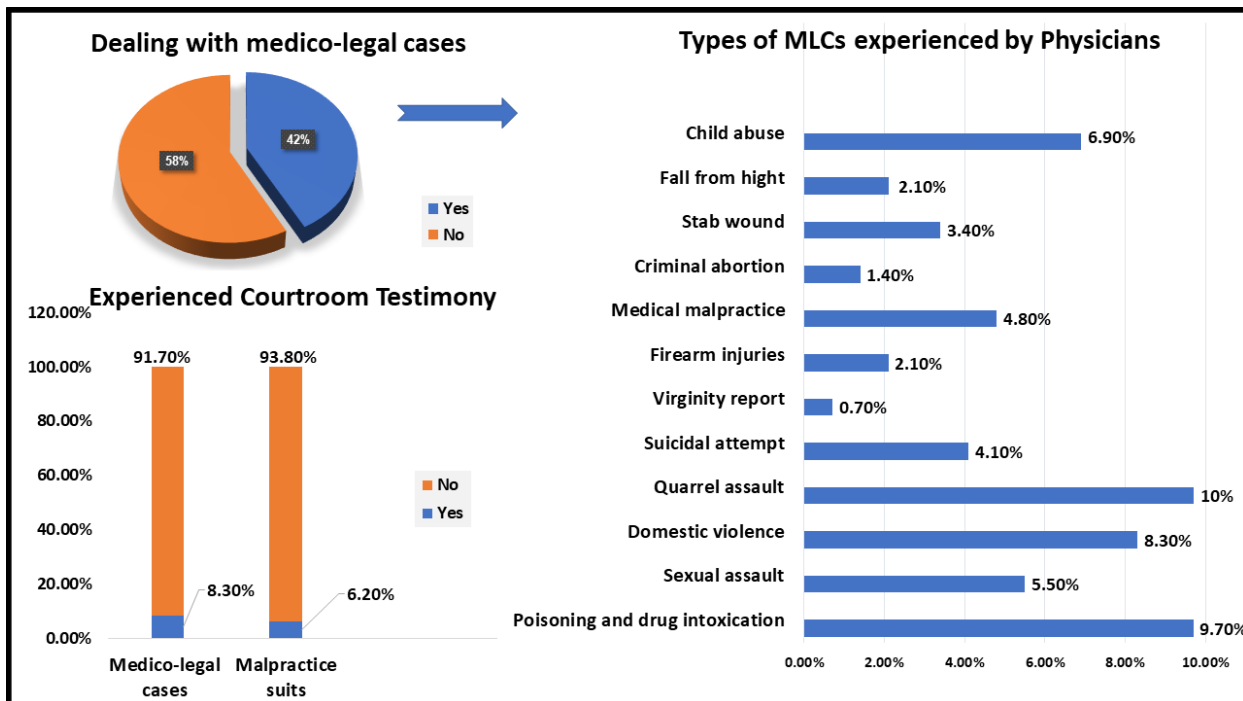


Figure 2: Physician's experience regarding dealing with medico-legal cases and forensic evidence (N= 145).

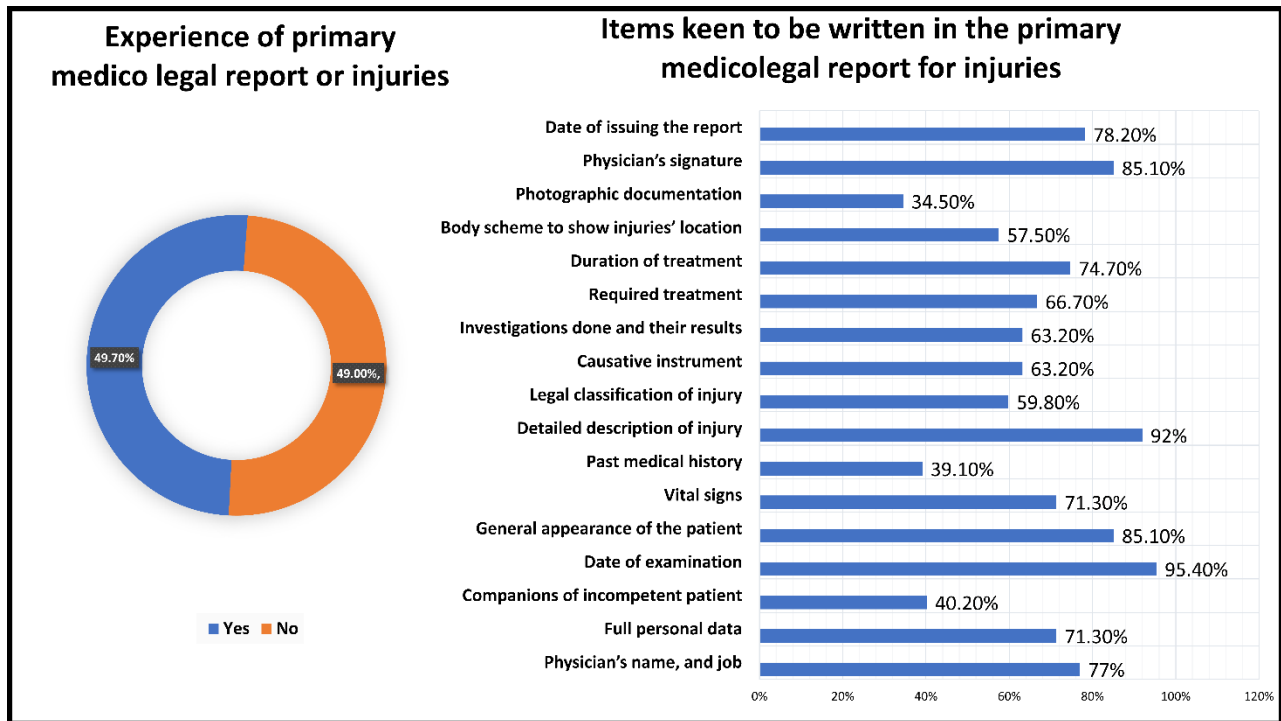


Figure 3: Physician's experience of writing primary medicolegal reports (N= 145).

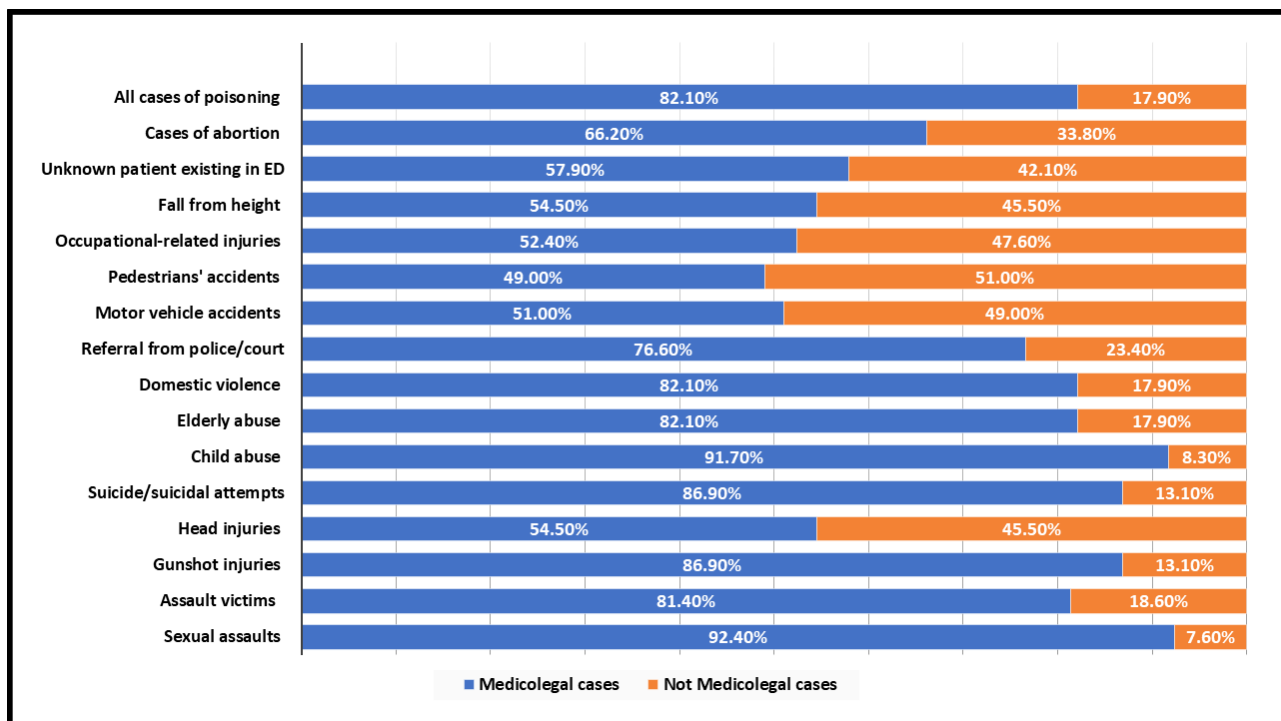


Figure 4: Physician's knowledge regarding recognizing medicolegal cases (N= 145).

Table (2) shows physicians' knowledge about certain MLCs and forensic evidence. Most respondent physicians (89%) knew that suspected living or dead MLCs should be notified immediately to the legal authority to avoid any legal responsibility and that a hospital admitted forensic case should not be delivered to the relatives immediately upon death (69%). About half of the participating physicians (51%) did not consider notification to the police of recognizing illicit drugs in the blood or urine of drivers following an automobile accident is a violation of confidentiality. Most respondent physicians (86.2%) defined ML evidence as

any material gathered from the case that might be useful in judicial proceedings. Only 34.5% of participating physicians recognized their responsibility for gathering, labeling, and conserving any patient-related forensic evidence, and that wet material should be allowed to dry before packaging (13.8%). About two-thirds of physicians (67.6%) emphasized the importance of taking patients or his/her relatives' permission for photographic documentation purposes. Participants who realized that doctors cannot refuse to treat a medico-legal case represented 60%.

Table 2: Physicians' knowledge about certain medico-legal cases and forensic evidence (N= 145)

Knowledge items	Correct n&%	Incorrect n &%
Suspected medico-legal cases (living or dead) are to be notified to the legal authority immediately, otherwise, there will be a legal responsibility	129 (89.0%)	16 (11%)
Upon death of an admitted forensic case in the hospital, the physicians can hand over the deceased to the relatives immediately	100 (69.0%)	45 (31.0%)
In motor car accidents, if the physicians notified the police of detection of drugs of abuse in the driver's blood or urine; this can't be considered breach confidentiality.	74 (51.0%)	71 (49%)
A simple wound is that heal within a period less than 20 days.	110 (75.9%)	35 (24.1%)
Medico-legal evidence is any substance collected from the case that may have value in legal investigations	125 (86.2%)	20 (13.8%)
Physicians are responsible for collecting, labeling, and preserving all materials related to the patient which could be evidence in a forensic investigation.	50 (34.5%)	95 (65.5%)
Wet material should be allowed to dry before packaging	20 (13.8%)	125 (86.2%)
All evidence materials are to be placed separately in paper packaging or envelopes.	105 (72.4%)	40 (27.6%)
All kinds of material which could be evidence are to be handled to the police authorities in accordance to a chain of evidence.	109 (75.2%)	36 (24.8%)
Permission is to be taken from the patient or his/her relatives when any photographic documentation is made	98 (67.6%)	47 (32.4%)
Doctors cannot refuse to treat a MedicoLegal case.	87 (60.0%)	58 (40%)
During court room testimony, doctors should avoid complex medical terminology	110 (75.9%)	35 (24.1%)
During court room testimony, If a particular question falls outside the doctor's area of expertise, doctor is obliged to answer even outside his competence	101 (69.7%)	44 (30.3%)

n= number, N=total number

Table (3) shows physicians' attitudes towards dealing with certain ML issues and forensic evidence (N= 145). It is found that about 69% considered legal issues the duty of the hospital, not the physician. Most of them 91% considered incomplete ML reports could lead to legal consequences. Also, the majority of them 96.5% considered that to protect a patient's legal rights, precise injury reporting is critical. 89 % had a positive attitude towards the importance for the physicians to be aware of the appropriate forensic evidence handling and the need of having a ML committee at the hospital to help physicians when they encounter difficulty with ML issues. Only 42% said that describing the injury's causative instrument should be based on the patient allegation. For photographic documentation for MLCs, the majority 94.5% considered it to be useful to forensic medicine doctors and 92.5% considered it protection to medical staff from remote legal consequences. Caring for a more accurate recording of the victims' injuries than the perpetrators' is justified by 38 % of the participants. Unfortunately, less than half 44.8% perceived that the current overall medical approach of MLCs at their workplace is appropriate. Although only 35% said that they can successfully handle MLCs based on their current educational and clinical background, about 57.9% of them considered future training in dealing with MLCs and forensic evidence. Most of them 89.7% considered being well-prepared by patient's medical documents before court

room testimony is essential and only 18.6% said that they could ignore a subpoena.

Table (4) shows physicians' some practices regarding dealing with MLCs and forensic evidence. About 55.2% are keen to include full description of the injury during ML report documentation. Less than half of them 37.2% are keen to include the causative instrument, 44.8% are keen to include the duration of treatment, 24.8% use wound diagram and only 13.1 % do photographic documentation. Although 52.4% are keen to notify legal authorities for suspected MLCs, only 23.4% are keen to notify relatives. For forensic evidence, only 15.9% follow a specific workplace protocol for forensic evidence handling.

Table (5) shows the categorization of knowledge, attitude, and practice scores of the studied participants regarding dealing with MLCs and forensic evidence into three levels based on Bloom's cutoff points, and the median score. As regards knowledge, the highest score to be achieved was 29, the median score was 20. 50.3% of the participating participants had fair knowledge, while only 16.6 % had good knowledge. Concerning attitude, the highest positive attitude score to be achieved was 65, and the median score was 54. 67.6 % of the participating participants had positive attitude. As regards the practice, the highest score to be achieved was 8, and the median score was 3. Only 5.5 % of the participating participants had good practice, while 80% had poor practice performance.

Table 3: Physicians' attitude towards dealing with certain medico-legal issues and forensic evidence (N= 145).

Statements	Strongly agree n&%	Agree n&%	Neutral n&%	Disagree n&%	Strongly disagree
Legal issues are considered a fundamental hospital's responsibility not as physician's responsibility.	48 (33.1%)	52 (35.9%)	31 (21.4%)	13 (9.0%)	1 (0.7%)
Incomplete medico- legal reports issued from the emergency department at my workplace could lead to legal consequences	71 (49.0%)	61 (42.1%)	9 (6.2%)	4 (2.8%)	0
Accurate documentation of injuries is very important to preserve patients' legal rights.	122 (84.1%)	18 (12.4%)	5 (3.4%)	0	0
The causative instrument of the injury should be described according to patient's allegations.	26 (17.9%)	35 (24.1%)	53 (36.6%)	22 (15.2%)	9 (6.2%)
It is important for the physicians to be aware of the proper handling of forensic evidence	86 (59.3%)	43 (29.7%)	15 (10.3%)	1 (0.7%)	0
Photographic documentation for any medico-legal case can be useful to forensic medicine doctors	87 (60.0%)	50 (34.5%)	8 (5.5%)	0	0
Photographic documentation could protect medical staff from remote legal consequences	82 (56.6%)	52 (35.9%)	10 (6.9%)	1 (0.7%)	0
Caring of accurate documentation of the victims' injuries more than that of the assailants is justified	22 (15.2%)	33 (22.8%)	46 (31.7%)	27 (18.6%)	17 (11.7%)
In my work place, current overall medical approach of medico-legal cases is appropriate	16 (11.0%)	49 (33.8%)	46 (31.7%)	26 (17.9%)	8 (5.5%)
A medico-legal committee in the hospital is important to guide physicians when they face difficulties during the handling of medico-legal cases.	91 (62.8%)	38 (26.2%)	14 (9.7%)	1 (0.7%)	1 (0.7%)
I could successfully handle medico-legal cases based on my current educational and clinical background	16 (11.0%)	35 (24.1%)	58 (40.0%)	25 (17.2%)	11 (7.6%)
I could ignore a subpoena (a court-ordered command to appear in court at a certain date, time, and place to provide verbal testimony)	12 (8.3%)	15 (10.3%)	57 (39.3%)	39 (26.9%)	22 (15.2%)
Being well-prepared by patient's medical documents before court room testimony is essential	89 (61.4%)	41 (28.3%)	14 (9.7%)	0	1 (0.7%)
Future training in MLC and forensic evidence	38 (26.2%)	46 (31.7%)	52 (35.9%)	4 (2.8%)	5 (3.4%)

n= number, N=total number

Table 4: Physicians' practice regarding dealing with medico-legal cases and forensic evidence (N= 145).

Items	Yes n&%	No n&%
During Medicolegal report documentation, you keen to include		
Full description of the injury	80 (55.2%)	65 (44.8%)
Causative instrument	54 (37.2%)	91 (62.8%)
Duration of treatment	65 (44.8%)	80 (55.2%)
Wound diagram	36 (24.8%)	109 (75.2%)
Photographic documentation	19 (13.1%)	126 (86.9%)
You notify legal authorities for suspected MLCs	76 (52.4%)	69 (47.6%)
You notify relatives for suspecting MLCs	34 (23.4%)	111 (76.6%)
You follow a specific workplace protocol for forensic evidence handling	23 (15.9%)	122 (84.1%)

n= number, N=total number

Table 5: Bloom's cutoff categories for the Physicians' total knowledge, attitude and practice scores regarding dealing with medico-legal cases and forensic evidence (N= 145).

KAP score	Category	N	%
Knowledge Median (20)	Poor level	48	33.1%
	Fair level	73	50.3%
	Good level	24	16.6%
Attitude Median (54)	Negative attitude	0	0.0%
	Neutral Attitude	47	32.4%
	Positive Attitude	98	67.6%
Practices Median (3)	Poor	116	80.0%
	Fair	21	14.5%
	Good	8	5.5%
Total		145	100%

n= number, N=total number

Table (6) shows association of the participating physicians' knowledge scores with their sociodemographic characteristics and their previous postgraduate Forensic education/training. Among the studied physicians, increase in age and in years of experience were found to be associated with better knowledge. Females (17.7%) showed better knowledge than males (12.5%). Consultants (20.8%) showed better knowledge than specialists (14.8%) and residents (13.9%). Emergency physicians (24.6%) had greater knowledge than other specialties. Private sector physicians in our study showed greater knowledge (25%) than university hospital physicians (18.3%) followed by Ministry of health physicians (16.0 %). Physicians with previous postgraduate Forensic education/training (25.0 %) had better knowledge than those without such education/training (14.9 %). Physicians with previous postgraduate specific training on; Forensic evidence, photographic documentation, domestic

violence management, dealing with MLCs, and death certificate, had better knowledge than those without such training. No significant associations were found between the knowledge scores and all studied variables.

Table (7) shows association of the participating physicians' attitude scores with their sociodemographic characteristics and their previous postgraduate Forensic education/training. Among the studied physicians, age group >50 was found to be associated with positive attitude better than other age groups. Males (68.8%) showed a positive attitude better than females (67.3%). Specialists (73.8%) had a positive attitude better than consultants (64.6%) and residents (61.1%). Participating obstetricians (80%) had a positive attitude better than other specialties. Physicians with experience >10–15 years showed a better positive attitude (76.6%). Private sector physicians in our study showed better positive attitude (100%) than Ministry of health physicians (70%) followed by physicians of both Military

hospitals and health insurance hospitals (66.7%). Interestingly, university hospital physicians showed the least positive attitude (64.6%). Physicians with previous postgraduate Forensic education/training (79.2%) had a positive attitude better than those without such education/training (65.3%). Physicians with previous postgraduate specific training on; Forensic evidence, domestic violence management, dealing with MLCs, and death certificate, had a positive attitude better than those without such training. No significant associations were found between the attitude scores and all studied variables.

Table (8) shows the association of the participating physicians' practice scores with their sociodemographic characteristics and their previous postgraduate forensic education/training. Among the studied physicians, the poor practice was shown more in the smallest studied age group (20-30 years) as compared to other age groups, but the difference was not significant ($p=0.137$). Males (18.8%) had significantly good practice scores than females (1.8%). The poor practice was shown among participating residents (88.9%) more than among specialists and consultants. Emergency physicians (8.8%) had better practice score as compared to other specialties. Physicians with experience >10–15 years showed better practice score (8.5%). Poor practice score was shown more among Ministry of health physicians in our study (84%). Interestingly, Military hospitals physicians (33.3%) showed good practice score better than other physicians at different hospital categories.

Physicians with previous postgraduate forensic education/training (20.8%) had significantly good practice score better than those without such education/training (2.5%). Physicians with previous postgraduate specific training on; forensic evidence, domestic violence management, dealing with MLCs, and death certificate, had significantly good practice score better than those without such training except for previous postgraduate specific training on death certificate for which the difference was insignificant ($p=0.115$)

Figure (5) shows challenges faced by physicians during dealing with MLCs and forensic evidence. Firstly, the majority of them 86.2% considered classifying cases as ML ones & 86.9% denoted considering material as forensic evidence are challenges. Most of them 89% considered proper dealing with Forensic evidence before handling to police authorities is a challenge. Secondly, a large percentage found difficulties regarding ML report documentation, 75.9% considered writing ML reports is a challenge, 82.8% found the Arabic language of the ML report also a challenge. About 73.8 % considered the time wasted in ML issues (ML reports and handling forensic evidence), 92.4% considered the pressure/stress from relatives or others that could prevent disclosure of criminal suspicion, 89.7% considered psychological stress, 87.6% considered increased ML liability and 80% considered courtroom testimony process are other forms of challenges facing physicians during dealing with medico-legal cases and forensic evidence

Table 6: Association of physicians' Knowledge scores regarding dealing with medico-legal cases and forensic evidence with their sociodemographic characteristics and their previous postgraduate Forensic education/training (N= 145).

Demographic variables		Knowledge score*			p value#
		Poor n&%	Fair n&%	Good n&%	
Age	20–30 years	14 (37.8%)	16 (43.2%)	7 (18.9%)	.375
	>30–40 years	28 (32.6%)	46 (53.5%)	12 (14%)	
	>40–50 years	5 (31.3%)	9 (56.3%)	2 (12.5%)	
	>50 years	1 (16.7%)	2 (33.3%)	3 (50.0%)	
Gender	Male	13 (40.6%)	15 (46.9%)	4(12.5%)	.547
	Female	35 (31.0%)	58 (51.3%)	20 (17.7%)	
Current Job title	Resident	12 (33.3%)	19 (52.8%)	5 (13.9%)	.756
	Specialist	23 (37.7%)	29 (47.5%)	9 (14.8%)	
	Consultant	13 (27.1%)	25 (52.1%)	10 (20.8%)	
Highest Qualification	Bachelor	12 (37.5%)	15 (46.9%)	5(15.6%)	.571
	Master	23 (35.4%)	32 (49.2%)	10 (15.4%)	
	Doctorate	13(31.7%)	20 (48.8%)	8 (19.5%)	
	Fellowship	0 (0.0%)	6 (85.7%)	1(14.3%)	
Primary Specialty	Emergency	11 (19.3%)	32 (56.1%)	14 (24.6%)	.130
	Family medicine	5 (29.4%)	11 (64.7%)	1 (5.9%)	
	Internal medicine	17 (47.2%)	15 (41.7%)	4 (11.1%)	
	Obstetrics	3(30.0%)	5 (50.0%)	2 (20.0%)	
	Pediatrics	4 (50.0%)	4 (50.0%)	0 (0.00%)	
	Surgery	8 (47.1%)	6 (35.3%)	3(17.6%)	
Experience years	< 5 years	13 (37.1%)	15 (42.9%)	7 (20.0%)	.836
	5–10 years	14 (34.1%)	22 (53.7%)	5 (12.2%)	
	>10–15 years	16 (34.0%)	24 (51.1%)	7 (14.9%)	
	>15 years	5 (22.7%)	12 (54.5%)	5 (22.7%)	
Workplace	University hospital	22 (26.8%)	45 (54.9%)	15 (18.3%)	.673
	Ministry of health	21(42.0%)	21 (42.0%)	8 (16.0%)	
	Military hospital	1 (33.3%)	2 (66.7%)	0.0%	
	Private sector	1 (25.0%)	2 (50.0%)	1 (25.0%)	
	Health insurance	3 (50.0%)	3 (50.0%)	0.0%	
Previous postgraduate forensic education/training					
Formal postgraduate forensic education	Yes	5(20.8%)	13(54.2%)	6(25.0%)	.268
	No	43(35.5%)	60(49.6%)	18(14.9%)	
Postgraduate specific training on					
Forensic evidence	Yes	3(42.9%)	2(28.6%)	2(28.6%)	.462
	No	45(32.6%)	71(51.4%)	22(15.9%)	
Photographic documentation	Yes	3(33.3%)	4(44.4%)	2(22.2%)	.881
	No	35(27.8%)	69(54.8%)	22(17.4%)	
Domestic violence management	Yes	1(11.1%)	6(66.7%)	2(22.2%)	.351
	No	47(34.6%)	67(49.3%)	22(16.2%)	
Dealing with medicolegal cases	Yes	6(25.0%)	12(50.0%)	6(25.0%)	.404
	No	42(34.7%)	61(50.4%)	18(14.9%)	
Death certificate	Yes	6(28.6%)	10(47.6%)	5(23.8%)	.616
	No	42(33.9%)	63(50.8%)	19(15.3%)	

[§]Significance at $p < 0.05$ using #Chi-square analysis. n= number, N=total number.

*Total knowledge score range (0-29).

Good knowledge if the score (24-29), fair if the score (18-23), and poor if the score (0–17).

Table 7: Association of physicians' attitude scores (neutral and positive attitude scores) regarding dealing with medico-legal cases and forensic evidence with their sociodemographic characteristics and their previous postgraduate Forensic education/training (N= 145).

Demographic variables		Attitude score*		p value#
		Neutral n&%	Positive n&%	
Age	20–30 years	13 (35.1%)	24 (64.9%)	.263
	>30–40 years	27 (31.4%)	59(68.6%)	
	>40–50 years	7(43.8%)	9(56.3%)	
	>50 years	0.0%	6(100.0%)	
Gender	Male	10(31.3%)	22(68.8%)	.873
	Female	37(32.7%)	76(67.3%)	
Current Job title	Resident	14(38.9%)	22(61.1%)	.377
	Specialist	16(26.2%)	45(73.8%)	
	Consultant	17(35.4%)	31(64.6%)	
Highest Qualification	Bachelor	12(37.5%)	20(62.5%)	.792
	Master	19(29.2%)	46(70.8%)	
	Doctorate	13(31.7%)	28(68.3%)	
	Fellowship	3(42.9%)	4(57.1%)	
Primary Specialty	Emergency	21(36.8%)	36(63.2%)	.093
	Family medicine	5(29.4%)	12(70.6%)	
	Internal medicine	9(25.0%)	27(75.0%)	
	Obstetrics	2(20.0%)	8(80.0%)	
	Pediatrics	6(75.0%)	2(25.0%)	
	Surgery	4(23.5%)	13(76.5%)	
Experience years	< 5 years	13(37.1%)	22(62.9%)	.461
	5–10 years	15(36.6%)	26(63.4%)	
	>10–15 years	11(23.4%)	36(76.6%)	
	>15 years	8(36.4%)	14(63.6%)	
Workplace	University hospital	29(35.4%)	53(64.6%)	.666
	Ministry of health	15(30.0%)	35(70.0%)	
	Military hospital	1(33.3%)	2(66.7%)	
	Private sector	0.0%	4(100.0%)	
	Health insurance	2(33.3%)	4(66.7%)	
Previous postgraduate forensic education/training				
Formal postgraduate forensic education	Yes	5 (20.8%)	19(79.2%)	.185
	No	42(34.7%)	79(65.3%)	
Postgraduate specific training on				
Forensic evidence	Yes	2(28.6%)	5(71.4%)	.824
	No	45(32.6%)	93(67.4%)	
Photographic documentation	Yes	3(33.3%)	6(66.7%)	.951
	No	44(32.4%)	92(67.6%)	
Domestic violence management	Yes	2(22.2%)	7(77.8%)	.500
	No	45(33.1%)	91(66.9%)	
Dealing with medicolegal cases	Yes	4(16.7%)	20(83.3%)	.071
	No	43(35.5%)	78(64.5%)	
Death certificate	Yes	5(23.8%)	16(76.2%)	.362
	No	42(33.9%)	82(66.1%)	

§Significance at $p < 0.05$ using #Chi-square analysis. n= number, N=total number.

*Total attitude score range (13–65).

Positive attitude if the score (52-65), neutral if the score (39-51), and negative if the score (13-38).

Table 8: Association of physicians' practice scores regarding dealing with medico-legal cases and forensic evidence with their sociodemographic characteristics and their previous postgraduate Forensic education/training (N= 145).

Demographic variables		Practice score*			p value#
		Poor n&%	Fair n&%	Good n&%	
Age	20–30 years	31(83.8%)	5(13.5%)	1(2.7%)	.137
	>30–40 years	71(82.6%)	9(10.5%)	6(7.0%)	
	>40–50 years	11(68.8%)	5(31.3%)	0.0%	
	>50 years	3(50.0%)	2(33.3%)	1(16.7%)	
Gender	Male	21(65.6%)	5(15.6%)	6(18.8%)	.001^s
	Female	95(84.1%)	16(14.2%)	2(1.8%)	
Current Job title	Resident	32(88.9%)	3(8.3%)	1(2.8%)	.265
	Specialist	50(82.0%)	7(11.5%)	4(6.6%)	
	Consultant	34(70.8%)	11(22.9%)	3(6.3%)	
Highest Qualification	Bachelor	28(87.5%)	3(9.4%)	1(3.1%)	.798
	Master	52(80.0%)	9(13.8%)	4(6.2%)	
	Doctorate	31(75.6%)	8(19.5%)	2(4.9%)	
	Fellowship	5(71.4%)	1(14.3%)	1(14.3%)	
Primary Specialty	Emergency	43(75.4%)	9(15.8%)	5(8.8%)	.360
	Family medicine	15(88.2%)	1(5.9%)	1(5.9%)	
	Internal medicine	31(86.1%)	4(11.1%)	1(2.8%)	
	Obstetrics	6(60.0%)	4(40.0%)	0.0%	
	Pediatrics	8(100.0%)	0.0%	0.0%	
	Surgery	13(76.5%)	3(17.6%)	1(5.9%)	
Experience years	< 5 years	29(82.9%)	5(14.3%)	1(2.9%)	.420
	5–10 years	36(87.8%)	3(7.3%)	2(4.9%)	
	>10–15 years	36(76.6%)	7(14.9%)	4(8.5%)	
	>15 years	15(68.2%)	6(27.3%)	1(4.5%)	
Workplace	University hospital	66(80.5%)	14(17.1%)	2(2.4%)	.137
	Ministry of health	42(84.0%)	5(10.0%)	3(6.0%)	
	Military hospital	2(66.7%)	0.0%	1(33.3%)	
	Private sector	2(50.0%)	1(25.0%)	1(25.0%)	
	Health insurance	4(66.7%)	1(16.7%)	1(16.7%)	
Previous postgraduate forensic education/training					
Formal postgraduate forensic education	Yes	15(62.5%)	4(16.7%)	5(20.8%)	.001^s
	No	101(83.5%)	17(14.0%)	3(2.5%)	
Postgraduate specific training on					
Forensic evidence	Yes	4(57.1%)	1(14.3%)	2(28.6%)	.023^s
	No	112(81.2%)	20(14.5%)	6(4.3%)	
Photographic documentation	Yes	5(55.6%)	2(22.2%)	2(22.2%)	.050^s
	No	111(81.6%)	19(14.0%)	6(4.4%)	
Domestic violence management	Yes	4(44.4%)	2(22.2%)	3(33.3%)	.000^s
	No	112(82.4%)	19(14.0%)	5(3.7%)	
Dealing with medicolegal cases	Yes	16(66.7%)	4(16.7%)	4(16.7%)	.027^s
	No	100(82.6%)	17(14.0%)	4(3.3%)	
Death certificate	Yes	14(66.7%)	4(19.0%)	3(14.3%)	.115
	No	102(82.3%)	17(13.7%)	5(4.0%)	

^sSignificance at p<0.05 using #Chi-square analysis.

n= number, N=total number.

*Total practice score range (0–8).

Good practice if the score (6.4-8), fair if the score (4.8-6.3), and poor if the score (0-4.7).

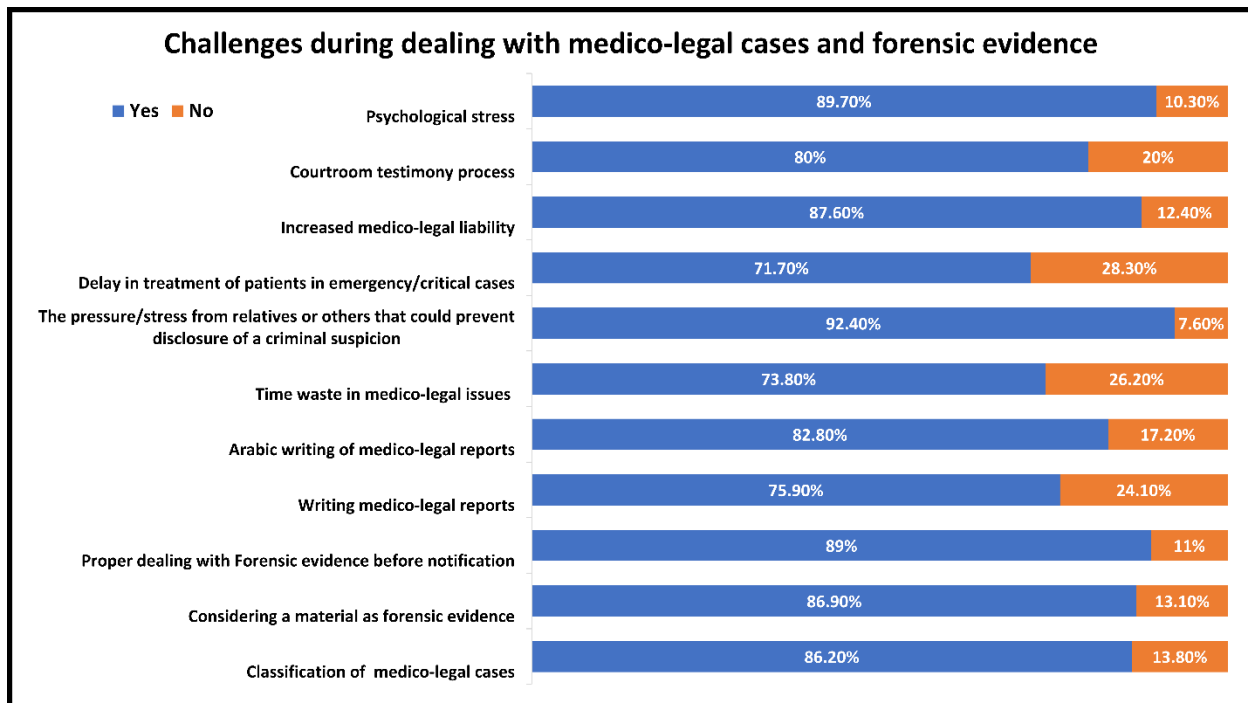


Figure 5: Challenges faced by participating physicians during dealing with medico-legal cases and forensic evidence (N= 145).

IV. DISCUSSION

Among healthcare practitioners, the likelihood of seeing MLCs is relatively significant. However, such instances are frequently overlooked (Erkan, 2017). Physicians' priority in medical practice is to save the patient's life. Most doctors, on the other hand, are cautious when it comes to dealing with MLCs, they either attempt to avoid the instances or try to get rid of them as quickly as feasible because of this fear element. Every doctor should keep in mind that their expertise and services may be required in the administration of justice (Meera, 2016). This study sheds light on a sample of Egyptian physicians' dealing with MLCs and forensic evidence during their clinical practice. Collectively, 50.3% of the participating physicians had fair knowledge, while only 16.6 % had good knowledge.

Concerning attitude, 67.6 % had positive attitude. As regards the practice, only 5.5 % had good practice.

Current study showed lack of formal forensic education and training courses on the postgraduate level among most physicians. Only 17 % of the physicians participating in this study had previous postgraduate Forensic education/training. Similar findings were reported in previous studies conducted in Egypt, Saudi Arabia, and Hong Kong (Mokhtar et al., 2018; Wong et al., 2004; Zaki et al., 2018). On the undergraduate level the Egyptian medical schools include teaching forensic medicine in their curricula but without practical field training (Kharoshah et al., 2011; Mardikar and Kasulkar, 2015), and after graduation, physicians do not receive compulsory medicolegal training within their clinical specialties (Zaki et al., 2018). In

Egypt handling MLCs is exclusive for the forensic medical examiners who receive their professional forensic training in the Egyptian forensic medicine authority before employment (Kharoshah et al., 2011).

When the participating physicians in this study were asked to recognize MLCs from the list given to them. Most physicians (82.1%) in the current study considered all poisoning cases as MLCs. Moreover, nearly half of the physicians could not recognize victims of pedestrian accidents, motor vehicle injuries, occupational-related injuries, and head injuries as MLCs. Similarly, a study conducted in Turkey showed that less than half (42.9%) of the participating physicians and nurses were able to recognize a medico-legal patient brought to the operating room (Ozsaker et al., 2020). Another study on physicians working in Cairo's hospitals found that the majority of participants misidentified all poisoning cases as MLCs, and couldn't identify work-related injuries as MLCs (Mokhtar et al., 2018). A study conducted in South Africa showed similar results and denoted that healthcare providers correctly recognized some MLCs; however, they need to become acquainted with the full forensic patient population (Filmlalter, Heyns, and Ferreira, 2017). The obvious deficiency of recognition of some MLCs in this study could be due to the shortage of standardized guidelines for determining and handling MLCs in many Egyptian medical institutes which confuses physicians in identifying some cases and eventually affects the whole process for the interest of justice of the patient/victim (Mokhtar et al., 2018; Zaki and Sobh, 2022). This is a critical problem since physicians,

regardless of their workplace or residency, will invariably encounter ML situations in the course of their daily activities. As a result, the capacity to spot such instances is crucial (Ropmay et al., 2018).

In the current study, most physicians (89%) knew their essential role in notifying the legal authorities immediately about any suspected MLC. Previous studies in Egypt, Saudi Arabia, and Turkey reported similar results (Mokhtar et al., 2018; Zaki et al., 2018; Ozsaker et al., 2020). When it comes to practice, only 52.4 % notify legal authorities for suspected MLCs, while 23.4 % notify relatives for suspecting MLCs. This low percentage could be explained by their attitude that legal issues are considered a fundamental hospital's responsibility not as physician's responsibility as denoted by 69 % of the total respondents. This also indicates physicians' ignorance about the cases to be notified to the authorities. In fact, early notification of possible MLCs to the police will protect the physician from getting involved in any legal responsibility (Raj et al., 2014). However, almost half (51%) of the physicians considered notification to the police after detecting drugs of abuse in a driver's blood or urine in a motor car accident as a breach of confidentiality. This specific scenario shows the misconception of physicians when confronted with a possible MLC and the preference in such conditions to preserve patient confidentiality over the legal notification. It is well established that physicians are under a duty to maintain the confidentiality of the patients' medical information; however certain legal obligations require disclosure of patient's information to the authorities if the patient

represents a threat to himself or to the public health and well-being (Berger et al., 2000; Williams, 2015).

A noteworthy result of our study was that less than two-thirds (60%) of the physicians were aware that a doctor cannot refuse to treat a medicolegal case. Similar results were mentioned by other authors (Gurpur et al., 2019). This is an alarming sign as physicians could deal with MLCs as regular patients. This also reveals the lack of solid policies guiding the physicians to manage MLCs within the Egyptian healthcare system (Zaki and Sobh, 2022).

Unfortunately, less than half (44.8%) of the physicians who participated in this study perceived that the current overall medical approach of MLCs at their workplace is appropriate. Only 35% said that they can successfully handle MLCs based on their current educational and clinical background. Such loss of confidence in their capabilities to deal with MLCs could be handled by a ML committee in the hospital to guide physicians when they face difficulties during handling of MLCs as 89 % of the participating physicians declared. This attitude suggests that they can perform their ML responsibilities in full provided that they are guided by forensic experts. Similar findings were reported in different studies (Erkan, 2017; Mokhtar et al., 2018; Zaki et al., 2018). This indicates the need to have a second look at the existing approach of handling MLCs in every institution.

ML documentation includes the comprehensive documenting of a case's clinical features, as well as material required by courts that depend largely on ML documentation. Most of the physicians in this

study considered that accurate documentation of injuries is very important to preserve patients' legal rights and that incomplete ML reports could lead to legal consequences. (Çalışkan and Özden, 2012) study showed similar results. On the other hand, this finding is not in alignment with (Zaki et al., 2018) study in which only (32.8%) considered such an importance and (42.3%) were expecting substantial legal ramifications or penalties in court as a result of ML findings (Zaki et al., 2018). In this study 58% of participants found that the causative instrument of the injury shouldn't be described according to patient's allegations which is different from the Mokhtar et al., 2018 study as (80.1%) considered the causative instrument should be specified based on the type of wound, not on the patient's claims (Mokhtar et al., 2018). On the other hand, concerning their practice, about 55.2% were keen to include full description of the injury during ML report documentation. Less than half of them (37.2%) were keen to include the causative instrument, 44.8% were keen to include the duration of treatment, and only 24.8% used wound diagram. Inadequate ML documentation was shown in similar studies as (Henderson, Harada, and Amar 2012; Mokhtar et al., 2018; Zaki et al., 2018; Madadin et al., 2021) The issue of ML reports being written in poor, and nearly incomprehensible handwriting is a major one that should not be overlooked. Such reports must be made by qualified physicians and they must be intelligible and understandable in court, otherwise, the administration of justice would be hampered (Jain, 2021). Accordingly, because it affects legal procedures and patients' rights, ML reports

must adhere to defined rules (Madadin et al., 2021). In criminal or judicial proceedings, photographic documentation is neither a convenience nor a decision (Zaki and Sobh, 2022). Majority of the respondents in this study (94.5%) considered photographic documentation for MLCs to be useful to forensic medicine doctors and 92.5% considered it as a protection to medical staff from remote legal consequences. Similar results were reported by Zaki et al., 2018. Interestingly about one-third (32.4%) of the physicians in this study did not know the necessity of obtaining permission from the patient or his/her relatives for photographic documentation purposes. This finding is not in alignment with other studies conducted among physicians and nurses (Zaki et al., 2018; Ozsaker et al., 2020). This discrepancy is possibly due to the difference in the setting of participants as mentioned studies focused either on physicians working in the emergency department, or physicians and nurses in the operating room. Also, this issue was assessed in their studies under attitude and practice sections which could possibly be different from knowledge assessment results. Despite being knowledgeable of the importance of photographic documentation, only 13.1 % of the physicians in this study do photographic documentation. Similar finding was found in (Henderson, Harada, and Amar, 2012; Zaki et al., 2018) studies. It worth mentioning that taking photographs for documentation purposes need patient's consent as it is considered a diagnostic method used for obtaining later opinion by more experienced physicians and forensic experts otherwise, the auditing of these reports is hampered by poor photographic

documentation. As a result, at every medical facility, measures should be used to guarantee adequate photographic documentation. To ensure the application of ML photographic documentation, availability of equipment such as cameras and lighting sources is crucial (Verhoff et al., 2012; Zaki and Sobh, 2022). Furthermore, forensic photography training should be included in a clinical forensic medicine training course for emergency room residents. Furthermore, training in forensic photography should be offered for physicians (Zaki et al., 2018).

Healthcare practitioners are to be knowledgeable with and skilled in adequate forensic evidence recognition, gathering, and preservation, otherwise, they may accidentally ignore, lose, or destroy the evidence and legal consequences may result (Çalışkan and Özden, 2012; Henderson, Harada, and Amar, 2012). Although most physicians in this study understood the correct definition of a medico-legal evidence and had positive attitude towards its importance, the greater proportion of them did not realize that collecting and preserving this evidence for a probable forensic investigation is under their responsibility. Consistently with this finding, other researchers reported similar results regarding knowledge of physicians and nurses about handling ML evidence (Mokhtar et al., 2018; Ozsaker et al., 2020). In the same context, most physicians in the current study could not know that wet material should be allowed to dry before packaging, which is in accordance with other studies' results (Gurpur et al., 2019; Ozsaker et al., 2020). Furthermore, only 15.9 % of the participating physicians

follow a specific workplace protocol for forensic evidence handling in contrast to about (76.6%) of physicians who participated in another study who were cognizant that their workplace has a single policy for MLCs handling (Zaki et al., 2018). Our findings could be attributed to the deficient forensic training of physicians about adequate evidence collection from a medicolegal case. Also saving the patient's/victim's life is always the top priority of the physicians especially in emergency situations (Aung and Chandalia, 2012), accordingly under this workload and stressful situations, proper evidence collection is usually missed (Zaki and Sobh, 2022). Furthermore, the lack of specialized medical equipment needed for evidence collection, packaging, and preservation should be considered (Zaki and Sobh, 2022).

Most physicians (75.9%) participated in this study were knowledgeable that during court room testimony, doctors should avoid complex medical terminology. This is a means to avoid being called upon to court just to clarify the used medical jargon (Mokhtar et al., 2018). Only 18.6% of our participants said that they could ignore a subpoena. A subpoena is a court-issued summons to attend in court on a specific day, time, and location to provide oral testimony, present ML reports, or both in connection with a specific court matter (Murphy, 2018). Truly said, the court values healthcare professionals and it does not demand a lot of time (Kotze, Brits, and Botes, 2014). Therefore, a subpoena is not to be ignored.

About one third (30.3 %) of our participants declared that if a particular question falls outside the doctor's area of

expertise during courtroom testimony, the doctor isn't obliged to answer outside his competence. Most of them (89.7%) considered being well-prepared by patients' medical documents before courtroom testimony is essential. This might be explained by the fact that a prepared witness will be more successful than an unprepared witness, who may appear hesitant. Witness preparation increases witnesses' confidence in their ability to testify and lessens their fear (Murphy, 2018).

Only 6.10 % have experienced malpractice suits during their work as physicians. Even this is a low percentage, by taking measures to keep patients pleased, sticking to rules, providing patient-centered healthcare, and learning how to argue against malpractice verdicts, litigation for medical negligence can be minimized or prevented (Raveesh, Nayak, and Kumbar, 2016). 42 % of the participating physicians in this study have dealt with MLCs during their work as physicians. The low percentage in our study could be explained by the average knowledge regarding recognizing whether a case is a MLC or not.

The participating physicians in this study declared several challenges they have faced during dealing with MLCs and forensic evidence. Pressure/stress from relatives or others that could prevent disclosure of a criminal suspicion was considered as a challenge by 92.4%, followed by psychological stress by 89.7%, then proper dealing with forensic evidence before handling to police authorities by 89%, increased ML liability by 87.6%, considering a material as forensic evidence by 86.9%, classifying cases as ML ones by 86.2%,

Arabic language of the ML report by 82.8%, courtroom testimony process by 80%, writing ML reports by 75.9%, and time wasted in ML issues (ML reports and handling forensic evidence) by 73.8 %. Similar challenges were revealed in different studies at different settings ((Mokhtar et al., 2018; Gurpur et al. 2019). Accordingly, these challenges should be addressed to ensure proper handling of MLCs and forensic evidence and overcome the inefficiencies encountered in such issues.

As regards comparing participating physicians' knowledge, attitude, and practice scores according to their sociodemographic characteristics and their previous postgraduate Forensic education/training; there was an insignificant difference between physicians' knowledge, attitude, and practice scores and age, gender, job title, specialty, years of experience, and previously attained postgraduate Forensic education/training except for practice score with gender and previous education/training. Similarly, Mokhtar et al., 2018 showed no significant difference in physicians' knowledge, attitude and practice scores based on their age, gender, job titles, and work experience (Mokhtar et al., 2018). While, this finding is not in alignment with Çalışkan and Özden, 2012 study who reported a significant variation in knowledge scores based on level of education, and health personnel institution (Çalışkan and Özden, 2012). Despite that, increase in age in our study was found to be associated with better knowledge. Age group >50 was found to be associated with positive attitude better than other age groups. Poor practice was shown more in the smallest studied age group (20-30 years) as compared

to other age groups. On the contrary, it is thought that young physicians are more knowledgeable in forensic medicine than elder ones as the forensic medicine is included in undergraduate curricula in Egyptian medical schools. However, it seems that undergraduate education is insufficient to prepare students to handle clinical forensic situations (Kotze, Brits, and Botes, 2014). This finding is in alignment with another result in this study showing that the participating residents had the poorest knowledge and attitude as compared to consultants and specialists. Their poor knowledge and attitude can explain why they also attained poorest practice than others as with the proper and appropriate knowledge comes the accurate and quality practice (Çalışkan and Özden, 2012). This could be attributed also to the lack of guidance given to them by senior staff regarding ML issues (Zaki and Sobh, 2022). Private sector physicians in our study showed greater knowledge and better positive attitude than other physicians at different hospital categories. Interestingly, university hospital physicians showed the least positive attitude. Poorest practice score was shown more among Ministry of health physicians in our study. This could be explained by the increased workload in university and Ministry of health hospitals; therefore, they might focus on medical aspects rather than ML issues. It is believed that inefficiencies and inaccuracies in dealing with ML issues are assumed to be caused by a lack of organizational rules and processes connected to such instances, as well as a lack of assessment of the current procedures carried out by healthcare workers (Ozsaker et al.,

2020). Accordingly, the regulations should be reconsidered at an institutional level. Emergency physicians participating in this study had greater knowledge and better practice score than other specialties. This might be explained by the fact that the emergency department is the heart of any hospital. It not only responds to emergencies of medical and surgical background 24 hours a day, but it also handles a large number of MLCs (Siddappa and Datta, 2015). Furthermore, Emergency Department physicians are in a unique position to have a substantial effect on both the medical and legal outcomes of such patient population (Henderson et al., 2012). Despite that, special concern should be given to the intense work environment in emergency situations which may impede with appropriate handling of ML issues (Zaki and Sobh, 2022).

Physicians with previous postgraduate Forensic education/training and previous postgraduate specific training on; Forensic evidence, photographic documentation, domestic violence management, dealing with MLCs, and death certificate had better knowledge, more positive attitude, and better practice score than those without such education/training. This finding is in alignment with Ozsaker et al., 2020 study in which participants who had attained previous training had statistically greater knowledge and implementation levels than those who had not received such training (Ozsaker et al., 2020). This highlights the significance of ongoing and specific training programs for different ML aspects, since increasing knowledge and enhancing positive attitude influence practice (Manju and Nazeema Beevi., 2018; Ropmay et al., 2018; Gurpur et

al., 2019; Ozsaker et al., 2020; Zaki and Sobh, 2022). This goes with the recommendation of 57.9% of the participating physicians for the necessity of future training in dealing with MLCs and forensic evidence. Furthermore, a bad or ambiguous opinion is worse than no opinion at all, as the former might mislead the administration of justice (Kharat and Kedare, 2019).

V. CONCLUSION

Despite that, most of the participants in this study had a positive attitude towards dealing with MLCs and forensic evidence, half of them had fair knowledge, while one-third had poor knowledge. As knowledge affects practice, most of the participants had poor practice. Participants with previous postgraduate forensic education/training showed better knowledge, more positive attitude, and better practice than those without such education/training. These data confirm the shortage of a unified protocol for dealing with ML aspects in many Egyptian medical institutes.

VI. RECOMMENDATIONS

There is a necessity to take measures to ensure proper handling, documentation, and reporting of MLCs and forensic evidence at medical institutes to protect patients' rights. These measures could include collaboration between forensic experts and physicians of different specialties to handle such ML issues, integrating forensic education at the postgraduate level, and supplying facilities needed for proper dealing with ML issues to keep the patient right.

VII. Limitations of the study

There are several limitations in this study. First, the use of self-reported questionnaire may be biased by recall bias, and social desirability effects. Second, the use of online survey may be biased by selection bias. Third, the dependence on a convenience sample might affect the generalizability of the results. Despite that, major concerns were raised by the results of the study regarding dealing with MLCs and forensic evidence.

VIII. Conflicts of interest

The author declared that there was no conflict of interest.

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الملخص العربي

معرفة واتجاهات وممارسة عينة من الأطباء المصريين تجاه التعامل مع الحالات الطبية الشرعية والأدلة الجنائية

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مقدمة البحث: تعد الحالات الإكلينيكية ذات الطبيعة القانونية واحدة من أكثر الحالات السريرية صعوبة التي يواجهها الأطباء أثناء أداء عملهم الروتيني اليومي. ويعتبر التعامل مع حالات العنف والتسمم والاصابات العديدة جزء لا يتجزأ من الممارسة الطبية ويشير هذا إلى الدور المهم المسند للطبيب بصفته أول من يعاين تلك الإصابات قبل تغيير معالمها عن طريق التدخل الجراحي أو الشفاء. **الهدف من البحث:** قياس معرفة واتجاه وممارسة عينة من الأطباء المصريين تجاه التعامل مع الحالات الطبية الشرعية والأدلة الجنائية. **طريقة البحث:** أجريت هذه الدراسة المقطعية عن طريق توزيع استبانات الكترونية على عينة ملائمة من الأطباء المصريين. وتضمنت الاستبانة معلومات عن الخصائص الديموغرافية والمهنية للطبيب وخلفية التدريب والمعرفة والاتجاه والممارسة في التعامل مع الحالات ذات الطبيعة الطبية القضائية وأيضا شملت استكشاف بعض التحديات التي يواجهها الأطباء أثناء أداء عملهم. **النتائج:** بلغ عدد المبحوثين 145 طبيباً مصرياً. معظم المشاركين (83%) لم يتلقوا أي تعليم أو تدريب رسمي في الطب الشرعي بعد التخرج. فيما يتعلق بمستويات درجات الأطباء استناداً إلى نقاط بلوم الفاصلة، كان 3، 50% من المشاركين لديهم معرفة محدودة، و 6، 67% لديهم إتجاه إيجابي، ولكن 80% كانت ممارستهم ضعيفة. لا توجد أي ارتباطات ذات دلالة إحصائية بين درجات المعرفة والاتجاه مع جميع المتغيرات المدروسة. كانت الفئة العمرية (أكبر من 50 سنة) لديها اتجاه إيجابي أفضل من الفئات العمرية الأخرى بينما ظهرت الممارسة الضعيفة أكثر في الفئة العمرية (20-30 سنة) مقارنة بالفئات العمرية الأخرى. كان لدى الأطباء الحاصلين على تعليم / تدريب في الطب الشرعي بعد التخرج معرفة أفضل، واتجاهها أكثر إيجابية، وممارسة أفضل من أولئك الذين ليس لديهم مثل هذا التعليم / التدريب. فيما يتعلق بالتحديات التي يواجهها الأطباء أثناء التعامل مع الحالات الطبية الشرعية والأدلة الجنائية، اعتبر 4، 92% أن الضغط من الأقارب أو غيرهم قد يمنع الإفصاح عن الحالات ذات الطابع الجنائي، و 7، 89% اعتبروا الضغوط النفسية تحدي يواجهونه، و 9، 89% اعتبروا القدرة على التعامل السليم مع الأدلة الجنائية قبل تسليمها للشرطة إحدى التحديات التي تواجههم. **الخلاصة:** على الرغم من أن معظم المشاركين في هذه الدراسة كان لديهم إتجاه إيجابي تجاه التعامل مع الحالات الطبية الشرعية والأدلة الجنائية، إلا أن نصف عدد المشاركين كانت معرفتهم محدودة، وثلاثهم لديه درجة معرفية ضعيفة، وكان معدل الممارسة لدى معظم المشاركين ضعيف. **التوصيات:** هذا وتوصي الدراسة بضرورة دمج تعليم وتدريب الطب الشرعي على مستوى طلبة الدراسات العليا إضافة إلى اتخاذ التدابير اللازمة لضمان التعامل السليم مع الحالات الطبية الشرعية والأدلة الجنائية في القطاع الطبي من حيث التوثيق والإبلاغ عن تلك الحالات حماية لحقوق المرضى.