REVIEW   **Open Access**

Forensic organizational psychology: shedding light on the positive repercussions of ethical leadership in forensic medicine

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Abstract

Ethics is crucial to professional and academic forensic practice. It is not only essential in achieving justice; but it may also be key to the effectiveness, reliability, speed and efficiency of forensic operations. Ethics has received a great deal of attention in the field of forensic psychology and psychiatry. It has also received attention in the clinical and laboratory practice of forensic medicine. This attention has developed in the aftermath of various cases of unethical forensic practice. Various studies have stressed the importance of the formulation of clinical and professional forensic codes of ethics rather than organizational ones. This paper argues that the implementation of ethical leadership in any forensic organization is critical to the effectiveness, reliability, speed and efficiency of forensic operations. The promotion of clinical ethical practices is a function of top-level ethical leadership. Top-level ethical leaders should be acting as role models responsible for the promotion and implementation of ethics across all organizational levels. This paper proposes a new field of concern within *forensic psychology*, that is concerned with behavioural reshaping of forensic practitioners across all specialties, from an organizational perspective. The sum of all practitioners' ethical behaviours should trigger to higher reliability, efficiency and effectiveness of forensic operations and processes.

Keywords: Forensic ethical leadership, Ethical Leadership, Forensic organizational psychology, Forensic psychology, Humanitarian forensic medicine, Sexual violence, Gender violence, Child abuse

Background

Ethics is crucial to the effectiveness, reliability, speed and efficiency of forensic operations. Awareness of the significance of ethics should be enhanced among scholars and practitioners of forensic medicine. Ethics receives a great deal of attention in the forensic medicine literature, and this focus is even more evident in the field of forensic psychiatry (Miller 2008; Arboleda-Flórez 2006; Griffith 1998; Stone 1984). Leaders' ethics in forensic organizations and their influence on subordinates' behaviour is an under-investigated topic in literature as is the impact that they have on the reliability of forensic operations. The main cause for this under investigation is the forensic science scholars' focus on clinical aspects only. There is no doubt that clinical matters are important. Nonetheless,

a multi-disciplinary perspective must be adopted by forensic medicine scholars and practitioners to enhance the reliability, speed, effectiveness and efficiency of forensic operations.

A multi-disciplinary perspective is also essential to manage the risk of unethical behavioural and operational incidents in forensic organizations. Moreover, it will allow organizational behaviourists to manage the behaviour of forensic practitioners, specifically their ethical behaviour, in a way that would have a positive influence on the reliability of the results of forensic operations. The purpose of this paper is to introduce the concept of ethical leadership in the field of forensic science. This paper sheds light on a new line of research in forensic science called *organizational forensic psychology*, which is concerned with the management of overall forensic organizational behaviours in forensic operations. This perspective guides the concept of ethical leadership

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defined and discussed in this paper. This paper presents ethical leadership as a remedy to unethical forensic behaviours and prescribe a systemic process that could facilitate the implantation of ethical leadership in forensic organizations. Furthermore, my paper discusses two cases of ethical misconduct in two different forensic organizations and offers an organizational behavioural remedy to forensic examiners' misconduct. It also underlines the importance of viewing "The potential to become an ethical leader" as a key criterion in the recruitment, training and promotion of forensic practitioners.

Main text
Case studies of forensic scandals
"I screwed up big time, I messed up, I messed up bad." was Dookhan's comment on her crime (Driscoll 2014). Dookhan was a chemist at the Shuttered Department of Public Health Lab in the State of Massachusetts, who was arrested for having falsified thousands of forensic results of samples in criminal drug cases (Driscoll 2014). Dookhan had faked thousands of signatures related to tests that she recorded as complete, which were not even conducted (Gabel 2014). Results from approximately 34,000 drug examinations were put into question. The number of samples tested by Dookhan every year was triple the average of her colleagues/year, which might have raised suspicions against her (Driscoll 2014).

Forensic science could simply be defined as "the application of scientific or technical practices to the recognition, collection, analysis and interpretation of evidence for criminal and civil law or regulatory issues" (National Research Council 2009). The main objective of any forensic practitioner should be to provide unbiased, scientific information based on data (Saviers 2002). Dookhan, however, did not bother to conduct any tests as she was dry-labbing. Dry-labbing could be defined simply as the creation and fabrication of scientific data without conducting any forensic laboratory tests (Dutelle 2011). Consequently, this means that Dookhan used to identify toxic substances through guessing rather than testing.

The absence of effective leadership was a major trigger to Dookhan's deviant behaviour for various reasons (Giannelli 2015). Firstly, Dookhan did not comply with the quality control procedures of the laboratory as she used to conduct the first and the second confirmatory tests on the sample and used to falsify signatures of her colleagues (Giannelli 2015). In fact, leaders should act as role models to their subordinates to motivate them to emulate their behaviour (Bandura and Walters 1977). Dookhan's continuous ignorance to the quality control standards is a clear sign that her leaders never punished her misconduct. Furthermore, ethical leaders are supposed to set clear ethical standards,

monitor their subordinate's performance and then reward desired behaviours or punish undesired ones (Brown and Treviño 2006). Moreover, ethical leaders are also expected to be fair and to have integrity (Brown and Treviño 2006). Nonetheless, Dookhan's leader failed to monitor Dookhan's performance and never punished her despite the doubts that were raised about the increased and unrealistic number that she used to process every year (Driscoll 2014).

Dookhan's colleagues had, for instance, reported their doubts about her deviant behaviour various times (Driscoll 2014). Her leaders, however, failed to punish her deviant behaviour and never acted as ethical role models for Dookhan's colleagues (Driscoll 2014). Dookhan's leader finally only took action when the doubts about her large number of processed samples had become overwhelming as it was triple the average rate of samples processed by her colleagues (Giannelli 2015). Nevertheless, her leader's action was considered as a reward rather than a punishment (Giannelli 2015). She was moved to an administrative desk position and she was asked to formulate a plan to enhance the laboratory quality control procedures, which looked like a reward rather than a punishment, especially as she still had access to all of the lab's sample results (Giannelli 2015; Driscoll 2014). Dookhan's misconduct has finally come under investigation in 2011 after having been accidentally caught by her supervisors while removing ninety samples from the evidence vault without signing them off (Valencia and Ellement 2013). The deception of that chemist would have been realized earlier only if her leaders have chased her performance and if her leaders have assessed her compliance with the quality control procedures. Her leaders could have also taken some corrective actions as a response to her colleague's reports to her suspicious behaviour.

An appropriate punishment tends to create a social learning process which could have motivated her colleagues associate that punishment with her behavioural misconduct (Bandura and Walters 1977). However, no appropriate corrective actions were taken and Dookhan even continued to give testimonies in court trials for three consecutive years in the aftermaths of discovering her deception. Even though, she was not allowed to perform any laboratory tests. Nonetheless, she was still not supposed to be allowed to give any testimonies during police investigations (Driscoll 2014). The appointment of Dookhan to an administrative disc position with complete access to all evidence was also an inappropriate unfair response to the reports received by Dookhan's colleagues.

The absence of effective and ethical leadership is clear in this case study. Moreover, the lack of fairness is also evident, and Dookhan's colleagues rightly complained that her promotion was not deserved (Driscoll 2014). In fact, Dookhan's direct leaders and the top laboratory leadership are responsible for the unsuccessful implementation of the quality control procedures in the laboratory. Cross-

examination, for instance, was adopted in that laboratory (Driscoll 2014). It was not, however, conducted appropriately and did not prevent Dookhan from falsifying her results. The lack of effective assessment of Dookhan's performance and her incompliance with the quality control measures is the responsibility of Dookhan's direct leaders.

The ineffective leadership of Dookhan's leaders is the responsibility of the top leadership in that laboratory as well. Ethical leadership is being transmitted from top leadership to middle and lower level leaders who should create an ethical organizational climate and treat their subordinates more fairly (Brown and Mitchell 2010). An effective solution to that problem would be the implantation of ethical leadership all over all organizational hierarchies via recruitment of ethical leaders in the first place. Furthermore, all laboratory members should be trained to act as ethical leaders. This could be implemented through a systematic process which should be discussed in that paper in details. Another recent case that represents a clear example of an absence of organizational ethical leadership will also be discussed in the next section.

A scandalous case of abuse of dead bodies brought for autopsy to the Israeli National Institute of Forensic Medicine of Abu Kabir, in Tel Aviv, was discovered in 1999 by a recently trained forensic pathologist. The young pathologist became a whistleblower about the misconduct of Dr. Hiss, the head of the institute (Scheper-Hughes and Bostrom 2012). Dr. Hiss had been involved with organ and tissue confiscation and the stockpiling of body organs that were distributed for research and organ transplantation purposes without any consent (Scheper-Hughes and Bostrom 2012). Stockpiling of body organs without consent is considered as an illegal act in any country that does not operate with the presumed consent system of organs donations.

Under the presumed consent system that is used in various European countries, it is presumed that people automatically consent to donate their organs in the aftermaths of their death unless they or their families register an objection (Glasson et al. 1994) There are various ethical dilemmas associated with the application of the presumed consent system that are beyond the scope of this paper. The main focus of this case study is to shed light on ethical leadership as a solution to such unethical and illegal act when it occurs in a country that does not operate with the presumed consent system. The informed consent system is being used in Israel where organ extraction requires prior consent of the donor before death (Abadie and Gay 2006). Thus, an insubstantial investigation was conducted, and no action was taken and the reporter of the deviant behaviour lost his position (Scheper-Hughes and Bostrom 2012).

The scandal erupted in 2009 after its publication in Sweden by Donald Boström, who also reported on cases involving organ mutilation and harvesting from Palestinian combatant's bodies during the Palestinian intifada (Boström 2009). The case was reopened in 2012 when a police operation revealed the stockpile of 8200 organs and tissues at Abu Kabir Institute (Scheper-Hughes and Bostrom 2012). Dr. Kugel, who first reported the case, became the director of the institute, and Dr. Hiss was sued in court by the families of his victims. Yet, he was still not arrested and has never paid any compensation as the government has paid on his behalf. Moreover, all those that participated in his crimes remained employed at the institute (Scheper-Hughes and Bostrom 2012).

Ethical leadership as a remedy

Ethical leadership could be defined as "The demonstration of normatively appropriate conduct through personal actions and interpersonal relationships and the promotion of such conduct to followers through two-way communication, reinforcement and decision making" (Brown et al. 2005, p.120). The definition will be broken down into separate parts for the sake of elucidation. Firstly, "The demonstration of normatively appropriate conduct through personal actions and interpersonal relationships" refers to the ideal behaviour of leaders that would be imitated by followers, resulting in perceiving their leaders as ethical role models (Brown et al. 2005, p.120). For instance, warmth, trustworthiness, care, and honesty would lead to perceiving leaders as legitimate and credible role models (Brown et al. 2005). Indeed, the term "normatively appropriate" has been described by Brown and colleagues as deliberately vague because what is considered as normatively inappropriate is highly dependent on various contextual variables (Brown et al. 2005). For instance, what is ethical for one forensic practitioner could be unethical for another, and hence organizational ethical codes are essential to forensic practice (Barnett 2001).

The second pillar of the definition focuses on the promotion of ethically desirable conduct towards subordinates through an effective communication process (Brown et al. 2005). Ethical leaders should not only draw their followers' attention to forensic ethics and make it salient. Rather, they must also provide them with support via procedurally and interpersonally fair processes (Bass and Steidlmeier 1999). Support is essential to motivate forensic practitioners to engage in the desired ethical behaviour (Bandura 1978; Brown et al. 2005; Brown and Treviño 2006). *Reinforcement*, on the other hand, is the third component of Brown and colleagues' definition. It implies that ethical leaders should reward ethical behaviours and discipline deviant ones (Treviño et al. 2003). The process of rewarding ethically promoted behaviour and the punishment of deviant unethical behaviour is called behavioural reinforcement (Bandura and Walters 1977).

The reinforcement process should be conducted on the basis of clear ethical standards set by ethical forensic leaders (Bandura and Walters 1977; Brown and Treviño 2006). Furthermore, praising ethical behaviour is important as it motivates followers to maintain the momentum of the new, desired behaviour (Bandura and Walters 1977; Brown et al. 2005; Brown and Treviño 2006). Meanwhile, the fourth component of Brown and colleagues' definition is concerned with the prominence of *ethical decision-making*. Decision-making refers to the responsibility of ethical leaders for the consequences of their decisions (Howell and Avolio 1992; Bass and Avolio 2000; Brown et al. 2005). Brown et al. (2005) also believe that it reflects their tendency to make fair and moral choices that can be observed and imitated by others (Howell and Avolio 1992; Bass and Avolio 2000; Brown et al. 2005).

The psychological mechanisms of ethical leadership

Despite the existence of various organizational ethical codes emerging from diverse forensic international associations, various forensic scandals have recently occurred. Yadav (2017) suggested that organizational forensic ethical codes should be complemented with personal and ethical codes. His recommendation was, however, vague as his study did not clarify what personal and professional ethical codes actually refer to. The missing connection lies in the adaptation of an organizational perspective to the implementation of forensic ethics in forensic organizations. There are various forensic ethical codes elaborated by diverse international associations such as the American Academy of Forensic Sciences (AAFS) and The American Board of Criminalistics (ABC). These codes, however, are country specific and they must be approved by local authorities. Accredit members of such forensic associations are required to comply with these ethical codes. The failure to comply with such ethical codes leads to the punishment of the board member by the membership association. The codes of these associations, however, cannot guarantee an international ethical forensic practice because an ethical organizational culture must exist in forensic organizations in the first place. This ethical organizational culture cannot exist unless these organizations are led by top-level ethical leaders who promote appropriate ethical forensic practice and who are perceived by all organizational members as role models.

Role modelling is a catalyst for the cognitive positive influence of ethical leaders on their subordinates (Brown and Treviño 2006). Forensic organizations led by ethical leaders provide a suitable organizational culture that enables the transition of ethical behaviour from top-level leaders to middle and lower level leaders (Brown and Treviño 2006). There is a behavioural learning process that occurs when team members are led by ethical leaders. The social learning theory states that a cognitive reshaping process occurs during the learning process (Bandura and Walters 1977). In fact, observation of a role model's behaviour and its consequences is the main mechanism of social learning (Bandura and Walters 1977). Bandura found that role models' decisions tend to be observed, as well as their consequences. Furthermore, an imitation process takes place if these consequences were favourable. Reinforcement is a key pillar of the process whereby positive behaviours must be rewarded by role models. Individuals should be aware that their positive behavioural responses will be rewarded if they act as ethical forensic practitioners and behave in a discretionary way that goes beyond their official job description.

Behavioural characteristics of ethical leaders

Ethical leaders have various behavioural characteristics that should be taken into consideration during the recruitment process of forensic practitioners. The assessment of these behavioural characteristics during the recruitment and selection process of forensic practitioners is crucial in evaluating their potential to become future ethical leaders. De Hoogh and Den Hartog (2008) studied ethical leadership by focusing on the behaviours of ethical leaders. De Hoogh and Den Hartog (2008) and Kalshoven et al. (2011, 2013) identified seven behavioural dimensions of ethical leadership, which are *fairness, power sharing, role clarification, ethical guidance, people orientation, concern for sustainability* and *integrity*.

First of all, ethical leaders are expected to *be fair* in their decisions. This fairness requires ethical leaders to be transparent, take balanced and moral decisions, be honest, responsible and treat people equally (Kalshoven et al. 2011; Steinmann et al. 2016). For instance, the reaction of Dookhan's leader would have been different if he/she had been a fair leader, as her misconduct should have led to punishment. Punishing her behaviour would have contributed towards a climate of fairness in the lab and would also have achieved further judicial justice as various innocent victims were imprisoned thanks to her behavioural misconduct (Driscoll 2014).

Power sharing is the second behavioural trait. It refers to involving everyone in decision-making and taking their ideas into account (Brown et al. 2005; De Hoogh and Den Hartog 2008). Ethical leaders also *clarify roles*, by making performance goals, expectations and responsibilities clear (De Hoogh and Den Hartog 2008; Kalshoven et al. 2011). These leaders also show *ethical guidance*, as they communicate about ethics, explain ethical issues and promote ethical conduct (Kalshoven et al. 2011, 2013). Such skills should be taught to forensic practitioners prior to any promotion. Leadership development programmes should also address the prominence of ethics to the efficiency, speed, effectiveness and reliability of forensic operations. Junior forensic practitioners should also be instructed in the

appropriate ethical standards at any forensic organization. Ethical leaders are also *people-oriented*, showing concern, care for people, and taking an interest in their welfare (Kalshoven et al. 2013). The dimension of *concern for people* can arguably be considered as the most prominent pillar of ethical leadership as it represents a leader's care, support and respect for their subordinates (Treviño et al. 2003). Ethical leaders also live with integrity, which refers to keeping their promises, acting consistently and reflecting high word-deed alignment (Kalshoven et al. 2011).

Ethical leaders are sensitive to environmental and sustainability issues, which they demonstrate by caring about the impact of their actions on society (Kalshoven et al. 2011, 2013). Concern for the environment is the sixth dimension of ethical leadership, which also complies with the altruistic nature of ethical leaders. To illustrate, ethical leaders should not care only about their subordinates. Rather, they are also expected to have concern for the environment and the society in which their organizations operate (Kalshoven et al. 2011). In fact, this is in line with the sustainability literature, which suggests that sustainable leaders act beyond their self-interests (Ferdig 2007). Concern for the environment has a social dimension, as ethical leaders should have a social responsibility towards their community. This social responsibility could be a major motivation for forensic practitioners to conduct efficient and effective examinations, tests or autopsies in order to support the practice of justice. Finally, the last dimension of ethical leadership, according to Kalshoven et al. (2011), is integrity. Integrity reflects the tendency of ethical leaders to keep their promises and be trustworthy (Kalshoven et al. 2011).

The Systematic Implantation of Ethical Leadership in Forensic Organizations

Recruitment of new forensic practitioners should not only be a function of their scientific, medical, and professional competences. Rather, their personality is also a major factor that must be carefully assessed prior to their recruitment. Interviews and personality assessment tests should be conducted during the recruitment process of any new forensic practitioner across all specialties of forensic science. A candidate who is concerned for others will empathize with the community that they serve. They are also unlikely to engage in behavioural misconduct because of their integrity. Candidates with a potential to become ethical leaders will also report any deviant behaviour if it ever occurs in their organizations.

These behavioural characteristics should not only be taken into consideration during recruitment and selection but also during promotion. They should, consequently, become primary assessment criteria in the performance appraisal system of forensic practitioners as well as in the compliance with ethical standards. Hence, performance appraisal systems should be adapted in forensic organizations as promotion should not be based on seniority, but rather on clear key performance indicators that measure the quality, efficiency, effectiveness and reliability of forensic operations. Reliability in forensic medicine can only be achieved when forensic operations are conducted accurately, ethically and in accordance with quality and ethical procedures. For example, drylabbing represents a clear form of fraud as it produces fake results.

Behavioural characteristics of ethical leadership should also be evaluated prior to the promotion of practitioners to any senior position. These characteristics should also be assessed following their appointment to senior or top-level leading positions, as part of their performance assessment criteria. A 360° appraisal system should be adopted, which involves subordinates assessing their leaders and vice versa. This would give subordinates of any leader the opportunity to evaluate aspects that might not be assessed by the human resources department and their top leaders because they are much more aware of their behaviour. Ethical clarity, ethical guidance and concern for others are clear examples of behavioural traits that should be assessed and commented on by subordinates.

Training of forensic practitioners should not only be based on clinical, legal and professional competences. Rather, ethics and ethical leadership should also become a major component of their training. Ethical leadership training and development programmes should address the significance of ethical forensic practice across all organizational levels. They should also address the impact of ethical practice and ethical leadership on the reliability of forensic operations. These criteria should be followed in the appointment of a director of any forensic institute or laboratory. Brown and Mitchell (2010) found that there is a process of top-down transmission of ethical behaviour across different organizational levels, which is called the *bypass effect*. The transmission of ethical leadership behaviour will also be reflected in the behaviour of all organizational members as ethical behaviour is contagious. An ethical organizational and departmental climate will also exist when forensic organizations are led by ethical leaders, which should motivate everyone to fit with ethical standards.

Ethical leadership as a catalyst for successful management of change

Most forensic practitioners work under the umbrella of a forensic laboratory, institute or an organization in general. An organizational psychological perspective should be adapted to manage the behaviour of forensic practitioners. Moreover, it should be adapted to study the impact of forensic practitioners' behaviour on the reliability of

daily forensic operations. Various basic terms from organizational psychology will be introduced in the upcoming following section. Implantation of ethics in daily forensic operational practices should not only lead to a higher presumed reliability and increased efficiency. Rather, it could also lead to a higher rate of operational effectiveness, efficiency and speed when forensic practitioners are led by ethical leaders and when forensic organizations are led by top-level ethical leaders.

Nowadays, change has become a major characteristic of most organizations (Dawson 2003). Change simply refers to new creative and innovative ways of conducting daily operations (Dawson and Buchanan 2005; Dawson 2003). The use of a new technology in forensic practice is a clear form of organizational change (Dawson 2003). Organizational change does not only have to refer to organizational restructuring. Rather, any form of change taking place inside the organization is an example of organizational change. Organizational change can occur in the form of operational and process re-engineering or a development of new technology. In fact, the use of new innovative technology (e.g. imaging and microscopic technology) is essential to the effective and reliable conduct of forensic operations (Filograna et al. 2010 and Turillazzi et al. 2008). For example, technologies such as multi-slice computed tomography (MSCT), magnetic resonance (MR), or confocal laser scanning microscopy could have been considered as forms of change when they were first introduced. The continuous technological change and innovation have led to the emergence of various techniques that have enhanced the reliability of various forms of heavily computerized forensic operations. Such daily operations include non-traumatic post-mortem computed tomography (PMCT), digital forensic osteology and virtual autopsy (Filograna et al. 2010; Ramsthaler et al. 2010; Shiotani et al. 2004; Thali et al. 2003).

Organizational change could also be triggered by the turbulence of external environments where forensic organizations operate (Dawson 2003). Forensic organizations operating in turbulent contexts such as conflict zones differ from other stable environments. Technology might be absent in such contexts or may not be available during times of crisis. Virtual autopsy, for instance, might not be available due to the absence of essential technology, which represents a form of process and operational change as well as challenge. Managing such operational changes requires the possession of an ethical leadership style to deal with people empathetically. Forensic practitioners are, therefore, required to acquire such skills to manage the psychological and behavioural reactions of their team members during any form of change. Ethical leadership is proposed in this article as a remedy to the problems associated with operational changes and as a catalyst to the implementation of ethics across all organizational levels.

Ethical leadership is important during any form of organizational change (Sharif and Scandura 2014). Sharif and Scandura (2014) found that ethical leadership is positively associated with the positive involvement of organizational members during organizational change. The study by Scandura also found a positive association between ethical leadership and organizational citizenship behaviour during times of change. Organizational citizenship behaviour is a positive prosocial, helping and cooperative behaviour that can have a positive influence on the performance of forensic practitioners (Podsakoff et al. 1997). Furthermore, ethical leadership is negatively associated with *silence behaviour* during organizational change (Bormann and Rowold 2016). Silence behaviour is a negative behaviour that could occur during change when individuals decide not to participate in the ongoing change (Bormann and Rowold 2016). They may also refuse to report any deviant behaviour if they decide to remain silent. This could be risky during any form of change that might take place in forensic organizations.

Ethical leadership and humanitarian forensic medicine
Forensic practitioners dealing with violence and abuse victims should be trained to be ethical leaders. This is applicable to those who deal with victims of elder abuse, child abuse, gender and sexual abuse, especially in humanitarian contexts. Doctors dealing with such victims during any form of humanitarian crisis should understand the social and psychological factors that affect the patient during that situation (Wells 2017). Victims of violence in such contexts are expected to be treated with more empathy if they are inspected by an ethical forensic practitioner who has concern for others and for the society where they are serving. Ethics and ethical leadership should be a primary selection criterion for all forensic examiners serving in such contexts.

Conclusion
This paper has shed light on the significance of ethical leadership in forensic practice. Firstly, the main objective of this paper was to illuminate the importance of ethical leadership in ethical forensic practice. Ethical leadership was also presented as a remedy to forensic unethical behaviour in that review. This paper marks the emergence of a new research field in forensic science, based on forensic organizational psychology. Forensic organizational psychology was the main approach adopted in the introduction and demonstration of ethical leadership in this paper. This approach reveals the importance of building a connection between the field of organizational psychology and the field of forensic science. This connection will enable forensic organizations to repair and treat ethical misconduct in the whole organization by adapting the appropriate leadership style essential to the management of overall organizational

behaviours. The present paper has used this approach to introduce a systematic process for the implantation of ethical leadership in forensic organizations through selection, recruitment, training, appraisal and promotion. Furthermore, the positive repercussions of the implanting of ethical leadership during organizational change have also been presented, as well as the importance of ethical leadership in humanitarian contexts. This paper has also shed light on the expected positive impact of ethical leadership on the efficiency, reliability and effectiveness of forensic operations.

This paper has also underlined the impact of external operating environments on forensic organizations. The management of the impact of such environments requires an effective ethical leadership style to formulate effective change strategies. Future empirical and conceptual research should focus on assessing the impact of ethical leadership in forensic operations during organizational change. The use of a new business model change of leadership, forensic operational and process re-engineering and development of new technologies could be considered examples of organizational change. Future research should address the connection between internal and external environments of forensic organizations and the outcomes for such organizations. In addition, future research should focus on the social and psychological impacts of ethical leadership on victims of violence and abuse, especially in humanitarian contexts.

Abbreviations
MR: Magnetic resonance; MSCT: Multi-slice computed tomography; PMCT: Non-traumatic post-mortem computed tomography

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The author read and approved the final manuscript.

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