THE KNOWLEDGE, ATTITUDE, PRACTICE, AND STRESSORS OF MEDICO-LEGAL ISSUES AMONG MEDICAL STUDENTS, MEDICAL OFFICERS, AND RESIDENTS: THE BOTSWANA EXPERIENCE

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Abstract

Patients expect health professionals to demonstrate proficiency and accountability in clinical practice, including the application of medico-legal principles. However, the knowledge, attitude, practice, and stressors related to medico-legal issues among medical students (MSs), medical officers (MOs), and residents in Botswana remained unexplored. This cross-sectional quantitative study aimed to address this gap. Data were collected via an online questionnaire assessing demographics, knowledge, attitude, practice and common stressors in medico-legal matters. Participants included all levels of MOs (including Medical Officer interns), and residents, as well as MSs in their first and third clinical years at Princess Marina Hospital. The response rate was 54.9%, with 191 participants: 41.9% MSs, 23.0% MOs, and 35.1% residents. Gender distribution was 52.9% males and 47.1% females. Findings revealed limited knowledge of 'dual loyalty' conflicts and agencies managing medico-legal issues, with residents demonstrating significantly higher knowledge than MOs and MSs. Attitudes towards medico-legal practice showed no significant difference between groups. Residents and MOs reported more frequent engagement with medico-legal practice compared to MSs, although residents were–significantly less likely to report medical errors than their counterparts. Fear of legal consequences and inadequate knowledge of medico-legal matters and policies emerged as the predominant stressors, consistent across groups. Despite reasonable levels of medico-legal knowledge and practice, significant gaps were identified. Participants emphasized the need for improved medico-legal training and resources. The study recommends the development and integration of contextually relevant medico-legal courses as core components of medical education in Botswana to address these gaps and reduce stress.

Keywords: *Attitude, Knowledge, Medico-legal issues, Practice, Stressor*

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Introduction

Healthcare delivery encompasses not only the provision of professional services but also the accountability of professionals' knowledge, attitudes, and practice (Barnie et al. 2015). With the rise in medico-legal litigations in developing countries (Barnie et al. 2015; Wong et al., 2013), it is essential for medical practitioners to be well-versed in the legal and regulatory frameworks of their respective countries (Barnie et al. 2015; Preston-Shoot et al., 2011; Shah, 2008). Many instances of medical errors, negligence, or malpractice are preventable through proper documentation, understanding of applicable healthcare laws and regulations, and enhanced doctor-patient communication. Failure to address these can result in serious civil or even criminal consequences (Wong et al., 2013; Swaranjali et al., 2022).

Medico-legal liability affects all stakeholders in the healthcare system, including practitioners, patients, their family members, and those responsible for service delivery (Barnie et al. 2015; Wong et al., 2013; Swaranjali et al., 2022; Evans et al., 2010). This has led to changes in working time regulations (Evans et al., 2010) and prompted some doctors to practice defensive medicine, significantly increasing the cost of care. Additionally, the resulting burnout can contribute to a shortage in high-risk specialities (Evans et al., 2010; Johnston et al., 2014).

The fear of lawsuits among medical students can diminish their future enjoyment of practicing medicine (Johnston et al., 2014). While law and medicine are in tension, closer collaboration between the two is essential for societal benefit (Al-Azri, 2020). Medico-legal investigations, though primarily designed to protect the public, often cause significant distress to doctors, adversely affecting their health and, consequently, the quality of care they provide (Melbourne School of Global and Population Health, 2022). General practitioners, particularly those experiencing high levels of chronic stress, are more likely to face medico-legal investigations (Kersting et al., 2019).

Unless medical ethics, human rights, and medico-legal protocols are properly aligned in both theory and clinical practice, there is a heightened risk of patients' rights being abused (Vivian et al., 2011). Knowledge of medical laws and ethics is crucial for reducing litigation rates, yet many medical schools focus primarily on "core competencies" (Wong et al., 2013; Shah, 2008; Evans et al., 2010; Okoye et al., 2017). For sound clinical practice and the protection of patients' legal rights, doctors must be well-versed in both local and international legal and ethical standards (Thomas, 2020).

The teaching of medico-legal issues varies significantly across institutions (Wong et al., 2013; Preston-Shoot et al. 2011; de Lemos et al., 2021). However, some medical schools lack a formal curriculum for medical ethics, leaving students to acquire legal decision-making skills and moral attitudes passively (Okoye et al., 2017). Others struggle with insufficient time and appropriate opportunities for assessment (Brooks et al., 2017). Although some medical schools claim to offer training in medical ethics and law, many medical students and physicians were unsure of their knowledge and skills when they were faced with medico-legal problems (Wong et al., 2013; Preston-Shoot et al. 2011; Jamieson, 1999).

A practitioner who is not confident in medico-legal issues cannot effectively challenge poor practice, ensure quality, maintain continuity of care, or lead efforts to enhance patient care (Preston-Shoot et al. 2011; Evans et al., 2010). The teaching of medico-legal issues is designed to equip medical students and practitioners with the legal framework governing their regulatory bodies, an understanding of malpractice, and the ethical dilemmas they are likely to encounter (Shah, 2008; Chima, 2013). Regulatory medical councils must guide medical schools in adopting more interactive and engaging teaching methods while revisiting themes that involve healthcare providers throughout their basic and advanced training (Preston-Shoot et al. 2011; Al-Azri, 2020; Brooks et al., 2017; AlKabba et al., 2013).

In the United Kingdom, ethics teaching is not consistently integrated into clinical placements, and there are often minimal consequences for failing ethics assessments (Brooks et al., 2017; Mattick et al., 2006). Some UK medical schools have implemented small-group teaching, where ethics and law are applied in a clinical context (Preston-Shoot et al. 2011; Dowie, 2014). Continuous and integrated teaching of medical law throughout medical education enhances students' ability to apply medico-legal principles, understand patient rights, develop strong patient relationships, and grasp the ethical, legal, and professional responsibilities inherent in quality medical care (Barnie et al., 2015; Wong et al., 2013; Shah, 2008; Al-Azri, 2020; Mattick et al., 2006; Todorovski, 2018; Teo et al., 2017; Kapp et al., 2012).

In the United States, case-based education has been used to incorporate legal risk management into staff development programs (Mattick et al., 2006). Problem-based learning and other active teaching methodologies have also been employed to teach medico-legal topics (Alexander-Silva et al., 2021). Some educators, however, lack guidance in developing curricula that incorporate religious values into medico-legal education (AlKabba et al., 2013), while others cite a shortage of staff and resources for teaching ethics (Mattick et al., 2006).

Medical students often report a gap between their theoretical knowledge of human rights, ethics, and medico-legal issues and the reality of clinical practice (Vivian et al., 2011). In India, second-year medical students found their skills enhanced by combining lectures with practical experiences involving medico-legal cases (Turvill, 2015). Additionally, students expressed high satisfaction when learning from role models and when medical and law students were taught and worked together (Peabody et al., 2008).

There is a lack of knowledge about medico-legal issues among the lay public, medical students, and medical practitioners, which could lead to increased mortality due to violation of ethics and basic human rights (Swaranjali et al., 2022). In Botswana, the integration of medico-legal learning and assessment during clinical rotations, which could enhance knowledge and skill retention, has not been documented. Although the understanding and application of medico-legal principles have the potential to significantly improve the safety of medical care (McCleery et al., 2019), such data remain undocumented in Botswana.

Methods

Aim: This study aimed to assess the knowledge, attitude, practice, and stressors related to medico-legal issues among medical students (MSs), medical officers (MOs), and residents (doctors engaged in specialist training) attending medical programs at the University of Botswana and practicing at the Princess Marina Hospital, the largest public tertiary teaching hospital in Botswana.

Design**:** A cross-sectional quantitative study was conducted among MSs, MOs, and residents at Princess Marina Hospital from May 2022 to July 2022.

Setting**:** Princess Marina Hospital, the largest public (and the only teaching) hospital in Botswana is affiliated with the University of Botswana.

Participants**:** The study invited all levels of MOs (including Medical Officer interns) residents, and MSs in their first and third clinical years at Princess Marina Hospital to participate.

Survey**: Consenting** participants completed an online questionnaire using Microsoft Forms. The 37-item self-administered questionnaire, developed by researchers, collected information on demographics (gender, education level, and prior medico-legal experience), and assessed medico-legal knowledge, attitudes, practice, and stressors using Likert-type scales.

- Knowledge: Assessed with 10 questions, graded as 'I know this well', 'I have heard about this, but I don't know it well', and 'I don't know this'.
- Attitudes: Assessed with 10 questions, graded as: 'I think this is essential', 'I think this is important, but it is not essential', and 'I don't think this is important'.
- Practice: Assessed with 10 questions, graded as 'I always do this', 'I sometimes do this', and 'I don't do this at all'.
- Stressors: Assessed with 7 questions, graded as 'High stress', 'Low stress', and 'No effect'.

To enhance validity, reliability, and clarity, the questionnaire was reviewed by a senior clinician, a medical education expert, and a medico-legal expert. It was pre-tested with fourth-year medical students. The exact questions are presented in Appendix 1. The study hypothesized a positive association between years of experience and levels of knowledge, attitude, practice, and stressors.

Data analysis**:** Data were analyzed using SPSS version 28. Independent variables included gender, education level, and years of experience. Dependent variables were knowledge, attitude, practice, and stress levels. Categorical variables were compared using Chi-Square tests and Fisher's Exact tests when necessary. A p-value of <0.05 was considered statistical significance.

Ethical consideration: The study was approved by the relevant Institutional Review Boards at the University of Botswana (UBR/RES/IRB/BIO/285), the Ministry of Health (MoH) (HPDME:13/18/1), and Princess Marina Hospital (PMH 2/2A (7)/148). Participants were informed about the study through an online document and assured of

measures of confidentiality, and their consent was implied through the completion of the questionnaire.

Results

Demographics of the participants

A total of 191 participants were included in the study: 80 MSs, 44 MOs, and 67 residents, resulting in an overall response rate of 54.9%. Men comprised 102/191 (53.4%) respondents. Prior experience with medico-legal issues was reported by 46/191 (24.1%) respondents (Table 1).

Table 1: Response rate, gender distribution, and prior experience of the participants, PMH, May to July 2022

Participants	Population	Response Rate	Sample	Men	Women	Prior experience
Medical Students	127	80 (63.0%)	80 (41.9%)	48 (60.0%)	32 (40.0%)	8 (10.0%)
Medical Officers	70	44 (62.9%)	44 (23.0%)	21 (47.7%)	23 (52.3%)	7 (17.1%)
Residents	151	67 (44.4%)	67 (35.1%)	33 (49.3%)	34 (50.7%)	31 (46.3%)
Total	348	191 (54.9%)	191 (100.0%)	102 (53.4%)	89 (46.6%)	46 (24.1%)

Knowledge of medico-legal issues

There was no statistically significant difference among the three groups regarding their knowledge of the "dual loyalty" conflict, the necessity of securing informed consent before providing medical service, the implementation of the Hippocratic Oath, and other controversial issues in medical care. However, a significantly higher number of residents reported having a thorough understanding of the handling of medico-legal issues by the MoH and Botswana Health Professions Council to MSs, p=0.044 and MOs (p=0.029). Residents also demonstrated greater knowledge about the supplementation of legal rules with ethical ones compared to MSs (p=0.009 and MOs (p=0.015).

Residents were more familiar with the impact of skill on professional negligence than MSs (p<0.001) and MOs (p=0.036). Additionally, they had a better understanding of the assessment of negligence cases by skilled peers than MSs (p=0.032). Furthermore, residents showed greater awareness of the four Beauchamp and Childress principles of Bioethics - respect for autonomy, non-maleficence, beneficence, and justice - than MSs (p=0.032) and MOs (p<0.001). They also exhibit more awareness of human rights, especially the goal of providing the best possible health service to every person, compared to MSs (p=0.011). (Table 2, Appendix 2)

Table 2: The knowledge of participants in the common medico-legal issues, PMH, May to July 2022

Statement	Don't know it	Heard of it	Know it well	p-value
1. Medico-legal cases are handled by MoH and BHPC	44 (23.2%)	105 (55.3%)	41 (21.6%)	Res > MSs, p=0.044 Res > MOs, p=0.029
2. Legal rules are supplemented by ethical ones	9 (4.7%)	63 (33.2%)	118 (62.1%)	Res > MSs, p=0.009 Res > MOs, p=0.015
3. A reasonable level of skill determines negligence	26 (13.7%)	47 (24.7%)	117 (61.6%)	Res > MSs, p<0.001 Res > MOs, p=0.036
4. Negligence is assessed by skilled peers	18 (9.5%)	47 (24.7%)	125 (65.8%)	Res > MSs, p=0.032
5. Health professionals must be aware of dual loyalty conflicts	62 (32.6%)	61 (32.1%)	67 (35.3%)	All >0.05
6. Health professionals must always obtain informed consent	9 (4.7%)	12 (6.3%)	169 (88.9%)	All >0.05
7. Health professionals must implement the Hippocratic Oath	12 (6.3%)	32 (16.8%)	146 (76.8%)	All >0.05
8. Health professionals must take note of 4 Beauchamp principles of Bioethics	8 (4.2%)	11 (5.8%)	171 (90.0%)	Res > MSs, p=0.032 Res > MOs, p<0.001
9. Health professionals must take note of human rights law	20 (10.5%)	51 (26.8%)	119 (62.6%)	Res > MSs, p=0.012
10. Health professionals must be acquainted with current issues (e.g. abortion)	10 (5.3%)	56 (29.5%)	124 (65.3%)	All >0.05

Attitude towards medico-legal issues

Only 65.5% of participants believe they have received adequate training to handle medico-legal issues at their current level. Overall, attitudes are highly favourable towards the need for health institutions to provide training in evidence collection, medico-legal report writing, and medico-legal case management protocols, as well as facilities for safeguarding medico-legal evidence. While attitudes remain positive, there is slightly less enthusiasm for the provision of resources such as equipment for case photography and sexual assault kits.

Participants also expressed strong support for the Botswana Health Professionals Council (BHPC) providing training and documentation on its regulations concerning professional conduct. Similarly, there is a high level of agreement on the need for medical schools to offer adequate training in medico-legal issues appropriate to the participants' current levels of practice. Notably, there is no statistically significant difference among the three groups concerning their attitudes towards medico-legal issues. (Table 3, Appendix 3)

Table 3: The attitude of participants towards common medico-legal activities, PMH, May to July 2022

Statement	Not Important	Important but not essential	Essential	p-value
11. The health institution should train me to collect medico-legal evidence	2 (1.1%)	4 (2.1%)	184 (96.8%)	All >0.05
12. The health institution should train me to write medico-legal reports	1 (0.53%)	15 (7.9%)	174 (91.6%)	All >0.05
13. The health institution should provide me with medico-legal case protocols	0 (0.0%)	11 (5.8%)	179 (94.2%)	All >0.05
14. The health institution should provide me with resources for case photography	7 (3.7%)	48 (25.3%)	135 (71.1%)	All >0.05
15. The health institution should provide me with sexual assault kits	16 (8.4%)	32 (16.8%)	142 (74.7%)	All >0.05
16. The health institution should have a system to keep medico-legal evidence safe	2 (1.1%)	11 (5.8%)	177 (93.2%)	All >0.05
17. The BHPC should provide training on its professional conduct regulations	2 (1.1%)	14 (7.4%)	174 (91.6%)	All >0.05
18. The BHPC should provide a document on its professional conduct regulations	0 (0.0%)	18 (9.5%)	172 (90.5%)	All >0.05
19. Medical schools should give training about medico-legal procedures/ regulations	0 (0.0%)	9 (4.7%)	181 (95.3%)	All >0.05
20. My training so far is adequate to handle medico-legal issues in my current practice	18 (9.5%)	47 (24.7%)	125 (65.8%)	All >0.05

Practice in medico-legal issues

There was no statistically significant difference among the three groups regarding the sharing of medico-legal information via emails and social media, both with and without patient identifiers, consulting a senior when uncertain case management, prioritizing their well-being in practice, or reporting colleagues' medical errors to the appropriate bodies.

However, residents and MOs demonstrated significantly greater competence than MSs in examining and reporting assault cases (each $p<0.001$), accurately reporting rape cases (each $p<0.001$), ensuring the confidentiality of medico-legal evidence and reports (each $p<0.001$), and collecting various types of medico-legal evidence ($p=0.002$ and $p<0.001$ respectively). Interestingly, MSs were more likely to report medical errors than residents ($p<0.001$) and MOs ($p=0.043$), while MOs reported more errors than residents ($p=0.015$). (Table 4, Appendix 4)

Table 4: The level of practice of common medico-legal activities among participants, PMH, May to July 2022

Practice	Not done	Sometimes	Always	Differences
21. I competently examine and accurately report cases of assault	83 (43.7%)	59 (31.1%)	48 (25.3%)	MOs > MSs, p<0.001 Res > MSs, p<0.001
22. I competently examine and accurately report rape cases	117 (61.6%)	29 (15.3%)	44 (23.2%)	MOs > MSs, p<0.001 Res > MSs, p<0.001
23. I ensure that medico-legal evidence and reports are dealt with confidentially	42 (22.1%)	34 (17.9%)	114 (60.0%)	MOs > MSs, p<0.001 Res > MSs, p<0.001
24. I collect medico-legal evidence of different kinds when indicated	81 (42.6%)	57 (30.0%)	52 (27.4%)	MOs > MSs, p=0.002 Res > MSs, p<0.001
25. I send medico-legal information (e-mails, social media) with patient identifiers	168 (88.4%)	17 (8.9%)	5 (2.6%)	All >0.05
26. I send medico-legal information (e-mails, social media) without patient identifiers	155 (81.6%)	22 (11.6%)	13 (6.8%)	All >0.05
27. I consult a senior doctor or refer a patient if I am not comfortable managing him/her	6 (3.2%)	17 (8.9%)	167 (87.9%)	All >0.05
28. In my practice I am the priority (protecting myself from any harm)	26 (13.7%)	107 (56.3%)	57 (30.0%)	All >0.05
29. I report my medical errors to the responsible body	49 (25.8%)	82 (43.2%)	59 (31.1%)	MSs > Mos, p=0.043 MSs > Res, p<0.001 MOs > Res, p=0.015
30. I report my colleagues' medical errors to the responsible body	80 (42.1%)	88 (46.3%)	22 (11.6%)	All >0.05

Stressors

No significant differences were found between the three groups regarding potential medico-legal stressors. Five sources of stress were reported as relatively high severity: fear of legal consequences for omissions (78.4%), deficiency of knowledge of the local system (71.6%), pressure from victims/ relatives (65.3%), the influence of supervisors (59.5%), and interactions with legal authorities (53.2%). The sixth stressor (pressure from offenders) was still considered but somewhat lower at (41.1%). Religion/beliefs were reported as having no effect on 44.7% of the respondents. (Table 5, Appendix 5)

Table 5: Levels and determinants of stressors among the participants, PMH, May to July 2022

Potential stressor	No effect	Low stress	High stress	P-value
31. Fear of legal consequences of omissions, committed knowingly/ unknowingly	7 (3.7%)	34 (17.9%)	149 (78.4%)	All >0.05
32. Deficiency in the knowledge of Botswana medico-legal issues/ situations	5 (2.6%)	49 (25.8%)	136 (71.6%)	All >0.05
33. Pressure from victims or victims' relatives	14 (7.4%)	52 (27.4%)	124 (65.3%)	All >0.05
34. Pressure from offenders or those associated with offenders	34 (17.9%)	78 (41.1%)	78 (41.1%)	All >0.05
35. My religion/ beliefs	85 (44.7%)	71 (37.4%)	34 (17.9%)	All >0.05
36. Influence of supervisors, hospital leaders etc.	18 (9.5%)	59 (31.1%)	113 (59.5%)	All >0.05
37. Interactions with legal authorities: police officers, lawyers, etc.	24 (12.6%)	65 (34.2%)	101 (53.2%)	All >0.05

Discussion

Our study investigated the knowledge, attitudes, practices, and stressors related to medico-legal issues among medical students, medical officers, and residents at Princess Marina Hospital and the University of Botswana. The findings indicate that knowledge and practice levels were generally low, suggesting substantial room for improvement in these areas. However, participants rated their attitudes highly, reflecting a strong recognition of the importance of medico-legal knowledge and skills in their medical practice. Additionally, a majority of participants reported significant stress associated with medico-legal issues, underscoring the need to enhance medico-legal education and increase awareness within medical practice in Botswana.

Bona fide medical errors classified as negligence typically lead to financial compensation but do not attract criminal punishment (Coetzee et al., 2011). Conversely, failing to adhere to ethical standards may attract severe consequences, including debarment from practice under the Botswana Professionals Act (Botswana Professionals Act 2001, No 17, 2001). Malpractice escalates to criminal acts, such as murder, when a practitioner intentionally or negligently manipulates medical records or contributes to a patient's death (Coetzee et al., 2011). Corporate liability may also be implicated in cases involving defective equipment or inadequate facilities. Additionally, contributory negligence arises when both the doctor and the patient share the responsibility for the injury' (Swaranjali et al., 2022; Herring, 2014).

Given these complexities, medical practitioners must possess a thorough understanding of medico-legal aspects to mitigate litigation risks and deliver standard healthcare services (Swaranjali et al., 2022; Thomas, 2020). While this study did not explore the learning processes of medico-legal education, it focused on assessing knowledge, attitudes, practice, and stressors related to medico-legal issues within our context.

Knowledge of medico-legal issues

The level and depth of medico-legal knowledge among medical practitioners vary significantly across studies. In India, only 2.0% of medical students are aware of laws protecting practitioners, 20.0% know about consent laws, 10% correctly define medical malpractice, and 40.0% have heard of litigations (Swaranjali et al., 2022). Additional studies highlight a persistent knowledge gap emphasizing the urgent need to educate MSs on this topic (Swaranjali et al., 2022; Mohammed et al., 2020).

In the UK, Preston-Shoot et al. found that some medical students demonstrated a good understanding of medico-legal issues through self-assessment (Preston-Shoot et al. 2011). Similarly, Mattick *et al*. reported a 77.3% success rate in achieving ethics education goals among participating schools (Mattick et al., 2006), while Barnie et al. found that 74.0% of medical students in Ghana knew medico-legal and confidentiality issues (Barnie et al., 2015). In Brazil advanced-year medical students showed the highest performance in the Legal Medicine tests, with performance improving throughout the course.

For practicing doctors, a South African study revealed a good understanding of the informed consent requirement but highlighted deficiencies in its application and knowledge of local medico-legal regulations and laws (Chima, 2013). In our study, 60.0% of the participants reported a reasonable understanding of medico-legal issues, with residents generally displaying more knowledge than MOs and MSs, though some differences were not statistically significant.

Attitude towards medico-legal issues

There is limited literature on the attitude of students and doctors towards the medico-legal aspects of their practice. However, existing research indicates that medical students generally hold a positive perception, recognizing the importance of medico-legal knowledge in competent doctors (Preston-Shoot et al. 2011, Swaranjali et al., 2022,

Ingole et al., 2019). An Indian study found that only 5.0% of medical students believe the judiciary would be sympathetic in the event of a lawsuit, while 30.0% felt that trust between doctors and patients had eroded, understanding the need for attitude shifts to improve the healthcare system's smooth functioning (Swaranjali et al., 2022). A study from Ghana emphasized the importance of incorporating medico-legal training both during formal medical education and in professional practice (Barnie et al., 2015).

In contrast, our study focused on specific attitudes towards medico-legal practice. We found overwhelmingly positive attitudes regarding the responsibility of regulators and employers to provide medico-legal resources, such as equipment, secure information storage, and guidance on professional conduct. Over 90% of respondents agreed that medical schools, regulatory bodies, and health institutions should offer comprehensive training on medico-legal matters, including evidence collection, report writing, and case management protocols. Notably, only 65.5% of participants believed they had received adequate training to manage medico-legal issues at their current level, a concern not widely documented in other studies.

Practice in medico-legal issues

Research on individual medico-legal skills (Izegbu et al., 2006) or groups of skills (Vivian et al., 2011, Turvill, 2015, Peabody et al., 2008, Izegbu et al., 2006) and their practical application is limited. Some studies suggest that acquiring medico-legal knowledge alone can foster critical thinking and psychomotor skills related to ethical, legal, and professional issues (Swaranjali et al., 2022, Evans et al., 2010, Thomas, 2020, Todorovski, 2018, Alexander-Silva et al., 2021, Jambure et al., 2017, Paleakkara, 2021). This perspective underscores a widespread call for enhanced and comprehensive training (Barnie et al., 2015, Okoye et al., 2017, Izegbu et al., 2006).

In the UK, medical students expressed uncertainty about their ability to advocate for and protect their patients in practice (Preston-Shoot et al. 2011). A Nigerian study revealed that 70.0% of medical doctors had no training in death certification, with 50.0% only receiving such training post-graduation (Izegbu et al., 2006). Teaching and evaluating medico-legal facts is more straightforward than teaching practical skills. Nevertheless, there are instances of students acquiring medico-legal skills through practical or service-learning experiences (Shah, 2008, Mattick et al., 2006, Dowie, 2014, Turvill, 2015, Peabody et al., 2008). Most researchers concur that effective training in medico-legal skills requires a staged approach throughout medical career development (Barnie et al., 2015, Okoye et al., 2017, Izegbu et al., 2006).

Our study differs from previous research by focusing on whether respondents actively perform medico-legal practice, rather than merely assessing their knowledge about these practices – a concept sometimes referred to as 'practical knowledge' (Swaranjali et al., 2022, Evans et al., 2010, Thomas, 2020, Todorovski, 2018, Alexander-Silva et al., 2021, Jambure et al., 2017, Paleakkara, 2021).

Our study reveals that MSs report their errors more frequently than MOs and residents, while MOs report errors more often than residents. This trend raises concerns about whether more experienced practitioners are less inclined to report errors. A possible

explanation could be differing interpretations of 'responsible body'; medical officers and residents may view this as the BHPC, to whom they might not report errors, instead reporting them to workplace superiors, unlike students who may interpret 'responsible body' as their immediate supervisors.

Stressors in medico-legal issues

Published information regarding the extent to which medico-legal issues contribute to stress among students is sparse and variable (Preston-Shoot et al., 2011, Johnston et al., 2014). In many studies that report factors causing stress to medical students, medico-legal issues are notably absent from discussion. (Hill et al., 2018, Guthrie et al., 1998, Sattar et al., 2022). Instead, major stressors typically relate to academic pressure, home environments, and security concerns (Hill et al., 2018, Guthrie et al., 1998, Sattar et al., 2022, Sohail, 2013).

International studies that investigated medico-legal stressors among doctors have identified fear of lawsuits, as well as errors in record-keeping and regulatory processes, as common sources of stress (Shah, 2008, Melbourne School of Global and Population Health, 2022, Vivian et al., 2011). In alignment with these findings, participants in the current study – both students and doctors – reported specific stressors related to medico-legal issues in the work environment. These include concerns about the consequences of wrongful acts or omission, a lack of adequate understanding of the medico-legal system, and complexities of interactions with victims, supervisors and legal authorities.

Limitations

The findings of the current study shed light on specific aspects of medico-legal knowledge, attitudes, and practice of medical students, medical officers, and residents. Additionally, they highlight how these groups experience stress related to medico-legal challenges in their work. While the scope of the questions was informed by the researchers' experience and may not capture all dimensions of medico-legal issues, the insights are valuable, particularly in the context of low- and middle-income countries. The study reveals that the level of knowledge and practice in medico-legal matters are generally rated as low to moderate, suggesting significant room for improvement in education and training in these areas.

However, the ratings for attitudes are notably higher, suggesting that participants recognize the importance of medicolegal knowledge and skills. This discrepancy may indicate a keen awareness among participants that, despite valuing these competencies, they feel inadequately prepared and supported in acquiring and applying them. This highlights the need for enhanced training and institutional support to bridge the gap between their attitude and actual preparedness in medico-legal matters.

Conclusions

The level of knowledge regarding the ten aspects of medico-legal issues (categorized under Knowledge) is generally good, with only a few respondents expressing a lack of awareness. As anticipated, residents and medical officers demonstrated greater

knowledge in these areas compared to medical students, reflecting their increased experience in the field. All categories of the respondents expressed strong attitudes towards the importance of these medicolegal aspects of including a shared recognition of their relevance.

However, the reported level of regular practice (defined as "always) "was lower, although the majority still engaged in these practices to some extent ("sometimes" or "always"). Notably, the practice of competently examining and accurately reporting rape cases was less frequent with only 38.5% of respondents indicating they practiced these skills regularly. While more experienced medical officers and residents outperformed medical students in many practice-related items, medical students were more likely to report their errors to responsible bodies, indicating a proactive approach to accountability.

Among the seven potential medico-legal stressors investigated, six were reported as being strongly experienced across all respondent categories, with the exception of religious beliefs. This highlights a significant need to elevate the profile of medico-legal issues within medical practice in Botswana. Despite these challenges, the overall results exceeded our initial expectations.

To sustain and enhance these positive findings while addressing deficiencies, stakeholders such as the Faculty of Medicine, MoH, and BHPC should collaborate to develop contextually appropriate progressively structured medico-legal courses. These initiatives could help better prepare medical professionals for the complexities of medico-legal practice in their work environment.

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Appendices 1-5

Appendix 1: Exact wording of the knowledge, Attitude, Practice and Stressors questionnaire

Q1	Medico-legal cases are handled at the MoH (Ministry of Health) and the Botswana Health Professions

	Council.
Q2	The medical profession is characterized by the ethical rules which supplement the legal rules. Although the line between ethical rules and legal rules is at times blurred, they are not the same.
Q3	In assessing professional negligence, the degree of skill and care required is what can be reasonably expected of a person engaged in such skilled activities.
Q4	A doctor is not guilty of negligence if s/he has acted in accordance with the practice accepted as proper by a reasonable body of medical practitioners skilled in that particular art.
Q5	In discharging their duties health professionals are aware of 'dual loyalty' conflicts: loyalty to patients on the one hand, and loyalty to their employers, insurance companies, and even prisons a...
Q6	Medical doctors are aware that informed consent must be sought from an authorized person prior to taking a history from, conducting an examination on, or providing any treatment for a patient.
Q7	All medical doctors should know and implement the Hippocratic Oath and its modern variants as issued by the World Medical Association (WMA).
Q8	Healthcare professionals are required to have a working knowledge of the four principles of Bioethics: autonomy, beneficence, non-maleficence, and justice.
Q9	Health professionals are required to discharge their duties with knowledge of human rights law since health issues are ultimately human rights issues, and a goal of human rights law is to 'achieve...
Q10	Health professionals should be fully acquainted with the controversial ethical issues surrounding contraception, abortion, pregnancy, reproduction, organ donation, dying, and death.
Q11	The health institution where I work should provide training in evidence collection for medico-legal cases.
Q12	The health institution where I work should provide training in writing medico-legal reports.
Q13	The health institution where I work should provide me with management protocols or guidelines about collecting evidence for medico-legal cases.
Q14	The health institution where I work should provide me with resources for photographic documentation of medico-legal cases.
Q15	The health institution where I work should provide me with sexual assault kits.
Q16	The health institution where I work should have a system for keeping medico-legal evidence (documents and materials) safe, until delivery to the police.
Q17	The Botswana Health Professions Council should provide people like me with training on its regulations regarding professional conduct.
Q18	The Botswana Health Professions Council should provide people like me with a document or a flier setting out its professional conduct regulations.
Q19	Medical schools in Botswana should provide medical students with adequate training about the local medico-legal regulations and procedures.
Q20	The training I have had to date is adequate for me to handle medico-legal issues in my current level of practice in a health institution.
Q21	I examine cases of assault competently and complete the required medico-legal report accurately
Q22	I examine cases of rape competently and complete the required medico-legal report accurately
Q23	I ensure that the medico-legal evidence and reports for which I am responsible are dealt with confidentially
Q24	I collect medico-legal evidence, e.g. photos, samples, cloths, foreign bodies, etc. when indicated.
Q25	I send patients' medico-legal evidence and reports on e-mails and/or social media together with patient identifiers.
Q26	I send patients' medico-legal evidence and reports on e-mails and/or social media without patient identifiers.

Q27	I consult a senior or refer to a patient if I am not comfortable managing him/her.
Q28	In my practice, I am the priority (protecting myself from any harm).
Q29	I report my own medical errors to the responsible body.
Q30	I report my colleagues' medical errors to the responsible body.
Q31	Fear of legal consequences for omissions, committed knowingly or unknowingly
Q32	Deficiency in the knowledge of Botswana medico-legal issues/situations
Q33	Pressure from victims or victims' relatives
Q34	Pressure from offenders or those associated with offenders
Q35	My religion/ beliefs
Q36	Influence of supervisors, hospital leaders etc.
Q37	Interactions with legal authorities: police officers, lawyers, etc.

Appendix 2: The knowledge of participants in common medico-legal issues, PMH, May 2022 to July

Statement	Group	don't know it		heard of it		know it well		Total	Differences
		N	%	N	%	N	%	N	
1. Medico-legal cases are handled by MoHW and BHPC	Student	20	25.0	48	60.0	12	15.0	80	Res > MSs (p=0.044) Res > MOs (p=0.029)
	Medical officer	15	34.9	19	44.2	9	20.9	43	
	Resident	9	13.4	38	56.7	20	29.9	67	
	Total	**44**	**23.2**	**105**	**55.3**	**41**	**21.6**	**190**	
2. Legal rules are supplemented by ethical ones	Student	7	8.8	29	36.3	44	55.0	80	Res > MSs (p=0.009) Res > MOs (p=0.015)
	Medical officer	1	2.3	20	46.5	22	51.2	43	
	Resident	1	1.5	14	20.9	52	77.6	67	
	Total	**9**	**4.7**	**63**	**33.2**	**118**	**62.1**	**190**	
3. A reasonable level of skill determines negligence	Student	17	21.3	27	33.8	36	45.0	80	Res > MSs (p<0.001) Res > MOs (p=0.036)
	Medical officer	6	14.0	11	25.6	26	60.5	43	
	Resident	3	4.5	9	13.4	55	82.1	67	
	Total	**26**	**13.7**	**47**	**24.7**	**117**	**61.6**	**190**	
4. Negligence is assessed by skilled peers	Student	10	12.5	27	33.8	43	53.8	80	Res > MSs (p=0.032)
	Medical officer	3	7.0	9	20.9	31	72.1	43	
	Resident	5	7.5	12	17.9	50	74.6	67	
	Total	**18**	**9.5**	**47**	**24.7**	**125**	**65.8**	**190**	
5. Practitioners must be aware of dual loyalty conflicts	Student	28	35.0	27	33.8	25	31.3	80	All p>0.05
	Medical officer	16	37.2	14	32.6	13	30.2	43	
	Resident	18	26.9	21	31.3	28	41.8	67	
	Total	**62**	**32.6**	**61**	**32.1**	**67**	**35.3**	**190**	
6. Informed consent must always be obtained	Student	2	2.5	5	6.3	73	91.3	80	All p>0.05
	Medical officer	4	9.3	4	9.3	35	81.4	43	
	Resident	3	4.5	3	4.5	61	91.0	67	
	Total	**9**	**4.7**	**12**	**6.3**	**169**	**88.9**	**190**	
7. Practitioners must implement the Hippocratic Oath	Student	6	7.5	14	17.5	60	75.0	80	All p>0.05
	Medical officer	2	4.7	6	14.0	35	81.4	43	
	Resident	4	6.0	12	17.9	51	76.1	67	
	Total	**12**	**6.3**	**32**	**16.8**	**146**	**76.8**	**190**	
8. Take note of 4 Beauchamp	Student	3	3.8	5	6.3	72	90.0	80	Res > MSs(p=0.032) Res > MOs (p<0.001)
	Medical officer	5	11.6	5	11.6	33	76.7	43	

principles of Bioethics	Resident	0	0.0	1	1.5	66	98.5	67	
	Total	**8**	**4.2**	**11**	**5.8**	**171**	**90.0**	**190**	
9. Take note of human rights law	Student	10	12.5	28	35.0	42	52.5	80	Res > MSs (p=0.012)
	Medical officer	5	11.6	12	27.9	26	60.5	43	
	Resident	5	7.5	11	16.4	51	76.1	67	
	Total	**20**	**10.5**	**51**	**26.8**	**119**	**62.6**	**190**	
10. Acquainted with current issues e.g. abortion	Student	6	7.5	22	27.5	52	65.0	80	All p>0.05
	Medical officer	2	4.7	15	34.9	26	60.5	43	
	Resident	2	3.0	19	28.4	46	68.7	67	
	Total	**10**	**5.3**	**56**	**29.5**	**124**	**65.3**	**190**	

Appendix 3: The attitude of participants towards common medico-legal activities, PMH, May to July 2022

Statement	**Group**	**not important**		**important but not essential**		**essential**		**Total**	**Differences**
		N	**%**	**N**	**%**	**N**	**%**	**N**	
11. The health institution should train me to collect medico-legal evidence	Student	2	2.5	2	2.5	76	95.0	80	All p>0.05
	Medical officer	0	0.0	0	0.0	43	100.0	43	
	Resident	0	0.0	2	3.0	65	97.0	67	
	Total	**2**	**1.1**	**4**	**2.1**	**184**	**96.8**	**190**	
12. The health institution should train me to write medico-legal reports	Student	1	1.3	10	12.5	69	86.3	80	All p>0.05
	Medical officer	0	0.0	2	4.7	41	95.3	43	
	Resident	0	0.0	3	4.5	64	95.5	67	
	Total	**1**	**0.53**	**15**	**7.9**	**174**	**91.6**	**190**	
13. The health institution should provide me with medico-legal case protocols	Student	0	0.0	6	7.5	74	92.5	80	All p>0.05
	Medical officer	0	0.0	2	4.7	41	95.3	43	
	Resident	0	0.0	3	4.5	64	95.5	67	
	Total	**0**	**0.0**	**11**	**5.8**	**179**	**94.2**	**190**	
14. The health institution should provide me with resources for case photography	Student	4	5.0	21	26.3	55	68.8	80	All p>0.05
	Medical officer	0	0.0	11	25.6	32	74.42	43	
	Resident	3	4.5	16	23.9	48	71.64	67	
	Total	**7**	**3.7**	**48**	**25.3**	**135**	**71.05**	**190**	
15. The health institution should provide me with sexual assault kits	Student	4	5.0	12	15.0	64	80.0	80	All p>0.05
	Medical officer	2	4.7	10	23.3	31	72.1	43	
	Resident	10	14.9	10	14.9	47	70.1	67	
	Total	**16**	**8.4**	**32**	**16.8**	**142**	**74.7**	**190**	
16. The health institution should have a system to keep medico-legal evidence safe	Student	0	0.0	5	6.3	75	93.8	80	All p>0.05
	Medical officer	1	2.3	2	4.7	40	93.0	43	
	Resident	1	1.5	4	6.0	62	92.5	67	
	Total	**2**	**1.1**	**11**	**5.8**	**177**	**93.2**	**190**	
17. The BHPC should provide training on its professional conduct regulations	Student	1	1.3	6	7.5	73	91.3	80	All p>0.05
	Medical officer	0	0.0	2	4.7	41	95.3	43	
	Resident	1	1.5	6	9.0	60	89.6	67	
	Total	**2**	**1.1**	**14**	**7.4**	**174**	**91.6**	**190**	
18. The BHPC should provide a document on its professional conduct	Student	0	0.0	10	12.5	70	87.5	80	All p>0.05
	Medical officer	0	0.0	5	11.6	38	88.4	43	
	Resident	0	0.0	3	4.5	64	95.5	67	

regulations	**Total**	**0**	**0.0**	**18**	**9.5**	**172**	**90.5**	**190**	
19. Medical schools should give training about medico-legal procedures and regulations	Student	0	0.0	5	6.3	75	93.8	80	All p>0.05
	Medical officer	0	0.0	0	0.0	43	100.0	43	
	Resident	0	0.0	4	6.0	63	94.0	67	
	Total	**0**	**0.0**	**9**	**4.7**	**181**	**95.3**	**190**	
20. My training so far is adequate to handle medico-legal issues at my current practice level	Student	11	13.8	25	31.3	44	55.0	80	All p>0.05
	Medical officer	1	2.3	11	25.6	31	72.1	43	
	Resident	6	9.0	12	17.9	49	73.1	67	
	Total	**18**	**9.5**	**47**	**24.7**	**125**	**65.8**	**190**	

Appendix 4: The level of practice of common medico-legal activities among participants, PMH, May to July 2022

Practice	Group	not done		sometimes		always		Total	Differences
		N	%	N	%	N	%	N	
21. I competently examine and accurately report cases of assault	Student	60	75.0	11	13.8	9	11.3	80	MO > MSs (p<0.001) Res > MSs (p<0.001)
	Medical officer	8	18.6	18	41.9	17	39.5	43	
	Resident	15	22.4	30	44.8	22	32.8	67	
	Total	**83**	**43.7**	**59**	**31.1**	**48**	**25.3**	**190**	
22. I competently examine and accurately report rape cases	Student	66	82.5	6	7.5	8	10.0	80	MO > MSs (p<0.001) Res > MSs (p<0.001)
	Medical officer	21	48.8	8	18.6	14	32.6	43	
	Resident	30	44.8	15	22.4	22	32.8	67	
	Total	**117**	**61.6**	**29**	**15.3**	**44**	**23.2**	**190**	
23. I ensure that the medico-legal evidence and reports are dealt with confidentially	Student	35	43.8	12	15.0	33	41.3	80	MOs > MSs (p<0.001) Res > MSs (p<0.001)
	Medical officer	2	4.7	7	16.3	34	79.1	43	
	Resident	5	7.5	15	22.4	47	70.1	67	
	Total	**42**	**22.1**	**34**	**17.9**	**114**	**60.0**	**190**	
24. I collect medico-legal evidence of different kinds when indicated	Student	52	65.0	18	22.5	10	12.5	80	MOs > MSs (p=0.002) Res > MSs (p<0.001)
	Medical officer	15	34.9	13	30.2	15	34.9	43	
	Resident	14	20.9	26	38.8	27	40.3	67	
	Total	**81**	**42.6**	**57**	**30.0**	**52**	**27.4**	**190**	
25. I send medico-legal information (e-mails and/or social media) with patient identifiers	Student	68	85.0	9	11.3	3	3.8	80	All p>0.05
	Medical officer	39	90.7	3	7.0	1	2.3	43	
	Resident	61	91.0	5	7.5	1	1.5	67	
	Total	**168**	**88.4**	**17**	**8.9**	**5**	**2.6**	**190**	
26. I send medico-legal information (e-mails and/or social media) without patient identifiers	Student	61	76.3	12	15.0	7	8.8	80	All p>0.05
	Medical officer	34	79.1	5	11.6	4	9.3	43	
	Resident	60	89.6	5	7.5	2	3.0	67	
	Total	**155**	**81.6**	**22**	**11.6**	**13**	**6.8**	**190**	
27. I consult a senior or refer a patient if I am not comfortable managing him/her	Student	6	7.5	6	7.5	68	85.0	80	All p>0.05
	Medical officer	0	0	2	4.7	41	95.3	43	
	Resident	0	0	9	13.4	58	86.6	67	
	Total	**6**	**3.2**	**17**	**8.9**	**167**	**87.9**	**190**	
28. In my practice I am the priority (protecting myself from any harm)	Student	12	15.0	41	51.3	27	33.8	80	All p>0.05
	Medical officer	4	9.3	28	65.1	11	25.6	43	
	Resident	10	14.9	38	56.7	19	28.4	67	
	Total	**26**	**13.7**	**107**	**56.3**	**57**	**30.0**	**190**	
29. I report my own	Student	11	13.8	30	37.5	39	48.8	80	MSs > MOs (p=0.043)

medical errors to the responsible body	Medical officer	8	18.6	24	55.8	11	25.6	43	MSs > Res (p<0.001) MOs > Res (p=0.015)
	Resident	30	44.8	28	41.8	9	13.4	67	
	Total	**49**	**25.8**	**82**	**43.2**	**59**	**31.1**	**190**	
30. I report my colleagues' medical errors to the responsible body	Student	29	36.3	38	47.5	13	16.3	80	All p>0.05
	Medical officer	17	39.5	24	55.8	2	4.7	43	
	Resident	34	50.7	26	38.8	7	10.4	67	
	Total	**80**	**42.1**	**88**	**46.3**	**22**	**11.6**	**190**	

Appendix 5: Levels and determinants of stressors among the participants, PMH, May to July 2022

Potential stressor	Group	no effect		low stress		high stress		Total	Differences
		N	%	N	%	N	%	N	
31. Fear of legal consequences for omissions, committed knowingly/ unknowingly	Student	4	5.0	17	21.3	59	73.8	80	All p>0.05
	Medical officer	1	2.3	6	14.0	36	83.7	43	
	Resident	2	3.0	11	16.4	54	80.6	67	
	Total	**7**	**3.7**	**34**	**17.9**	**149**	**78.4**	**190**	
32. Deficiency in the knowledge of Botswana medico-legal issues/ situations	Student	3	3.8	24	30.0	53	66.3	80	All p>0.05
	Medical officer	1	2.3	10	23.3	32	74.4	43	
	Resident	1	1.5	15	22.4	51	76.1	67	
	Total	**5**	**2.6**	**49**	**25.8**	**136**	**71.6**	**190**	
33. Pressure from victims or victims' relatives	Student	9	11.3	17	21.3	54	67.5	80	All p>0.05
	Medical officer	1	2.3	14	32.6	28	65.1	43	
	Resident	4	6.0	21	31.3	42	62.7	67	
	Total	**14**	**7.4**	**52**	**27.4**	**124**	**65.3**	**190**	
34. Pressure from offenders or those associated with offenders	Student	15	18.8	32	40.0	33	41.3	80	All p>0.05
	Medical officer	8	18.6	17	39.5	18	41.9	43	
	Resident	11	16.4	29	43.3	27	40.3	67	
	Total	**34**	**17.9**	**78**	**41.1**	**78**	**41.1**	**190**	
35. My religion/ beliefs	Student	36	45.0	24	30.0	20	25.0	80	All p>0.05
	Medical officer	20	46.5	17	39.5	6	14.0	43	
	Resident	29	43.3	30	44.8	8	11.9	67	
	Total	**85**	**44.7**	**71**	**37.4**	**34**	**17.9**	**190**	
36. Influence of supervisors, hospital leaders etc.	Student	9	11.3	24	30.0	47	58.8	80	All p>0.05
	Medical officer	1	2.3	13	30.2	29	67.4	43	
	Resident	8	11.9	22	32.8	37	55.2	67	
	Total	**18**	**9.5**	**59**	**31.1**	**113**	**59.5**	**190**	
37. Interactions with legal authorities: police officers, lawyers, etc.	Student	13	16.3	20	25.0	47	58.8	80	All p>0.05
	Medical officer	7	16.3	19	44.2	17	39.5	43	
	Resident	4	6.0	26	38.8	37	55.2	67	
	Total	**24**	**12.6**	**65**	**34.2**	**101**	**53.2**	**190**	