



## **Medical Errors Detected at the Autopsy: A Prelude to Avoiding Malpractice Litigations**

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### **Authors' contributions**

*This work was carried out in collaboration between all authors. Author AOK conceived and designed the study, performed the statistical analysis, wrote the protocol and wrote the first draft of the manuscript. Author AAA managed the analyses of the study. Author AOK managed the literature searches. Author HAMA participated in the writing of the manuscript. Author OVO abstracted the data for the study. All authors read and approved the final manuscript.*

### **Article Information**

DOI: 10.9734/JAMMR/2018/43384

#### Editor(s):

(1) Dr. Rameshwari Thakur, Professor, Department of Microbiology, Muzaffarnagar Medical College, India.

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Complete Peer review History: <http://www.sciencedomain.org/review-history/26326>

**Original Research Article**

**Received 26 June 2018**

**Accepted 09 September 2018**

**Published 20 September 2018**

### **ABSTRACT**

**Background:** Diagnostic errors arising from wrong clinical judgments and conclusions are common occurrences worldwide in routine medical practice. Unfortunately, it results in unpleasant clinical sequelae such as unnecessary complications and premature deaths. Many of these cases pass undetected except post-mortem examination is conducted. The clinical post-mortem examination is gradually becoming extinct, partly due to over-reliance by clinicians on modern technology-driven diagnostic facilities. This study exhibits the role of the post-mortem examination in unravelling the errors of clinical management that resulted in death. Knowing the possibilities of these errors would be a prelude to avoid litigations as physicians endeavour to put structures in place to prevent them.

**Materials and Methods:** A retrospective review of one hundred (100) full post-mortem dissections done, were comprehensively analysed. The ages of patients and the errors of judgment were

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noted. Attention was paid to the diagnoses missed, complications undetected and the crucial contributions of the complications and diagnoses missed to death.

**Results:** Out of one hundred (100) post-mortem examinations, thirty-six (36, 36%) cases showed instances of medical errors as detected by the autopsy. Twenty-two (22) were males while fourteen (14) were females signifying a male predominance in a male to female ratio of 1.6:1. The bulk of the cases were seen from the third to the seventh decades of life. There were 4 cases of missed congenital disorders, 11 cases of missed infections, 8 cases of missed malignancies, 1 case of missed acquired cystic lesion and 1 case of missed head injury. Two infections were misdiagnosed as malignancies, 2 cases of infections misdiagnosed in the same organ, 2 cases of infections were diagnosed in the wrong systems, 14 cases of infections were completely missed, 4 cases of cancers were diagnosed in the wrong organ, 6 cases showed missed complications of hypertension. There was a case of critical omission involving elective induction of labour; resulting in ruptured uterus with concomitant massive intra-abdominal haemorrhage and intrauterine foetal death.

**Conclusion:** The post-mortem examination remains the gold standard for unravelling controversial deaths arising from clinical management. Autopsies should be duly conducted when indicated and structures put in place to examine corpse statutorily when deaths occur in unexpected circumstances. These findings would help clinicians to be wiser for the next patient and prevent future embarrassment from litigations.

*Keywords: Medical errors; autopsy; medical malpractice litigations; missed diagnosis.*

## 1. INTRODUCTION

Medical error is defined as an unintended act either by commission or omission or any action taken that does not achieve its intended outcomes, [1] lack of completion of a planned action, scheme of events (error of execution), the use of a wrong plan to achieve a desired aim or outcome (error of planning, or a deviation from established standard of duty, process and protocol of care on a case that may or may not cause harm to the patient [2]. Diagnostic errors occur regularly in all medical sectors though it is more apt to be preponderant in some than others [3]. Such errors are estimated to be 10% to 15% in different studies and researches [4–7]. Singh et al., in their work found a rate of outpatient diagnostic errors of 5.08%, affecting approximately 12 million US adults every year; many being harmful to the patients [8]. The frequency of diagnostic errors are indicators of the development/assessment of a nation's overall health structure, health management systems, policies and patients' care [9,10]. Medical errors present in varying shades, such as, missed diagnoses, medical misdiagnoses, missed preference diagnosis, inappropriate surgical procedures etc [11,12]. Delayed diagnosis leads to unpleasant long-term effects, unnecessary procedures particularly surgeries with increased risks of morbidity and mortality and emotional and psychological stress from associated injuries [9,11]. Errors in medical practice no matter how minimal, have variable degrees of consequences for the patient, who

upon being distressed has a wrong opinion about medical practice, develops a strained relationship with the caregivers particularly the physicians and by hospital extensions [13]. These could lead to complaints, embarrassing negative publicity for the hospital and unfriendly medico legal developments [9,14]. Medical errors should be studied and an essential means to achieve this is to conduct autopsies on suspicious cases. Though autopsy requests are diminishing, it is still the most veritable means of ascertaining the veracity of diagnosis and put records of the cause and circumstances of death straight [15,16]. The autopsy or post-mortem examination is the systematic dissection of the human body after death exclusively for medical reasons with appropriate interpretation consistent with the circumstances of death, pathophysiological mechanisms and manner of death [17]. The autopsy is unique in that it is an investigative tool that examines the entire body and discovers the attributes of the disease processes in their natural habitat, the tissues [18]. The autopsy should be given the most rightful place it deserves in the understanding of the pathogenesis, progression and prognostication of disease [19]. The role of the autopsy in the care of patients should also be revived as it remains the most accurate method of auditing the correctness of clinical diagnoses, preciseness of clinical judgements cum opinions, the usefulness in the index case and validity of diagnostic tests and determining the exact causes of death [20]. Inaccurate diagnoses lead to disease progression, severe complications and even

unnecessary and premature deaths [21]. The autopsy is the ultimate revealer of the hidden secrets about patients' management [22,23]. Medical malpractice and lately clinical malpractice is known to the medical and law practice as recurrent events [23,24]. Clinical malpractice includes misdiagnoses, missed diagnoses, unnecessary surgeries, unwarranted procedures, maiming to mutilating surgeries, unnecessary investigations that could further worsen the clinical state of the patient or are out rightly contraindicated in the index patients [25]. It also includes substandard practices, sub-optimal approaches to patients management with the ensuing complications and negative consequences, some even being grave mortality or embarrassing debilitating scenarios [26]. An error of omission is a failure of actions such as a missed diagnosis, a delayed evaluation, or a failure to prescribe needed drug treatment or commence the necessary management. An error of commission is an incorrect action, such as administering the wrong drug to the wrong patient at the wrong time or instituting the wrong management modality for cases [27]. Some errors are due to inexperience, misleading investigation results cum reporting, incompetence which may be case incompetence, speciality/sub-speciality incompetence or poor technical support, especially after sensitive and major surgical operations. Studying medical errors exemplifies the unique role of the anatomical pathologist in patients care [28]. Important reasons for studying medical errors is to create due awareness about them, put structures in place to prevent further occurrence and take appropriate proactive measures to prevent them [9]. Other benefits of a study like this would be to reassure patients and their relations and the general public that their interest is paramount to physicians. There would be reductions in unnecessary costs arising from poor management, improvement in overall patients care with improvement of the hospital image and health systems [26]. In the conduct, interpretation and presentation of qualitative autopsy reports, the anatomical pathologist must be wary of medical litigations; so he needs to be familiar with the patients' clinical history and give appropriate interpretation to findings, be aware of the consequences of delays in reporting or inconsistencies of his conclusions vis a vis gross, microscopy and toxicology reports and avoid crucial omissions that may appear to plaintiffs, relations and their lawyers as deliberate acts of concealment or conspiracy with clinicians [29-31].

## 2. MATERIALS AND METHODS

All cases of patients who died after undergoing treatment in hospital and had complete autopsy dissections with complete documentation were analysed for the following:

- a. The correctness or otherwise of the main diagnoses that initiated the sequence of events resulting in death (misdiagnosis or missed diagnosis).
- b. The presence of complications of the disease which were not discovered but contributed to the pathophysiologic progression of the disease process and contributed to death or caused death on their own.
- c. The presence of a pre-morbid condition which was a pointer to the emergence of the main disorder that led to death.
- d. Complications of a procedure, thus an iatrogenic episode whether it led to death or not
- e. Acts of medical or clinical negligence
- f. Data were analysed by descriptive statistical methods.

## 3. RESULTS

Out of one hundred (100) post-mortem examinations, thirty-six (36) cases showed instances of medical errors as detected by the autopsy. Twenty-two (22) were males while fourteen (14) were females signifying a male predominance in a male to female ratio of 1.6: 1. The bulk of the cases were seen from the third to the seventh decade of life as indicated by Table 1. There were 4 cases of missed congenital disorders, 11 cases of missed infections, 8 cases of missed malignancies, 1 case of missed acquired cystic lesion and 1 case of missed head injury. These results are depicted by Table 2. Table 3 shows that two infections were misdiagnosed as malignancies, 2 cases of wrong infections diagnosed in the same organ, 2 cases of infections were diagnosed in the wrong systems, 14 cases of infections were completely missed, 4 cases of cancers were diagnosed in the wrong organ, 6 cases showed missed complications of hypertension. There was a case of elective induction of labour resulting in the ruptured uterus, massive intra-abdominal haemorrhage and intrauterine foetal death. Figs. 1 and 2 illustrate the data in Tables 2 and 3. Instances of wrong diagnoses and medical errors cum clinical negligence were more apt to occur in the male patients.

#### 4. DISCUSSION

Instances of missed diagnoses, misdiagnoses, medical mistakes, iatrogenic causes of death and such have been recurring issues in medical practice which also precipitate medico-legal challenges for physicians and health facilities [23,24,32]. The autopsy records show many cases of medical errors, some of which are common ailments in the environment, easily diagnosable and are treatable benign conditions yet they were not diagnosed and ultimately had fatal outcomes. Pakis et al. [23], found a concordance of 49.1% but a discordance of 14.7% between clinical and autopsy diagnoses cases. These diagnostic challenges were mostly encountered in the cases of myocardial infarction, pneumonia and ruptured aortic aneurysm. In their study, considerable major diagnostic changes were realised after autopsies and thus certified the incontrovertible place of the autopsy in spite of the technology-driven modern methods of diagnosis [23]. Pakis et al. [23], also found out that cases with major diagnostic changes had high medical malpractice rates. Baker found major diagnostic errors in 39.7% of autopsies contributing to patients' death and minor diagnostic errors in 17.3% of autopsies

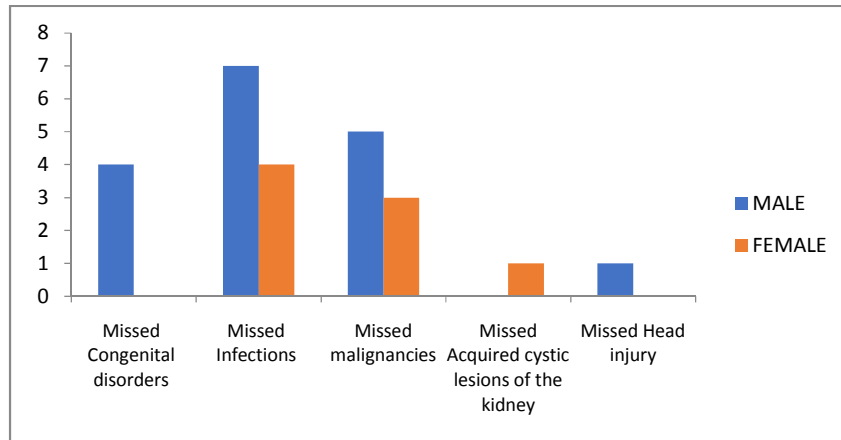
contributing to patients' death [33]. Britton found that failure of diagnosis is the main cause of deaths in more than 43% of the autopsies conducted in the University Hospital in Stockholm, Sweden [34]. This is unacceptably high considering the status of the hospitals involved and the expected expertise of the personnel expected to be practising in such a centre. David et al., in a systematic review also noted that autopsies discovered 23.5% of clinically missed diagnoses involving principal or underlying cause of death as well as 9% of errors that would or could have changed the outcome for the patient positively [16]. Thus, it means that wrong diagnoses or the wrong judgment in clinical management does not preclude any professional cadre or practise setting. Casali et al. [35], in their post-mortem evaluation of suspected malpractice confirmed medical errors in 17% of cases; 50% of these were surgical mistakes. Madae et al. [36], in his autopsy series found that 4.24% of deaths from suspected malpractice cases were due to medical errors. Sonderegger-Iseli et al., asserted that diagnostic errors are major unexpected discrepancies that would have changed the management of patients, seen in 10-20% of cases.

**Table 1. Sex distribution of cases with medical errors**

Ages	Male		Female	
	No of cases	%	No of cases	%
0-9	3	8.33	0	0
10-19	1	2.78	2	5.56
20-29	4	11.1	1	2.78
30-39	4	11.1	6	16.67
40-49	3	8.33	1	2.78
50-59	2	5.56	2	5.56
60-69	3	8.33	1	2.78
70-79	1	2.78	0	0
80-89	1	2.78	1	2.78
<b>Total</b>	<b>22</b>	<b>61.1</b>	<b>14</b>	<b>38.9</b>

**Table 2. Categories of cases of medical errors by gender**

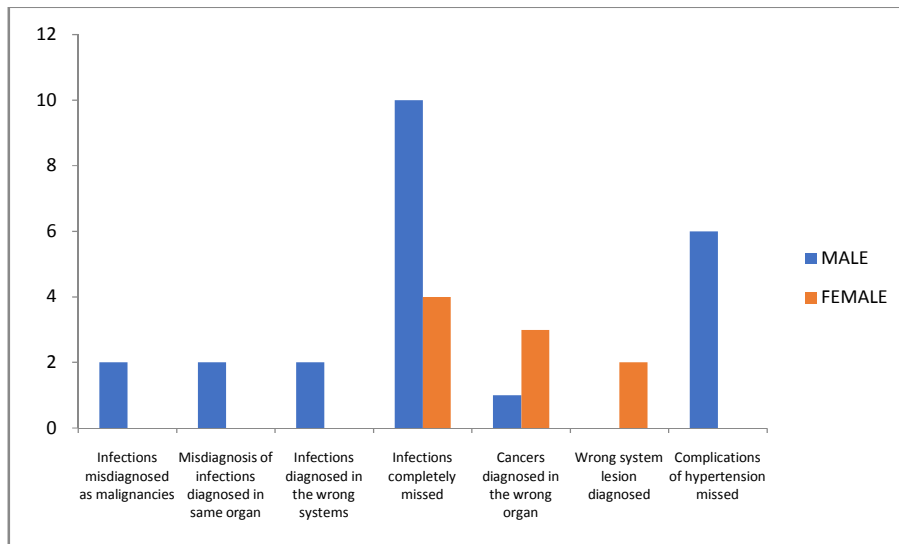
Categories	Male		Female	
	No of cases	%	No of cases	%
Missed Congenital disorders	4	16	0	0
Missed Infections	7	28	4	16
Missed malignancies	5	20	3	12
Missed Acquired cystic lesions of the kidney	0	0	1	4
Missed Head injury	1	4	0	0



**Fig. 1. Categories of cases of medical errors by gender**

**Table 3. Some of the wrong interpositions detected at autopsy**

Mixed-up cases	Male	Female
Infections misdiagnosed as malignancies	2	0
Misdiagnosis of infections diagnosed in same organ	2	0
Infections diagnosed in the wrong systems	2	0
Infections completely missed	10	4
Cancers diagnosed in the wrong organ	1	3
Wrong system lesion diagnosed	0	2
Complications of hypertension missed	6	0



**Fig. 2. Some of the wrong interpositions detected at autopsy according to gender**

The present study shows that infections were rampantly missed or misdiagnosed. Such infections as revealed by this study include pulmonary tuberculosis, acute pyelonephritis, typhoid enteritis, pyogenic meningitis and lobar pneumonia. Akinwusi et al. [37], showed that

typhoid septicaemia was responsible for sudden deaths in 47.1% of patients, pulmonary tuberculosis in 17.7% of patients, and lobar pneumonia in 17.7% of patients. Their finding correlated well with Akinwusi et al., as we captured the same commonest diseases in the

same practice area in south-west Nigeria. Findings also showed that there were six missed cases of complications of systemic hypertension which eventually resulted in death. Akinwusi et al. [38], in their work on sudden deaths found that systemic hypertension-related causes accounted for 48.3% of sudden deaths. Missing systemic hypertension and its complications in cases affecting blacks have worrisome implications. In a contemporary medical world of personalised and precision medicine, the correctness of the diagnosis of the index patient is exclusively the responsibility of the managing physician at that point in time. An incorrect diagnosis is wrong no matter how seemingly close to the exact diagnosis. Every disease entity is so classified and indexed because of its uniqueness in overall presentation, management and prognosis. No two patients are entirely similar in constitution and overall response to genetic-environmental influences and ultimate prognostication. The time-honoured systematic approach to diagnosis remains sacrosanct in the physician's and patient's overall interest. Physicians are expected to interact and clerk their patients, giving proper attention to assay, interrogate and analyse depending on complaints and symptoms, with painstaking eliciting signs and correlate with known pathophysiological processes.

Knottnerus et al. [39]. The symptoms and signs help to form opinions which distil in a set of impressions or differential diagnosis. Physicians then order appropriate and relevant investigations to confirm the exact diagnosis. However, the support of investigative departments such as laboratory and radiology may be ineffective or virtually non-existent in resource-limited environments such as the developing nations and third world countries [40]. When investigative facilities are available, the onus of the final diagnosis is entirely dependent on the clinical acumen and experience of the managing physician. The age-long medical dictum that common things occur commonly remain very strong in many clinical scenarios but it is not an absolute fact as it is known that there may be atypical presentations of diseases. Such atypical and bizarre presentations might make physicians to miss diagnosis [41].

## 5. CONCLUSIONS

The incidence of errors in clinical management among the cases of this study is quite high. Many

of these cases could have gone undetected without post-mortem examinations, considering that physicians do write death certificates on cases that should have had post-mortem examinations conducted on them. The post-mortem examination therefore, remains the gold standard for unravelling controversial deaths arising from clinical management. Autopsies should be duly conducted and structures put in place to examine corpse statutorily when deaths occur in unexpected circumstances. Such revelations would make physicians wiser for the next patient and prevent future embarrassment from litigations.

## CONSENT AND ETHICAL APPROVAL

It is not applicable.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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