Original Article

Does physician distraction lead to diagnostic and management errors? An exploratory study in the primary care setting

Ali I. Alhaqwi, SBFM a, Amir M. Babiker, FRCPCH b, Muneera A. Baraja, SBFM a, Jamila A. Alonazi, SBIM c, Lina A. Alyosif, MBBS a, Sara M. Alyousif, PhD d, Motasim H. Badri, PhD e and Ibrahim A. Alalwan, FRCPC b

a Departments of Family Medicine, King Abdulaziz Medical City, Ministry of the National Guard- Health Affairs and College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

b Pediatrics, King Abdulaziz Medical City, Ministry of the National Guard- Health Affairs and King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

c Internal Medicine, King Abdulaziz Medical City, Ministry of the National Guard- Health Affairs and King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

d Pharmaceutical Care, King Abdulaziz Medical City, Ministry of the National Guard- Health Affairs and King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

e Department of Epidemiology and Biostatistics, College of Public Health and Health Informatics, King Saud bin Abdulaziz University for Health Sciences, Riyadh, KSA

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Abstract

Objectives: There is an increasing concern about diagnostic errors and their impact on patient safety. Physicians’ diagnostic ability is significantly undermined by certain distractions that can carry potential negative consequences such as diagnostic and management errors. This study aimed to examine the effects of distracting factors for physicians during consultation and their

نتائج: تم إجراء ما مجموعة من الأطباء بين الطبيب والمرضى، مع 35٪ من الأطباء المقيمين. كان وقت الاستشارة أطول بكثير في اللقاءات مع محاكاة المرضى مع المشفى (تستغرق 43 دقيقة). مقارنة مع اللقاءات مع محاكاة المرضى دون المشفى (تساوى 4 دقيقة). لم تكن هناك فروق ذات دلالة إحصائية في وقت المنتصف، أو رضا محاكاة المرضى بين المجموعتين. ومع ذلك، أوصى الأطباء المقيمين بعد أكثر من الخطوط العريضة للعلاج مع التشخيص 12(2) مع نتائج الاتجاه مقابل 6.2(4).ورد

النتائج: ترتبط عوامل التشخيص وبك استشارة موطن بين الأطباء، على الرغم من أن هذه الدراسة لم تثبت أي تأثير سلبي لعوامل تشخيص الشبكة على فئة التشخيص أو تدبير المرضى، إلا أن هذه العوامل لا تزال تثير القلق، مما في المواقف والحالات السريرية المعقدة التي لا يوجد فيها ممارسة عامة. يجب التقليل من أثر عوامل التشخيص لمفهوم سلامة المرضى.

الكلمات المفتاحية: الأخطاء التشخيصية; التسبب الجنسي; التشخيص; لقاء الطبيب.

المراجعات: بواسطة عوامل التشخيص، أطول كثرة استشارة موطن بين الأطباء، على الرغم من أن هذه الدراسة لم تثبت أي تأثير سلبي لعوامل تشخيص الشبكة على فئة التشخيص أو تدبير المرضى، إلا أن هذه العوامل لا تزال تثير القلق، مما في المواقف والحالات السريرية المعقدة التي لا يوجد فيها ممارسة عامة. يجب التقليل من أثر عوامل التشخيص لمفهوم سلامة المرضى.

Abstract

Objectives: There is an increasing concern about diagnostic errors and their impact on patient safety. Physicians’ diagnostic ability is significantly undermined by certain distractions that can carry potential negative consequences such as diagnostic and management errors. This study aimed to examine the effects of distracting factors for physicians during consultation and their
consequent effects on diagnostic accuracy and disease or condition management.

**Methods:** Family medicine residents at a major training hospital in KSA were randomly assigned to two groups of simulated patients: one group with patients with distracting features and another group with patients without distracting features (the control group). Both groups encountered six simulated patients with different clinical conditions or diseases. The consultation time, accuracy of diagnosis, appropriateness of management, number of outlines of treatment, and simulated patient satisfaction were measured for both groups.

**Results:** A total of 70 simulated physician-patient encounters were conducted with 35 residents. Consultation time was significantly longer for encounters with patients with distracting features, which had a mean time of 7.43 min, compared with encounters with non-distracting patients, which had a mean time of 4.4 min. There were no significant statistical differences in accuracy of diagnosis, appropriateness of management, or patient satisfaction between the two groups. However, residents recommended a higher number of outlines of treatment for patients with distracting features (2.96 for distracting patients versus 2.46 for non-distracting patients; \( p < 0.001 \)).

**Conclusion:** Distracting factors are associated with prolonged consultation time among physicians. Although this study did not demonstrate any effects of distracting factors on accuracy of diagnosis or disease management, these factors are still concerning, especially in complex clinical situations and situations where there is lack of reflective practice. The effects of distracting factors should be minimized to ensure patient safety.

**Keywords:** Clinical reasoning; Diagnostic errors; Distracters; Physician-patient encounters

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**Introduction**

There is an increasing global concern about patient safety and medical errors. Recent reports have shown that there are up to 98,000 deaths related to medical errors in the United States annually. The awareness and understanding of medical errors have expanded recently to ensure safer environments and practice in healthcare settings. Among these efforts are those that involve distinguishing between diagnostic errors and misdiagnosis-related harms. Diagnostic errors are related to the process of medical care, whereas harms are related to the outcomes. Incorrect working diagnoses or delays in treatment potentially lead to misdiagnosis-related harms. Such harms are preventable, and this necessitates the availability of systems solutions to minimize their occurrence and the consequences.

Recognized types of diagnosis-related errors include wrong, missed, and delayed errors. There are also other types of errors related to failure or delay in recognizing the complications of the diagnosed disease or condition. The nature of primary medical care produces high-risk areas for diagnostic errors. Patients usually present with undifferentiated complaints as the first contact with healthcare services is in the primary care setting. This, along with the large variety of clinical presentations, many physician working solo, and large volumes of patients, contributes to increasing risk of diagnostic errors.

Despite advances in technology and increased attention to patient safety and healthcare quality, errors and adverse outcomes still occur frequently in clinical practice. It has been recognized that a physician’s faulty clinical reasoning process contributes to more diagnostic errors than his or her lack of knowledge, as relying on no analytical ‘pattern recognition’ mode of thinking and disturbing rational analytical clinical reasoning may result in faulty diagnostic reasoning. This could be due to salient factors affecting the cognitive process (i.e. the ability of the physician to make sound medical decisions). Few studies have investigated the influence of patient characteristics on the reasoning mode of physicians—for instance, by exploring the effect of physicians’ emotional reactions to ‘difficult patients’ on diagnostic reasoning. The term ‘difficult patient’ has been used to describe the subjective experience of physicians who care for patients with behaviours that make physician-patient interaction particularly distressful and challenging.

This study is part of a project entitled the ‘Influence of patient appearance and characteristics on physicians’ diagnostic ability’. The project included four studies that evaluated different factors related to diagnostic errors; two of the studies used computer-based scenarios with questions answered by treating physicians that compared ‘poor to well-to-do patients’ and ‘straightforward to complex cases’. The other two were conducted using the Objective Structured Clinical Examinations (OSCEs) approach to assess the effects of ‘Distractions’ and ‘Aggressive behaviour’ on physician performance in diagnosis and management.

To ‘distract’ is “to draw or direct the attention to a different object or in different directions in the same time”. Patients presenting with distracting features are commonly encountered in primary healthcare, and these features can influence the diagnostic and management ability of physicians which potentially lead to diagnostic and management errors.

There is a growing attention to the reporting, monitoring, and management of medical errors in KSA. In fact, showing organized and systematic efforts to report and monitor medical errors and serious incidents is a requirement for accreditation and reaccreditation of institutions required by the Saudi Central Board for Accreditation of Healthcare Institutions. A recent published review showed that the occurrence and community awareness of medical errors has been increasing over the past few years, as indicated by the increased rate of reported litigations. However, there is a limited knowledge about the different factors that contribute to the occurrence of diagnostic and management errors in the local setting. This study aimed to explore the effects of physician distraction on consultation time,
accuracy of diagnosis, appropriateness of management, and number of outlines of treatment.

Materials and Methods

Design

Resident physicians from family medicine and internal medicine at King Abdulaziz Medical City, National Guard Health affairs (NGHA), Riyadh, KSA, were assigned randomly to see two groups of simulated patients: one with distracting features and another group without distracting features (the control group). The dependent variables in the study were the group categories (i.e. whether there were ‘distractors’ or not). The independent variables were the duration of consultation, accuracy of diagnosis, appropriateness of management, and number of outlines of treatment. In addition, patient (simulator) satisfaction was assessed at the end of each encounter.

Setting

This study was conducted in April 2019 using the OSCEs approach. It included simulators and physicians in residency training in a clinic set up at King Abdulaziz Medical City, NGHA, Riyadh, KSA, a tertiary and teaching institute of King Saud Ben Abdulaziz University for Health Sciences. King Abdulaziz Medical City in Riyadh, with a bed capacity of 1501, is a distinguished tertiary healthcare facility that provides services for a rapidly growing patient population in all of its catchment areas in East Riyadh with a target population of 1.5 million, mainly represented by the National Guard employees. The primary healthcare services for patients are provided by many well-equipped and staffed family practice centres. These centres are staffed by board-certified family physicians and offer comprehensive management for acute and chronic medical problems.

Participants

The physicians who participated in the study were family medicine and internal medicine residents. Thirty-five residents participated in the study, and they were either at the end of their second year of training (R2) or at the third (R3) or fourth (R4) year of their training. While senior residents (R3 and R4) can make decisions independently in routine medical practice, a consultant should always be available to supervise and be ready to support R2 residents in clinical decision-making, as stipulated by the training rules.

Simulated patients (SPs) were used in the physician-patient encounters. The SPs were all non-healthcare professionals who had approximately an average of 2 years of experience serving as SPs for final board OSCE exams conducted by the Saudi Commission for Health Specialties, Riyadh, KSA. Twelve of the experienced SPs participated in the study.

Materials

The topics of the clinical cases were selected based on common clinical practice, and all cases required sound medical decisions. Content experts from the Family and Internal Medicine departments formulated a total of six different clinical scenarios. The initial formats of the six clinical cases were written by the first author (AH) and reviewed and modified by two other authors (MB and JA). All clinicians involved in the writing and review of the cases had more than 15 years of clinical experience. All selected cases were based on previous clinical encounters with real patients and had definite diagnoses. The diagnoses of simulated patients participated in the study were: severe bilateral knee osteoarthritis, dyspepsia with positive Helicobacter pylori infection, thyroid nodule with suspicious features, mild bronchial asthma, anxiety with benzodiazepine dependence, and breast benign findings in mammogram screening.

Each clinical case was designed to have two versions: a regular encounter in practice (straightforward or neutral) and an encounter with ‘added factors’ (i.e. distracters), which were expected to influence the decision-making process. Distracting patient behaviours used in this study included multiple demands and irrelevant requests.

Procedure

The Objective Structured Clinical Examinations were conducted on April 18, 2019. We trained the SPs on each case given to them prior to the physician-patient encounter, and their performances were evaluated. Each of the physicians saw six SPs (two for each scenario, with or without the added distracters). The OSCE was stopped after the first round of the physician-patient encounters to ensure accuracy and standardization between the two arms of the study. The SPs were instructed to record their ‘Time in’ and ‘Time out,’ and their satisfaction with the consultation. Physicians were requested to report their diagnosis and management plans at the end of each encounter.

All laboratory, radiological, and pathological diagnostic tests that were needed to properly carry out the diagnostic process were provided to the SPs. The SPs were trained on their roles by four of the authors (AH, MB, JA, and LY). This training was on what to say and how to behave during the consultation.

Statistical analysis

Categorical data were presented as proportions (%) and continuous data as means (standard deviations). Categorical variable comparisons were conducted using the chi-square or Fisher exact tests, as appropriate, and continuous data using the t-test. Duration of physician-patient encounter was measured in minutes. Responses for overall satisfaction of the simulated patients with the physician-patient encounters were measured on a Likert scale. Correctness of diagnosis and appropriateness of clinical management variables were expressed as binary variables (Yes/No). Level of current training status of physicians was categorized as Junior (R2) or Senior (R3 or R4). For each case, the number of outlines of treatment by the physician was measured on a continuous scale (1–4) and was compared between the two groups. Results were further stratified by level of current training status of the physician.
(junior and senior) within each group. All tests were two-sided, and a \( p < 0.05 \) was considered significant. Data analysis was conducted using SPSS version 20 (IBM Corporation, Armonk, NY, USA).

Results

Data from a total of 210 physician-patient encounters (75% of the expected) in the four studies of our project entitled ‘Influence of patient appearance and difficulty on diagnostic errors’ were analysed. There were 70 encounters in each study: the ‘VIP, or well-looking patients’, ‘Aggressive and distracting patients’ studies. In the present study, the participants included 12 trained SPs, who played roles of distracting or non-distracting patients, and 35 trainee physicians in primary healthcare (R2, R3, and R4 residents).

Due to the small number of Internal Medicine residents and the results of an initial assessment that showed no difference in the performance of Internal medicine and Family medicine residents, both groups were analysed together.

The overall duration of the physician-patient encounters was significantly prolonged with distracting patients compared with non-distracting patients. However, the differences between the two groups in patient satisfaction, accuracy of diagnosis, and appropriateness of management were not significant. In addition, the number of outlines of treatment was significantly higher with distracting patients compared with non-distracting patients, as shown in Table 1.

For further stratification of the data, the independent variables of the study were compared in distracting and non-distracting patients by the level of training of residents as shown in Table 2. There were no significant differences between encounters with distracting and non-distracting SPs in junior or senior residents.

Discussion

This study showed that distraction of physicians results in longer durations of physician-patient encounters. No differences were observed in the accuracy of the diagnosis or appropriateness of the management of the primary problem between the two study groups. However, the number of outlines of treatment was higher in the encounters with distracting SPs.

There was no difference in diagnostic accuracy between patients with distracters and those with no distracters. This finding may be due to the fact that the majority of the residents who participated in the study were at the senior level of training, and cases were probably not complex enough to have an impact on their diagnostic accuracy. It has been reported that diagnostic errors are more common among junior residents and with more complex cases.13,21

The addition of multiple demands and irrelevant requests to the patient’s main presenting problems may result in the consumption of more consultation time and increased

| Variable | Junior physicians | Senior physicians |
|----------|-------------------|-------------------|
| Duration | 8.13 (1.46)       | 7.22 (1.78)       |
| Diagnosis|                   |                   |
| Correct  | 6 (75)            | 21 (77.8)         |
| Incorrect| 2 (25)            | 6 (22.2)          |
| Management |                |                   |
| Correct  | 7 (87.5)          | 21 (77.8)         |
| Incorrect| 1 (12.5)          | 6 (22.2)          |
| Satisfaction |        |                   |
| Very dissatisfied | 0 | 0 |
| Dissatisfied | 0 | 0 |
| Neutral | 0 | 0 |
| Satisfied | 0 | 21 (3.7) |
| Very satisfied | 8 (100) | 26 (96.3) |

| Variable | Junior physicians | Senior physicians |
|----------|-------------------|-------------------|
| Duration | 4.33 (0.82)       | 4.41 (1.52)       |
| Diagnosis|                   |                   |
| Correct  | 4 (66.7)          | 27 (93.1)         |
| Incorrect| 2 (33.3)          | 2 (6.9)           |
| Management |                |                   |
| Correct  | 4 (66.7)          | 21 (77.8)         |
| Incorrect| 2 (33.3)          | 5 (17.2)          |
| Satisfaction |        |                   |
| Very dissatisfied | 0 | 0 |
| Dissatisfied | 0 | 0 |
| Neutral | 0 | 0 |
| Satisfied | 0 | 21 (3.7) |
| Very satisfied | 6 (100) | 29 (100) |

SD = standard deviation.

Table 1: Performance of physicians in the distracters and non-distracters groups.

| Variable | Distracter | Non-distracter | p-value |
|----------|------------|---------------|---------|
| Duration of diagnosis | 7.43 (1.74) | 4.40 (1.42) | <0.0001 |
| Number of outlines of treatment, Mean (SD) | 2.96 (0.77) | 2.46 (0.78) | 0.011 |
| Overall satisfaction | | 1.0 |
| Very dissatisfied | 0 | 0 |
| Dissatisfied | 0 | 0 |
| Neutral | 0 | 0 |
| Satisfied | 1 (2.9) | 0 |
| Very satisfied | 34 (97.1) | 35 (100) |
| Diagnosis | | | |
| Correct | 27 (77.1) | 31 (88.6) |
| Not correct | 8 (22.9) | 4 (11.4) |
| Management | | | |
| Correct | 28 (80) | 28 (80) |
| Not correct | 7 (20) | 7 (20) |
| Level of specialty | | | |
| Junior physicians (R2) | 8 (22.9) | 6 (17.1) |
| Senior physicians (R3&R4) | 27 (77.1) | 29 (82.9) |
management of management interventions. In this study, physicians had to spend more time with distracting patients to address their requests and needs. In a busy primary care setting, this may compromise the availability of the physician for the same patient or other patients and place time pressure on the physician. Available data showed that diagnostic errors are more common in situations that involve more time pressure. Deliberate reflection on current practice has been found to improve diagnostic performance and minimize diagnostic errors in subsequent practice. Reflective practice involves continuous engagement in the learning process for professional development and more commitment to patient safety.

In addition to encouraging reflective practice, other strategies should be implemented to minimize diagnostic and management errors. Such measures include manual and inbuilt electronic checklists to ensure proper implementation of clinical standards and to avoid potential harm to patients.

The findings of this study indicated that distracters do affect the consultation process, though not to the extent of producing diagnostic or management errors. However, future multicentre studies that utilize more complex clinical cases to demonstrate the potential effects of distractions on physicians’ diagnostic and management abilities are warranted.

The strength of our study lies in the better accuracy of OSCEs in providing dynamic environments in assessing difficult behaviours and physicians’ responses to them. This is well-reflected in the assessment of the effect on duration of consultation and patient satisfaction, which are difficult to accurately evaluate using virtual cases.

The limitations of our study include the small number of participating physicians in training in primary healthcare settings. Despite months of preparation prior to the OSCE session and the verbal agreement of the trainees on the day of the OSCE, several residents (especially junior ones) were unable to participate due to the personal related holidays and emergency hospital commitments. This was particularly common in R2 residents who still worked hospital-based shifts during the study period. In addition to these feasibility issues, the OSCE format using simulated patients could also potentially affect the decision-making of physicians compared with actual practice.

Conclusion

Distraction of physicians by patients leads to longer durations of physician-patient encounters. Though, no increase in the incidence of diagnostic errors with distraction was observed in our cohort, physicians had to spend more time with distracting patients to address their requests and needs.

Recommendations

Physicians in primary healthcare settings should be equipped with the technical skills that enable them to overcome challenges such as distraction by patients and to maintain adherence to the rational, analytical process of problem-solving, consequently, avoiding diagnostic and management errors in the time-limited physician-patient encounter. This objective should be incorporated into the curriculum of clinical training of junior physicians in the future. Future studies are recommended to explore the effects of physician distraction on the diagnosis and the management process in different settings, and with more complex and acute clinical cases.

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Conflict of interest

The authors have no conflict of interest to declare.

Ethical approval

Ethical approval for this study was obtained from the institutional review board of King Abdullah International Medical Research Centre, NGHA, Riyadh, KSA (reference number: RC 18/162/R dated: 10 December 2018).

Authors contributions

AIA and IAA conceived and designed the study. AIA, IAA, MAB, MB, JAA, LAA conducted the research, provided research materials, and collected and organized the data. AIA, MB, IAA and AMB analyzed and interpreted the data. AIA, IAA, AMB and MB wrote the initial and final drafts of the article. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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