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Public Perception of Medical Errors and Confusion About Medical Complications: Implications for Healthcare Safety in Saudi Arabia

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Purpose: This study assessed public perceptions of medical errors in the Tabuk region, Saudi Arabia, and explored how misconceptions about medical complications influence their views on medical errors.

Methods: A cross-sectional study surveyed 432 participants via an online questionnaire. The collected data included demographics, participants' knowledge, experiences, and perceptions of medical errors, and the accuracy in distinguishing errors from complications. Descriptive and inferential statistics were used for analysis.

Results: Overall, 37.5% of participants reported having knowledge of medical errors, and 31.5% had directly or indirectly experienced them. 62.4% believed that medical errors are common or very common, and 84% viewed medical errors as a real problem in the healthcare sector. Misdiagnosis (55.6%) was perceived as the most common type of error. While participants demonstrated 71.1% overall accuracy in differentiating medical errors from complications, 62% erroneously classified severe complications (internal bleeding due to blood thinner treatment) as errors. After controlling for confounders, regression analysis demonstrated that greater accuracy in differentiation error from complications was negatively associated with negative views on medical errors ($\beta = -0.373$, $p < 0.001$), though misconceptions alone explained only 16.4% of the variance in these views. Physicians were deemed most responsible for errors, while inadequate preventive measures, low competency, negligence, and lack of medical staff monitoring were identified as key contributors by the participants.

Conclusion: Negative views on medical errors stemmed in part from misconceptions about medical complications. Targeted educational initiatives clarifying the nature of medical errors and the error-complication distinctions are needed. These measures are essential to fostering trust, improving the accuracy of errors reporting and advancing collaborative safety efforts. The findings from this research advocate for public engagement in healthcare safety initiatives, bridging the divide between patient expectations and healthcare realities.

Keywords: medical errors, medical complications, patient safety, healthcare safety, public perceptions, public engagement

Introduction

Medical errors are a leading cause of harm in healthcare systems worldwide, contributing to significant morbidity and mortality.[1,2] World Health Organization (WHO) further identifies medical errors as a significant barrier to achieving universal healthcare quality and safety, emphasizing their role in undermining trust in healthcare and increasing financial burdens.[3] The global conversation on medical errors was significantly framed by the seminal Institute of Medicine (IOM) report entitled "To Err is Human: building a safer health system", which defined medical errors as "The failure of a planned action to be completed as intended or the use of a wrong plan to achieve an aim".[4] In alignment with the global initiatives to improve patient safety, the local healthcare system has made significant strides in mitigating the burden of medical errors, including the establishment of the Saudi Patient Safety Centre.[5,6] Despite these substantial improvements, maintaining transparency, accountability, and safety remains a pressing challenge.[7–9]

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A shift toward enhanced transparency and accountability, supported by better systems for error reporting and public engagement, is fundamental to achieving safer healthcare delivery.[8,10] This shift is particularly relevant in Saudi Arabia, where the ambitious Vision 2030 program aims to reform healthcare delivery by improving accessibility, enhancing quality, and fostering transparency.[6] To ensure that these reforms are implemented effectively, it is critical to engage the public and understand their perspectives on healthcare safety. A key component in this engagement involves understanding the public perception of medical errors, as this directly impacts the detection and reporting practices, as well as the trust in the healthcare system.[11] Public perception of medical errors is central to enhancing patient safety initiatives, as informed communities are more likely to report adverse events, implement safety practices, and support healthcare reforms.[12]

Public perception varies across countries due to cultural, systemic, and educational differences.[13] Cultural and systemic factors uniquely shape public perceptions of medical errors in Saudi Arabia. A hierarchical respect for medical authority, rooted in cultural norms, may discourage patients from questioning providers or reporting errors.[14] Additionally, limited public awareness of patient rights and fear of legal or social repercussions could further hinder transparency.[15] Compounding this issue, religious beliefs that attribute adverse outcomes to "divine will" may lead patients to view medical errors as inevitable or predestined, inhibiting them from questioning healthcare quality or reporting errors.[16] These dynamics complicate error reporting and trust-building, underscoring the need to evaluate public perceptions of medical errors in Saudi Arabia. However, in the broader Middle East region, public perceptions of medical errors remain poorly explored and underreported.[17] This gap in understanding underscores the importance of conducting focused research in this area.

Another issue in relation to medical errors perceptions in Middle Eastern countries is the confusion between medical errors and complications.[18] Previous studies have reported that in more than half of medical error complaints, no errors were found, and these high rates of unfounded claims can be attributed to misinterpretation of medical complications as medical errors.[19,20] Such misconceptions strain healthcare systems by diverting resources to address non-actionable complaints, eroding patient-provider trust, and discouraging clinicians from communicating transparently with patients.[8,19] Misinformed patients may also avoid care due to mistrust or, conversely, pursue adversarial litigation, weakening collaborative safety efforts.[18,21] However, understanding how the public perceives medical errors—and the influence of misconceptions regarding medical errors and medical complications—is essential for improving detection, reporting, and safer healthcare delivery.

The present study aimed to assess the current public knowledge, experiences and perspectives regarding medical errors in the Tabuk region of Saudi Arabia and examine how misconceptions about medical complications influence views on medical errors.

Materials and Methods

Study Design and Setting

A cross-sectional research approach was used to assess public perception of medical errors and their ability to distinguish between medical errors and medical complications. The study took place in the Tabuk region of Saudi Arabia from November 9 to November 27, 2024.

Study Participants

In terms of the participant characteristics, they were individuals from the Tabuk region of Saudi Arabia who had access to the internet and could understand the Arabic language. The inclusion criteria were adults aged 18 and above who were willing to participate. Individuals who worked in the healthcare sector or had a medical background were excluded from the study.

Sampling Method and Recruitment

As nearly 99% of the population in Saudi Arabia uses internet, the current study employed a convenience snowball sampling technique using an online survey.[22] This method was used due to logistical constraints. Initially, the survey link was distributed to multiple local social influencers from various socioeconomic and educational backgrounds, who were then requested to share the link within their respective networks of contacts. To increase the number of participants,

respondents were also encouraged to forward the link to their contacts. The targeted platforms were WhatsApp and X (Twitter), given the high penetration rates of these platforms in Saudi Arabia.[22] This strategy helped to ensure a diverse pool of participants from a broad demographic representation aimed at mitigating the potential for sampling bias.

Sample Size

The population of the Tabuk region is estimated to be approximately 886,000, according to the latest data from 2022. The target sample size was calculated using OpenEpi Version 3.01, which determined a required sample size of 384 with a 95% confidence level and a 5% margin of error.[23] Consequently, the sample size of 432 participants was considered adequate.

Questionnaire Design

The questionnaire was in Arabic and developed following a comprehensive literature review.[12,17,24–26] The first page of the questionnaire contained the consent form. If the respondent agrees, the second page appears, which inquires about the individual's medical science background. Those who declined participation or reported having a medical science background were excluded from the study.

The demographic section captured information on age, sex, education level, occupation, health care utilization, presence of chronic illness, medication use, and past medical experience.

The questionnaire included self-reported items that assessed participants' knowledge of medical errors and complications, their ability to distinguish between the two, and their knowledge of what to do in case of experiencing a medical error.

To further test the respondents' knowledge, medical scenarios reflecting different cases of medical errors and complications were presented to the participants, who were asked to determine whether each case represented a medical error or a medical complication. These medical scenarios were adapted from a previous study with a reported Cronbach's alpha of 0.71.[18] The scores range from 0 to 100, reflecting the percentages of correct answers for all scenarios. Higher scores indicate lower misconceptions about medical complications.

Items on personal history of medical errors were included in the questionnaire, in line with the Blendon et al work.[24] Additionally, four items were included to assess overall views on medical errors. Participants responded to these 3 of these items using a 5-point Likert scale (1 = strongly agree, to 5 = strongly disagree). One of these items used reverse scoring (medical errors are considered a problem in the healthcare sector). The fourth item was about the perceived prevalence of medical errors (1 = very uncommon, to 5 = very common). Higher scores indicate more negative views. The scores of these items were summed to reflect the overall negative views. The scores range from 4 to 20; the higher the score, the more negative the views on medical errors.

The questionnaire also explored perceptions of responsibility for medical errors and contributing factors to medical errors, with ratings given on a scale from 0 (No significant role) to 10 (Extremely significant role) for responsibility and from 0 (Not an important factor) to 10 (Extremely important factor) for contributing factors. The inclusion of this section in the questionnaire was guided by studies emphasizing the importance of understanding public perspectives on the responsibility and the causes of medical errors.[24,26]

The questionnaire was designed in a manner to reduce the response bias. The items in the questionnaire used neutral, non-judgmental language, with some items using reversed concepts. Furthermore, items employed different methods of responses including forced single answer, dichotomous answers, 3-point scale, 5-point Likert scale, and numerical scale. Care was taken to reduce the questionnaire length to minimize fatigue and encourage respondents' engagement. Anonymity was ensured and conveyed to respondents to reduce the social desirability bias. To further decrease bias, those with a medical knowledge background were excluded at the beginning of the study.

The questionnaire was translated into Arabic by a bilingual expert, after which a back-translation was performed to ensure the accuracy and equivalence of meaning across both languages. A pilot study with 20 subjects was conducted to guarantee the clarity of the concepts and readability of the items. Based on the comments, some items in the questionnaire were updated to improve its overall clarity (supplementary file: the study questionnaire).

Data Analysis

Descriptive statistics were used to summarize the demographic profile of the respondents and their knowledge, experiences and perspectives about medical errors. A correlation analysis was conducted to assess the relationship

between the different items on views on medical errors and the overall scores for differentiation between medical errors and medical complications. Additionally, simple linear regression was used to assess the influence of accuracy in differentiating medical errors from medical complications (independent variable) and overall negative views on medical errors (dependent variable), and multivariable linear regression was performed to control for demographic and medical history variables.

Results

The responses to the questionnaire showed that 3% of recipients who opened the link did not continue the survey, and 13% of the respondents reported that they had medical knowledge or worked in the medical field. The responses of 432 participants were included in the analysis. Reliability testing for the questionnaire, encompassing all scaled items, revealed a Cronbach's alpha of 0.89, while it was 0.62 for the four items reflecting negative views on medical errors.

Table 1 provides an overview of the demographic and health-related characteristics of the 432 participants. Most of the respondents were aged 36–45 years (41.2%), followed by 46–55 years old (20.1%). There were more males (59.0%) in the sample than females (41.0%). Regarding education level, most participants held a Bachelor's degree (58.5%), while only 18.8% had a high school degree or below. In terms of occupation, government employees comprised the largest group (73.1%), whereas there were notably fewer private-sector workers and students in the sample. Chronic illnesses affected 27.8% of participants, and 72.9% of those with chronic conditions reported having the illness for more than 3 years. Moreover, around 32.2% reported current medication use. Finally, regarding healthcare utilization, 25.7% of the sample reported six or more annual visits, 48.4% had a history of hospitalization, and 38.9% had undergone surgery or invasive procedures, highlighting a notable level of healthcare usage among the study sample.

In terms of knowledge and understanding of medical errors, only 9% of the respondents reported not knowing medical errors. In comparison, 53.5% claimed partial knowledge, and 37.5% perceived that they had enough knowledge

Table 1 Demographic Data of the Study Participants (N = 432)

Variable	Frequency	Percentage
Age (years)		
18–25	59	13.7%
26–35	86	19.9%
36–45	178	41.2%
46–55	87	20.1%
56–65	17	3.9%
>65	5	1.2%
Gender		
Male	255	59%
Female	177	41%
Education Level		
High school or below	81	18.8%
Diploma	32	7.4%
Bachelor's degree	252	58.5%
Postgraduate degree	66	15.3%

(*Continued*)

Table 1 (Continued).

Variable	Frequency	Percentage
Occupation		
Government employee	316	73.1%
Private sector employee	16	3.7%
Student	42	9.7%
Retired	33	7.6%
Not working	25	5.8%
Chronic Illness		
Yes	120	27.8%
No	312	72.2%
Currently on Medication		
Yes	139	32.2%
No	293	67.8%
Duration of Chronic Illness		
Less than 1 year	11	8.5%
1–2 years	5	3.9%
2–3 years	19	14.7%
More than 3 years	94	72.9%
Annual Visits to Healthcare Facilities		
0	40	9.3%
1	46	10.6%
2	86	19.9%
3	69	16%
4	65	15%
5	14	3.2%
6 or more	111	25.7%
History of Hospitalization		
Yes	209	48.4%
No	223	51.6%
History of Surgery or Invasive Procedure		
Yes	168	38.9%
No	264	61.1%

Note: Percentages are rounded.

of such errors. However, a lower percentage (34.5%) reported having sufficient knowledge of medical complications, 46.3% were somewhat aware of them, and 19.2% had no understanding. When participants were asked whether they could distinguish between medical errors and complications, 25.7% said they could differentiate between them, while 41.7% were uncertain, and 32.6% could not. This result reflects the widespread confusion between the two concepts (Table 2). Finally, only 26.9% of the participants knew what to do if a medical error occurred, 30.8% had partial knowledge of what to do, and 42.4% were unaware of the proper actions to take (Table 2).

Table 3 presents a summary of the participants' experiences of medical errors and their perceptions of the characteristics and prevalence of such errors. Approximately 31.5% of the participants reported personal or indirect experience with medical errors, while 68.5% had no such experience. 156 participants responded to the outcome of medical errors. The reported outcomes of these errors included death and permanent disability (both 19.9%), followed by physical or psychological suffering (25%), pain (16.7%), and wasted time or money (16%). Regarding perceptions of the most common type of medical error, 55.6% cited misdiagnosis as the leading issue, followed by surgical errors (22.7%)

Table 2 Summary of the Study Participants' Responses Regarding Their Knowledge of Medical Errors

Question	Yes	Somewhat	No
Do you have knowledge about medical errors?	162	231	39
	37.5%	53.5%	9.0%
Do you have knowledge about medical complications?	149	200	83
	34.5%	46.3%	19.2%
Can you distinguish between medical errors and complications?	111	180	141
	25.7%	41.7%	32.6%
Do you know what to do if a medical error occurs?	116	133	183
	26.9%	30.8%	42.4%

Note: values represent the number and percentage of participants with their corresponding responses. Percentages are rounded.

Table 3 Medical Error Experience and Perceived Prevalence

Question and Response	Frequency	Percentage
Do you have personal experience with medical errors?		
Yes	136	31.5%
No	296	68.5%
If yes, what was the outcome of the medical error?		
Death	31	19.9%
Permanent disability	31	19.9%
Temporary disability	4	2.6%
Pain	26	16.7%
Physical or psychological suffering	39	25.0%
Wasted time and money	25	16.0%

(*Continued*)

Table 3 (Continued).

Question and Response	Frequency	Percentage
In your opinion, what is the most common type of medical error?		
Misdiagnosis	240	55.6%
Delay in diagnosis	32	7.4%
Incorrect prescription or dispensing of medications	46	10.6%
Surgical errors	98	22.7%
Investigational or laboratory errors	16	3.7%
In your opinion, how common are medical errors?		
Very common	55	12.7%
Common	212	49.1%
Unsure	107	24.8%
Uncommon	43	10.0%
Very uncommon	15	3.5%

Note: Percentages are rounded.

and incorrect prescription or dispensing (10.6%). Other errors, such as delays in diagnosis and lab errors, were perceived as being less frequent. Finally, regarding the perceived prevalence of medical errors, 49.1% of the participants considered them to be common, while 12.7% thought they were very common. Meanwhile, 24.8% were unsure, and only 13.5% believed medical errors to be uncommon or very uncommon. Overall, these results underscore the widespread public concern about medical errors, with misdiagnosis and surgical mistakes being perceived as primary contributors and reflect the need for improved healthcare safety practices.

Table 4 summarizes the participants' views on medical errors in the healthcare system. Firstly, 44% strongly agreed that all medical errors are reported, and 23.1% agreed, indicating confidence in reporting systems; however, 17.4% were uncertain, and 15.5% disagreed with this statement. Secondly, a significant majority (44% strongly agree and 40% agree) reported that medical errors are a problem in the healthcare sector, reflecting broad concerns about this issue among the public. Finally, when asked if the healthcare system is designed to prevent errors, opinions were divided: 17.6% strongly agreed, 31.9% agreed, 35.4% were uncertain, and 15% disagreed. This finding reflects both trust and skepticism regarding current safety measures.

Table 4 Participants' Views on Medical Errors

Statement	Strongly Agree	Agree	Unsure	Disagree	Strongly Disagree
All medical errors are reported.	109	100	75	41	26
	44.0%	23.1%	17.4%	9.5%	6.0%
Medical errors are considered a problem in the healthcare sector.	190	173	41	14	14
	44.0%	40.0%	9.5%	3.2%	3.2%
The healthcare system is designed to prevent medical errors.	76	138	153	52	13
	17.6%	31.9%	35.4%	12.0%	3.0%

Note: values represent the number and percentage of participants with their corresponding responses. Percentages are rounded.

Table 5 provides a summary of the participants' ability to distinguish between medical errors and medical complications. High accuracy in distinguishing these occurrences was found for cases such as prescribing blood pressure medication without proper checks (94.2% correct) and a patient experiencing a burning sensation from eye drops (83.6% correct). However, for scenarios such as a patient developing an infection after surgery and experiencing internal bleeding from a blood thinner, the participants' identification accuracy was only 57.2% and 38%, respectively. These findings reflect significant confusion between medical errors and complications, especially with severe complications. However, 75% correctly identified a nurse forgetting medication as a medical error despite no harm being caused. The overall average accuracy of the respondents for these items was 71.1% ± 18.2%.

Figure 1 illustrates the participants' ratings of the importance of different stakeholders in causing medical errors on a scale of 0 to 10. Doctors were rated as being the highest contributors to medical errors, with a score of 9, followed closely by nurses, with a score of 8.22. The involvement of other allied health professionals, such as lab technologists and respiratory therapists, was rated 7.21, while administrative staff scored slightly lower at 7.01. Patients themselves were rated as the lowest contributors to medical errors, with a score of 6.24, suggesting the participants viewed themselves as being the least responsible for medical errors compared to healthcare staff.

Figure 2 illustrates the participants' perceptions of the importance of various causative factors in contributing to medical errors. Each contributing factor was rated on a scale from 0 to 10, with higher values indicating greater perceived importance. The highest-rated factor (9.1) was failure to take preventive measures to avoid medical errors. The next three most important factors were low competency, negligence, and insufficient monitoring by medical staff. After these, the next most important factors were related to communication either between patients and healthcare providers or between the providers themselves, followed by machine failure and data entry errors. The complexity of healthcare and the competency of administrative staff were perceived as the least important factors contributing to medical errors.

The correlation analysis (Table 6) revealed a significant negative relationship between participants' ability to differentiate between medical errors and complications (total test score) and their views on medical error prevalence (correlation coefficient = –0.309, $p < 0.001$), with those showing lower differentiation accuracy perceiving medical

Table 5 Accuracy of Responses to Scenarios Related to Medical Errors Versus Medical Complications

Scenario	Correct Answer	Wrong Answer
An eye drop was prescribed for a patient; later, she felt a burning sensation.	361	71
	83.6%	16.4%
A patient complained of bruises over the area where the blood was drawn	341	91
	78.9%	21.1%
A patient developed an infection after surgery.	247	185
	57.2%	42.8%
A doctor prescribed blood pressure medication without measuring the patient's blood pressure.	407	25
	94.2%	5.8%
A doctor prescribed a blood thinner for a patient who had a blood clot; later, he developed internal bleeding.	164	268
	38.0%	62.0%
A nurse forgot to give medication to an admitted patient, and the patient suffered no harm.	324	108
	75.0%	25.0%

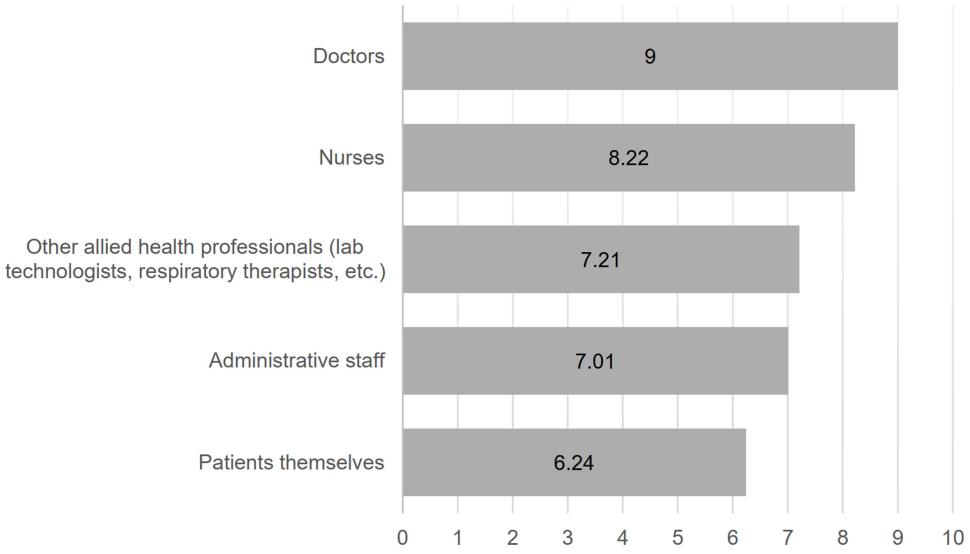

Figure 1 Summary of the participants' perceptions of the relative significance of various stakeholders in contributing to medical errors. (on a scale of 0 to 10).

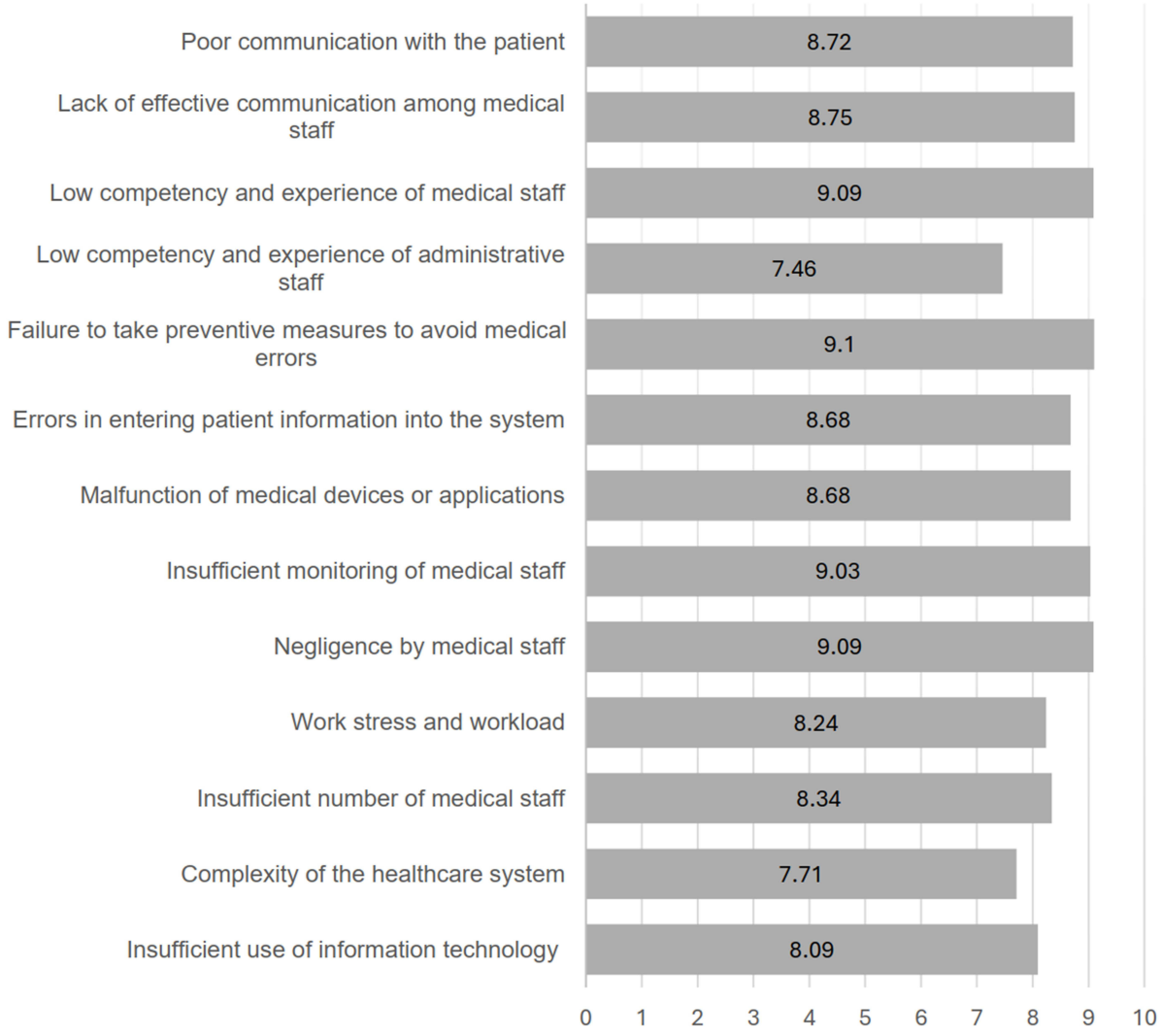

Figure 2 Participants' ratings of the importance of different causative factors of medical errors (on a scale of 0 to 10).

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Table 6 Correlation Between the Participants' Overall Accuracy in Differentiating Medical Errors From Medical Complications and Items Reflecting Their Views on Medical Errors

	Mean ± SD	How Common are Medical Errors?	All Medical Errors are Reported	Medical Errors are Considered a Problem in the Healthcare Sector*	The Health System is Designed to Reduce Errors
Accuracy in differentiating medical errors from medical complications	71.1 ±18.2	–0.309**	–0.151**	–0.222**	–0.178**

Notes: *Inverse score, ** = Correlation is significant at the P < 0.01 level (2-tailed).

Table 7 Regression Analysis of the Relationship Between Overall Negative Views on Medical Errors (Dependent Variable) and Accuracy in Differentiating Medical Errors From Medical Complications

Independent Variable	B	95% CI	β	p
Accuracy in differentiating medical errors from medical complications	− 0.056	(−0.068, −0.043)	–0.373	< 0.001

Notes: Adjusted for age, sex, occupation, education, medical and surgical history, and prior experience with medical errors, B = unstandardized coefficient; CI = confidence interval; β = standardized coefficient.

errors to be more common. Additionally, more negative views regarding the burden of medical errors on the healthcare sector were associated with a lower ability to differentiate medical errors from medical complications (correlation coefficient = –0.222, $p < 0.001$). Overall, these findings suggest that individuals who have more misconceptions about medical errors tend to view medical errors as a more common issue and a significant problem in the healthcare sector. Finally, more negative views on the reporting of medical errors and the design of healthcare systems had weaker correlations with poorer accuracy in differentiating medical errors and complications (correlation coefficients = –0.151, –0.178, respectively, $p < 0.001$).

Multivariable linear regression analysis was conducted (Table 7) to examine the relationship between accuracy in differentiating medical errors from medical complications (test score) and overall negative views on medical errors (the sum of negative views items), adjusting for age, sex, occupation, education, history of chronic disease, medication use, hospital admission and surgery, and prior experience with medical errors. The analysis revealed a statistically significant inverse relationship between accuracy and negative views. For each 1-point increase in accuracy (range 0–100), there was a −0.057-unit decrease in negative views on medical errors (range 4–20) (B = −0.056, SE =0.006, Confidence Interval (CI) =[−0.069, −0.044], β = −0.373, $p < 0.001$).

A simple linear regression between the two variables only revealed an R^2 value of 0.164, indicating that approximately 16.4% of the variance in views on medical errors was explained by accuracy in distinguishing medical errors from medical complications alone. While this finding suggests that the model accounts for a modest portion of the variance, it also implies that other unmeasured factors may play a substantial role in shaping individuals' views of medical errors. This simple linear regression model was statistically significant (B = −0.061, SE = 0.007, CI =[−0.074,-0.048], β = −0.404, F(1, 480) = 84.1, $p < 0.001$).

Discussion

The demographic profile of respondents showed that the majority were males (59%), the most common age group was 36–45 years, and 73.8% had a Bachelor's degree or above, which reflects a high level of education among the sample. This demographic profile is in line with the Absher survey that included 707,303 participants from the whole of Saudi Arabia.[27] In that study, 49.1% of the participants were in the age group of 30–45 years, and the majority were male (83%). Alsubaihi (2008) found that Saudi males tend to participate significantly more in web surveys compared to females, despite both genders having similar levels of internet access.[28] However, future research and initiatives in this context should use strategies to include more females in surveys in order to ensure gender-balanced perspectives.

Furthermore, in this work, 32.2% of the participants reported being on medication, while the prevalence of chronic diseases was 27.8%, similar to the findings of a retrospective study of 650,835 individuals aged 16 years or older, which found that 26.7% had multimorbidity.[29] In previous studies, the average number of visits to healthcare facilities, mainly primary healthcare, has been reported to be three to four visits per person per year.[30] In this study, 50.9% of participants reported visiting healthcare facilities two to four times per year, although the average number of visits was not measured. Prior studies on the lifetime history of hospitalization and surgery among the Saudi population are lacking. For comparison, in the United Kingdom, a study found that the lifetime risk of having surgery was around 60%.[31] In the present study, 48.4% reported a history of hospitalization, and 38.9% had a history of surgery or an invasive procedure, meaning a significant number of study participants had exposure to healthcare services.

The awareness of medical errors among the study participants was not high, as only 37.5% of the respondents reported having enough knowledge about medical errors. These findings resonate with global studies, which often report that public awareness of medical error issues is limited.[17,26] This study further showed that a low percentage of respondents (34.50%) reported having knowledge of medical complications, while only 25.7% claimed to be able to differentiate between medical errors and complications. These findings are in line with Alanizy et al (2021) results, highlighting the need for the public to be educated on the differences between these concepts.[18] This need was also reflected in the accuracy of the responses to the scenarios on the distinction between medical errors and complications. Specifically, severe complications were often interpreted as medical errors, in line with previous findings.[32] As revealed in this study, these misconceptions further exacerbate the public perception of the prevalence of medical errors. In the future, the use of plain language and more effective communication between healthcare providers and patients would help to clarify and reduce such misconceptions of medical errors. Furthermore, this study also revealed that 42.4% of respondents did not know how to react to medical errors, further highlighting the need to educate the public about medical errors and the relevant reporting systems.

The results also shed light on personal experiences of medical errors; indeed, 31.5% of the respondents had either experienced medical errors themselves or through someone in their immediate family. The outcomes of these medical errors included death (19.9%), permanent disability (19.9%), pain (16.7%), and psychological suffering (25%). The reported incidence of medical errors in this study is lower compared to findings from other countries which may reflect a reduction in medical errors. Specifically, a comprehensive investigation in the United States revealed that 41% of the participants had encountered a medical error either personally or indirectly.[26] In a study in Canada, researchers found that 37% of respondents had experienced a medical error.[25] Most notably, an Australian study demonstrated a significantly higher prevalence, with 74.9% of participants reporting experiencing a medical error.[12] Conversely though, the reported consequences of medical errors in this study appear to be more severe than those in prior studies. Indeed, in a study by Robert J. et al (2002), only 10% of the participants reported death as the consequence of the experienced medical error. In terms of the perceptions of error types, the participants in this work perceived misdiagnosis as the most common type of error, followed by surgical error. In the NORC study, respondents reported the most common type of error to be misdiagnosis, while the most harmful errors occurred during procedures.[26] In a study in Australia, the participants reported incorrect diagnosis to be the most common type of error they experienced, followed by disrespectful treatment.[12] These figures regarding self-reported experiences of medical errors underscore the considerable variability in the perceptions and beliefs regarding medical errors across different countries.

The respondents perceived medical errors as a common issue in healthcare (60%), in line with a previous study reporting that the respondents viewed medical errors as a prevalent problem.[24] The present study further revealed mixed opinions about the healthcare system's management of medical errors; specifically, where nearly 70% of participants agreed that medical errors are reported, and almost 50% felt that the healthcare system is designed to prevent errors, even though a large percentage (84%) believed that medical errors are a major problem in the healthcare sector. These findings reflect the public recognition of efforts to reduce medical errors, including improving reporting and preventive measures. However, the public still think medical errors are a key issue in the healthcare industry.

Although, in this study, different items and methodologies were used to explore perceptions about the responsibility of different stakeholders to medical errors and contributing factors to such errors compared to previous studies, some findings were similar to previous results. In this study, the participants reported that healthcare givers are most responsible for

medical errors, especially physicians, which is similar to previous findings.[12,24] The respondents believed that the physician was the person most responsible for their care and for any errors. Additionally, the respondents suggested that human factors, including competency, experience, and negligence, are a major cause of medical errors, but they also considered the lack of preventive measures as the most important factor contributing to medical errors. These findings show that the public perceives preventive measures such as policies, pathways, guidelines, and protocols, as well as controlling human factors, to be an effective strategy to control medical errors, as recommended by other researchers.[33,34]

Regarding the factors influencing medical error perceptions, misconception of medical errors and confusion with medical complications negatively contribute to views on medical errors. This relationship may explain the high number of false medicolegal complaints arising due to perceived errors. Indeed, Al Jarallah et al (2013) reported that, in nearly half of medical complaints that reach the court, no errors were found, and the authors attributed this outcome to people's misunderstanding of medical errors and the confusion with medical and surgical complications.[19] Another small study by Al-Mazroea et al (2017) found that in 75.3% of medicolegal complaints, no errors were found. It is important to note that the misconceptions of medical errors explained only a small part of the variance in views on medical errors in this work, meaning that the public's opinions of medical errors are complex and affected by multiple factors.

This study has certain limitations that should be acknowledged. As a cross-sectional study that relied on an online questionnaire, self-reported data may affect the accuracy of the results. The use of a convenience sampling method in the Tabuk region of Saudi Arabia may limit the generalizability of the results to a broader population. Random sampling was not feasible due to logistical constraints; however, care was taken to distribute the questionnaire link to social influencers from different local social groups and backgrounds to ensure the representativeness of the community. Although the study did not use an established standardized metric for negative views due to the lack thereof, the reliability coefficient was excellent for the questionnaire. However, the coefficient of 0.62 for negative views on medical errors is marginally acceptable and can be attributed to the low number of items used for this construct, warranting cautious interpretation. The study timeframe and rapid response might reflect public interest in this topic but also raised concerns about response bias; however, responses were analyzed for the first 9 days and the remaining period to evaluate potential non-response bias. No significant differences in demographics or key variables were found between the two groups. Moreover, as clarified before, many similarities were found in the current study's findings compared to the results of other local studies, which indicates a lower risk of response bias.

Conclusion

This study assessed public perceptions of medical errors in the Tabuk region, Saudi Arabia, revealing important findings highlighting these views' complexity. Nearly one third of the public perceived themselves as having enough knowledge of medical errors and a lesser percentage feel the same toward medical complications, and only a quarter of them feel that they can deal with medical errors. They demonstrated overall fair knowledge in distinguishing medical errors from medical complications, however, their accuracy declined in cases representing severe complications. These misconceptions contribute partly to negative views on medical errors, especially the beliefs about medical error prevalence. While confusion between complications and errors partially explains negative views toward healthcare safety, regression analysis suggested other unmeasured factors accounted for most of the variance, highlighting the complexity of public perception.

Personal experiences with medical errors were reported by 31.5% of participants, which is lower than older international findings. Misdiagnosis was identified as the most common error type, aligning with international trends. Many participants believe that medical errors are reported, and the healthcare system helps to reduce these errors; however, despite recognizing efforts to improve transparency and error reporting, 84% of participants perceived medical errors as a major healthcare issue, reflecting persistent mistrust and unmet expectations.

The public predominantly attributes responsibility for errors to physicians, emphasizing human factors (low competency, negligence, and lack of medical staff monitoring) and systemic gaps (inadequate preventive measures) as key contributors.

These findings have profound implications for policymakers and healthcare providers. They advocate for targeted public education initiatives to clarify distinctions between errors and complications. Enhancing transparency and strengthening communication between healthcare providers and patients, alongside consumer engagement, could mitigate misconceptions and foster trust. Future research should employ probability sampling to ensure gender and demographic

diversity, validate findings using mixed-methods approaches, and explore the influence of other possible factors such as cultural norms, health beliefs, health literacy and media misinformation on shaping public views on healthcare safety. Aligning with Saudi Vision 2030's healthcare reforms, longitudinal studies are needed to assess the impact of educational interventions on public perceptions and safety outcomes. In conclusion, addressing misconceptions and enhancing transparency are pivotal to advancing patient safety and public trust, ensuring healthcare reforms resonate with community needs and expectations.

Abbreviation

NORC, national opinion research centre.

Data Sharing Statement

The datasets are available from the author upon request.

Ethical Approval and Informed Consent

This study received approval from the local research ethics committee at Tabuk University (UT-461-255-2024) and was conducted in accordance with the Helsinki Declaration. In order to address the concerns related to privacy and data security, all collected data have been anonymized to protect the participants' identities and are managed solely by the author. Informed consent was obtained from all participants prior to the collection of data. The participants were appropriately informed of the study's purpose and objectives and their right to voluntary participation; no incentives were offered to respondents for participating in the survey.

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