







“Health insurance claims management systems: Potential factors affecting their decisions”

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HEALTH INSURANCE CLAIMS MANAGEMENT SYSTEMS: POTENTIAL FACTORS AFFECTING THEIR DECISIONS

Abstract

This study examines how patients' health insurance claims were denied by different insurance providers at a Saudi Academic Medical Center (AMC), exploring the reasons for these rejections, their relationship to claim characteristics, and the factors that predict health insurance claim rejections. A descriptive study design was employed, involving a retrospective review of all insurance claims submitted by both inpatients and outpatients between January and December 2023 at a tertiary care AMC in Saudi Arabia. Following data screening using the UCAF 2.0 form, all denied insurance claims cases ($n = 1,117$) were subjected to qualitative analysis. The majority of rejected health insurance claims were submitted by female patients (56.9%) and outpatients (93.6%). Among the insurance companies studied, "Tawuniya" rejects the most insurance claims ($n = 730$). Variables such as age, gender, and insurance company were significantly associated with the reasons for denying claims ($p < 0.05$). Furthermore, variables such as age, cost, department type (inpatient/outpatient), and the month of claims are significant predictors of claim rejections ($p < 0.05$). However, gender, insurance companies, and clinical diagnosis were not significant ($p > 0.05$). The primary reasons for insurance claim denials in Saudi Arabia are missing medical data, system errors, and non-coverage of specific conditions. This study will help insurance companies and patients identify trends and reasons for claim rejections, enabling them to implement more effective preventive and corrective measures.

Keywords

health insurance, claims management, rejection factors, academic medical center, Saudi Arabia

JEL Classification

I13, G22, I18

INTRODUCTION

In Saudi Arabia, the Ministry of Health (MOH) provides preventive, restorative, and rehabilitative healthcare services through a nationwide network of healthcare centers, as healthcare is considered an essential right for all residents. Such services are primarily subsidized using public revenues and designed to ensure the welfare of Saudi residents (Al Asmir et al., 2020; Alonazi, 2017). The primary healthcare sector offers healthcare services to Saudis and expatriates in the public sector (Al Asmir et al., 2020). Meanwhile, expatriates serving in the private sector typically obtain healthcare through employer-provided health insurance (Al-Hanawi & Qattan, 2019). The Saudi government has mandated compulsory private health insurance for expatriates, Saudi nationals, and their dependents working in the private sector (Al-Nozha, 2024). As a result, a significant growth in the Saudi health insurance sector was observed following the implementation of compulsory health insurance for private-sector employees and their fami-

lies (Saudi Gazette, 2024). Several health insurance providers in Saudi Arabia reimburse patient claims and offer financial relief; yet, the rejection of these claims has a significant impact on both healthcare providers and patients (Alkire, 2024).

1. LITERATURE REVIEW

There is a structured approach to reimbursing healthcare expenditures through a health insurance scheme for patients in Saudi Arabia. The Saudi government introduced the “Cooperative Health Insurance System (CHIS)” in 1999 to mitigate the rising costs and pressures on the nation, as well as to reform the healthcare system. Later, it established the “Council of Cooperative Health Insurance (CCHI)” to oversee and control CHIS, thereby achieving equitable access to healthcare. The CHIS focused on mitigating a portion of the strain on the public healthcare system by rerouting private-sector workers and their dependents to access crucial services through private healthcare institutions and by ensuring their fiscal protection against employer-sponsored healthcare expenses (Alzahrani et al., 2025). To expand the health sector in Saudi Arabia and achieve Vision 2030, the “National Platform for Health and Insurance Exchange Services (NPHIES)” was launched by CCHI and the National Health Information Center, in collaboration with MOH, to enable the exchange of health information among patients (Council of Health Insurance, 2021). Though the health insurance provides financial relief, medical insurance claims can be rejected due to incorrect information, exhaustion of sum insured limits, delay in claim intimation, filing a claim during waiting duration, expired policies, hiding info about pre-existing illnesses, missing documents during filing claim, inaccurate medical diagnosis, lack/incomplete prior authorization, and alteration in policy terms and benefits (The Economic Times Wealth, 2025). These health insurance claim rejections pose a significant challenge for healthcare organizations, as they can result in lost income and increased managerial expenses associated with rework (Matson et al., 2020). Such rejections also lead to patient dissatisfaction and long-term health consequences (LaPointe, 2025).

Health insurance accounted for 59% of total gross written premiums (GWP) in Saudi Arabia’s insurance market in 2023. In 2023, net claims incurred (NCI) for health insurance totaled SAR 29.24 million, resulting in a loss ratio (claims ratio) of 82.4%.

Additionally, health gross claims paid increased by 27.7% (Insurance Authority, Saudi Arabia, 2023). Specifically, the term “Claim” refers to the process of substituting the value of health service costs covered by the policy, which is supported by monetary and medical documents (Council of Health Insurance, 2023).

While reviewing the trend of Saudi health insurance claims, Medgulf Insurance Company had the highest count of claims. Its loss ratio was 92.3% in 2022, compared with other insurance companies’ loss ratios: Al Rajhi Takaful (85.9%), Tawuniya (85.6%), and Bupa Arabia (85.1%) (Ubhar Capital, 2023). Empirical data on claim rejection rates in Saudi Arabia – especially in tertiary academic medical centers – remains sparse in peer-reviewed literature. Nonetheless, a few sources shed light on this issue. A study analyzing fraud and abuse in Saudi insurance claims (2014–2019) reported an overall claim rejection rate of approximately 15%, with dental and obstetrics/gynecology services most affected (Alonazi, 2020). Moreover, the average healthcare claims rejection rate for small- and medium-sized hospitals in Saudi Arabia was around 20%-25%. This condition results in delays and revenue losses, totaling 3.5-4.5 billion SAR annually. This digit is poised to rise further, as the healthcare market is expected to grow to 141 billion SAR by 2030 (Glance Care, 2022).

Earlier studies have identified those reasons behind medical insurance claim rejections. A set of demographic factors, such as age, sex, ethnicity, and marital status, significantly affected the volume of health insurance claims, and analyzing these risk factors helps manage and control risks (Osman & Ali Ismail, 2018). A retrospective Saudi-based study identified more than 196 fraud cases, with an average annual claim rejection rate of about 15%. The average claim rejection rate was higher among females than among males (Alonazi, 2020). Thus, factors such as gender, age, and insurance company type are critical predictive variables, indicating that specific demographic groups are more likely to face claim rejections due to increased scrutiny from insurers (Nabrawi & Alanazi, 2023). Moreover, the submission of incomplete or er-

erroneous data substantially increases the incidence of insurance claim rejections, accounting for 20% of such rejections and being directly linked to standard/poor data quality, including insufficient demographic details, absent/missing diagnostic codes, and inconsistent clinical records (Al-Hamad et al., 2025). There are substantial barriers to the adoption of Clinical Decision Support Systems (CDSS) in Saudi primary care, which directly affect data accuracy and indirectly influence claim acceptance (Aljarboa & Miah, 2022). Erroneous or incorrect data leading to rejections can be mitigated through extensive healthcare quality enhancement and standardization initiatives, primarily through comprehensive, meticulous data collection and adherence to national standards, such as the Saudi Cooperative Health Insurance System (CHIS) (Derouez & Bin Shary, 2025).

Adopting technology helps mitigate insurance claims rejections caused by poor documentation and data-handling processes. Specifically, several machine learning models (Random Forests, Logistic Regression, and Artificial Neural Networks) effectively identified key predictors of claim rejection in Saudi contexts, including policy type, age, gender, education, and claim cost (Nabrawi & Alanazi, 2023). Another study by Kim et al. (2020) introduced “Deep Claim,” a deep learning predictive model that forecasts payer responses based on claim characteristics, clinical diagnoses, and other temporal factors such as the claim submission month, department type, and cost, and this model substantially improved prediction accuracy. It is also recommended that blockchain technology, combined with smart contracts, can be used to automate claim processing, thereby minimizing rejections due to administrative errors and fraud (Al Amin et al., 2024). Although theoretical, this model holds significant potential to reduce errors by streamlining documentation and validation processes – a concept relevant to Saudi healthcare systems transitioning towards digitalization and standardized data practices.

Given Saudi Arabia’s ambitious Vision 2030 healthcare transformation goals, understanding claim rejections and improving insurance claims management systems are critical. The existing literature strongly supports the assertion that demographic variables (age, gender), institutional determinants (insurance company, departmental practices), and

technological adoption (data quality standards, clinical decision support systems) are significantly associated with the incidence of insurance claim rejections. Applying predictive analytics and adopting technology-driven approaches such as machine learning and blockchain could substantially reduce rejection rates, streamline processing, and enhance decision-making transparency. These findings suggest significant potential for operational improvement and inform targeted policy interventions to reduce health insurance claim rejections in Saudi Arabia’s tertiary academic medical centers. Despite the financial and clinical importance of health insurance claims’ data, few Saudi-based studies provide detailed insights into the characteristics and predictors of health insurance claim rejections at the patient-claim level. Existing studies are either insurer-based or general population surveys or focus on satisfaction rather than claim outcomes (Alshahrani, 2023; Almalki et al., 2022). No study to date has explored rejected claims at tertiary AMCs, which are vital in research and high-volume service delivery. As an attempt, this study aims to reveal the following objectives:

- (i) uncover the number of health insurance claims made by patients that different insurance companies reject at a tertiary AMC in Saudi Arabia;
- (ii) investigate the associations between reasons for health insurance claim rejections and the claim characteristics (i.e., gender, age, and insurance company); and
- (iii) predict health insurance claim rejections based on variables such as gender, age, department type, month of claims made, insurance company, cost, and clinical diagnosis.

2. METHODOLOGY

The authors employed a descriptive study design based on a retrospective review of all inpatient and outpatient health insurance claims at an academic medical center located in Saudi Arabia. The study included all insurance claims data filed between January and December 2023. The population for this study comprises all patients with billing activity from January 1 to December 31, 2023, excluding those with billing activity outside this

time frame. The total number of claims included is 13,467, and after excluding the accepted claims ($n = 10,941$), the total rejected claims tally 2,526. Of the 2,526 rejected claims, incomplete claims were removed, leaving a final sample of 1,117. The data collection instrument adopted by the authors includes the UCAF 2.0 form, which was developed based on the executive regulations of Certification Commission for Healthcare Interpreters (CCHI) for the criteria of requesting approval to bear the costs of treatment, which clarified the procedures followed if approval is requested by healthcare providers and the responsibilities of insurance companies to comply with what is stated therein (UCAF, 2.0, 2025). These UCAF papers and an Excel sheet are used to gather information, including the total amount of claims for each month in 2023 and the methods used to submit the claims to the insurance company. The UCAF form is used to collect the data needed to test and achieve the objectives of this research, as this information is not available in a database or an Excel sheet. The study has been approved by the Institutional Review Board (IRB) of Imam Abdulrahman bin Faisal University, Saudi Arabia. After securing IRB approval, the data collection and cleaning process began, and the researchers extracted the necessary data from the study setting. During the data cleaning process, the research team employed a qualitative approach, utilizing the “affinity diagram technique,” to categorize and explore the reasons for rejection into seven main themes. Then, to enhance the reliability of the qualitative analysis, the two researchers worked closely together, cross-checking each other’s coding and categorizing the reasons for rejection. This inter-reliability process helped to minimize subjective biases. The authors used descriptive statistics, including frequency and simple percentage techniques, to show the number of insurance health claims made by patients in the study setting by gender, department (i.e., inpatient or outpatient units), insurance company, and total cost of insurance claims in 2023 (Table 1). The mean age of the participants is 33 years. 57% were females, and 43% were males. Most insurance claims were rejected by insurance companies, including Tawuniya ($N = 730$), followed by Al Rajhi Takaful ($N = 126$), Malath ($N = 74$), MedGulf ($N = 58$), and Allianz S.F.-SNC ($N = 35$). Secondly, the chi-square statistic was used to examine the association between rejection reasons and other in-

dependent variables, including gender, age group, and the insurance companies where the claims are made. Lastly, a linear regression analysis was conducted to identify which independent variables (i.e., gender, department type, month of health insurance claims, insurance company, cost, patient age, and clinical diagnosis) are predictors of insurance claim rejection in the study setting.

Table 1. Demographic profile

Variables	Categories	N (%)
Age	(Mean \pm S.D)	33.16 \pm 23.218
Gender	Male	481 (43.1)
	Female	636 (56.9)
Department type	Inpatient	71 (6.4)
	Outpatient	1046 (93.6)
Insurance company	Al Rajhi Takaful	126 (11.3)
	AllianzS.F.-SNC	35 (3.1)
	GIG	53 (4.7)
	Malath	74 (6.6)
	MedGulf	58 (5.2)
	NextCare	2 (0.2)
	SAICO	20 (1.8)
	Tawuniya	730 (65.4)
Cost	Walaa-SNC	19 (1.7)
	(Mean \pm S.D)	2375.4987 \pm 5235.52776

3. RESEARCH RESULTS

This study reveals the association between the reasons for rejecting insurance claims and the patient’s gender (Table 2). Precisely, there is a significant association between gender and reasons for rejecting insurance claims by insurance companies ($p = 0.014$) at a 0.05 level of significance. Among reported rejection reasons, non-coverage of clinical conditions is the most common, affecting 61% of females and 39% of males. Further, system mode is the second most common reason for claim rejection, affecting 51% of females and 49% of males. Thirdly, lack of medical data is the most common reason for claim rejection, affecting 52% of females and 48% of males. Other reasons include referral problems, missing personal data, and duplicate claims, which are the reasons for rejection among male and female patients.

Table 3 illustrates a significant association between reasons for rejecting insurance claims and patients’ age groups ($p = 0.00$) at a 0.05 level of significance. Considering the frequency of rejection

Table 2. Chi-square statistic showing the association between insurance claim rejection reasons and the gender of patients

Reasons for Rejection	Gender		Chi-square (p-value)
	Male N, (%)	Female N, (%)	
Duplication of Claims	10 (35.7)	18 (64.3)	15.866 (0.014)*
Claims exceed approved limit - days	6 (24.0)	19 (76.0)	
Medical data missing	107 (47.6)	118 (52.4)	
Non-coverage of clinical conditions	153 (39.3)	236 (60.7)	
Personal data missing	22 (44.9)	27 (55.1)	
Referral problems	34 (34.7)	64 (65.3)	
System-Mode	149 (49.2)	154 (50.8)	

Table 3. Chi-square statistic showing the association between insurance claim rejection reasons and the age group of patients

Reasons for Rejection	Age group					Chi-square (p-value)
	Below 18	19-30	31-40	41-50	Above 50	
Duplication of Claims	7 (25.0)	5 (17.9)	5 (17.9)	4 (14.3)	7 (25.0)	251.449 (0.000)*
Claims Exceed approved limit – days	8 (32.0)	6 (24.0)	7 (28.0)	1 (4.0)	3 (12.0)	
Medical data missing	45 (20.0)	52 (23.1)	62 (27.6)	27 (12.0)	39 (17.3)	
Non-coverage of clinical conditions	122 (31.4)	100 (25.7)	77 (19.8)	25 (6.4)	65 (16.7)	
Personal data missing	13 (26.5)	11 (22.4)	8 (16.3)	5 (10.2)	12 (24.5)	
Referral problems	57 (58.2)	12 (12.2)	11 (11.2)	9 (9.2)	9 (9.2)	
System-Mode	58 (19.1)	29 (9.6)	25 (8.3)	19 (6.3)	172 (56.8)	

reasons reported about the age group, non-coverage of clinical conditions is the most commonly reported reason for insurance claim rejection across all age groups, where 16.7%, 31.4%, 25.7%, 19.8%, and 6.4% of the patients falling under the category of over 50 years, below 18 years, between 19 to 30 years, between 31 to 40 years, and between 41 to 50 years, respectively. Secondly, system mode is the following most common reason for the insurance claim rejection regarding the age group of the patients, where 56.8%, 19.1%, 9.6%, 8.3%, and 6.3% of the patients fall under the category of over 50 years, below 18 years, between 19 to 30 years, and between 41 to 50 years, respectively. According to the system mode, 56.8% of insurance

claims made by patients aged 50 and above were mainly rejected. Regarding duplicate claims, 25% of rejections pertained to age groups below 18 and above 50.

The study's findings clearly indicate a significant association in the reasons for rejecting insurance claims across different insurance companies (Appendix A). Tawuniya rejects patients' insurance claims for various reasons, including missing personal data (94%), exceeding the approved claim limit (92%), incomplete medical data (69%), and duplicate claims (61%). Likewise, Al Rajhi Takaful rejects 70% of insurance claims due to referral issues, and 11% are attributed to a lack of

medical data. Furthermore, Malath rejects 14% of cases due to duplicate claims, and 8% are rejected for exceeding the approved claim limit.

The linear regression analysis revealed that 31.7% of the variance in insurance claim rejections was explained by the predictors ($R^2 = 0.317$) (Appendix B). Significant predictors included department type (inpatient/outpatient) ($p = 0.048$), the month of claims ($p < 0.001$), cost ($p = 0.021$), and age ($p < 0.001$), with the month in which claims are made being the strongest predictor, indicating a seasonal trend in rejections. Gender ($p = 0.606$), insurance companies ($p = 0.074$), and clinical diagnosis ($p = 0.295$) were not statistically significant. There were no multicollinearity problems in the model ($VIF < 2$). These results provide valuable insights for enhancing insurance procedures and policies by identifying key factors that influence claim denials.

4. DISCUSSION

This study revealed the number of rejected health insurance claims and ascertained whether the reasons for rejections were associated with a set of claim characteristics at a tertiary care AMC in Saudi Arabia. The claim characteristics that are prone to rejection of insurance claims include “duplication of claims,” claims that exceed the approved limit days, missing medical data in the claim document, non-coverage of clinical conditions as per the insurance policy, missing personal data in the claim document, referral problems, and system-mode errors. Additionally, the authors identified and estimated the factors influencing health insurance claim rejections. The results showed that most rejected claims were made by female patients (56.9%) and inpatients (93.6%).

The rejection rate of health insurance claims to healthcare providers was higher for inpatients than for outpatients (Park et al., 2012). Several factors may be associated with this phenomenon, as inpatient care typically entails more complex medical interventions and higher expenditures, leading to increased scrutiny by insurance companies. This complexity often creates additional opportunities for billing and documentation errors, which are common factors contributing to claim

rejections (Kusumoto et al., 2024). Variances in reimbursement frameworks between inpatient and outpatient settings can significantly affect claim denials. Inpatient care is typically more expensive, prompting insurers to impose stricter criteria to manage expenditures (Tallapaneni et al., 2023). Inpatient claims are often high-risk for billing errors and documentation discrepancies, which are frequently cited as reasons for denials, and the complexity of inpatient billing procedures increases the probability of such errors (Hoagland & Horný, 2024).

Furthermore, this study observed that the mean age of the patients who experienced rejected claims was 33.16 years. The highest number of health insurance claim rejections was reported by Tawuniya ($n = 730$), accounting for 65.4% of the total ($n = 1,117$). Followingly, other insurance companies that rejected claims were Al Rajhi Takaful ($n = 126$; 11.3%), Malath ($n = 74$; 6.6%), MedGulf ($n = 58$; 5.2%), and Allianz S.F.-SNC ($n = 35$; 3.1%). On the other hand, the fewest claim rejections were made by NextCare ($n = 2$; 0.2%). It has been demonstrated that the health insurance claim rejection rate varies significantly across insurance payers, including Medicare, Medicaid, private insurance, and workers' compensation (Matson et al., 2020). The rejection of health insurance claims in Saudi Arabia is influenced by various factors, including payer-related issues such as insurance coverage limitations and the absence of gold-standard criteria for specific treatments, which can lead to claim rejections because insurers may not recognize the necessity of specific medical interventions (Attia et al., 2024). It is also found that regulatory and compliance issues contribute to the rejection of insurance claims, as the Saudi Arabian insurance sector faces challenges in corporate governance and regulatory compliance, which can affect the processing and approval of insurance claims (Alsuyayfi et al., 2023). Further research is warranted to investigate the claim rejections made by health insurance companies across Saudi Arabia and to examine the volume of rejected claims by sociodemographic variables.

Through this study, the authors identified the reasons insurance companies rejected insurance claims, which were significantly associated with the patient's gender and age groups (Tables 2 and

3). The most prominent reasons for rejections include duplicate claims, exceeding the approved number of days, missing medical data, not being covered, missing personal data, referral issues, and system errors. By gender and age group, the most commonly reported reason for insurance claim rejection is non-coverage of clinical conditions, diagnoses, and services that do not fall under insurance companies' claim benefits, with 61% of females and 39% of males falling into this category. This may be due to a lack of awareness of insurance policies, which is often associated with the duration or period of coverage. Many patients/insurance company clients in Saudi Arabia lack sufficient understanding of their health insurance policies, leading to misunderstandings and claim rejections (Alessa & Alshagrawi, 2023). The authors also explored patient age groups to study the reasons for rejected insurance claims. In particular, 56.8% of insurance claims made by patients aged 50 and above are mostly rejected due to system errors. Elderly people who have chronic conditions like diabetes, high blood pressure, and heart failure are more likely to use healthcare services often and present complex claims that are more likely to be rejected (Shahbar, 2024). Insurance claim non-coverage is a primary factor in health insurance rejection, and systemic and individual factors influence it. Systemic factors include insurance policy limitations, which often restrict access to necessary diagnostic tests and treatments due to high costs and a lack of standardized criteria (Attia et al., 2024). Individual factors, such as an inadequate understanding of health insurance policies, can lead to miscommunication and claim denials. This lack of literacy influences financial planning and healthcare utilization decisions (Alessa & Alshagrawi, 2023). Thus, coverage issues are among the reasons for claim rejections, as health insurance companies do not pay the incurred expenses if the policy does not cover the treatment; therefore, the beneficiaries should carefully review the policy's list of covered conditions or treatments before filing a claim (Davis, 2024; HDFC ERGO Team, 2024; Maryland Local Health Department, 2015).

This study found a significant association between the reasons for rejecting insurance claims and the insurance companies involved (Appendix A). Medicare had the highest claim rejection rate

(31.2%), followed by Medicaid (30.7%). The use of multiple Current Procedural Technology (CPT) codes in a claim was associated with the highest risk of claim rejection. On the other hand, applying modifier 25 was associated with a minimal risk of rejection (Matson et al., 2020). However, no previous studies have statistically examined the association between the reasons for rejecting insurance claims and insurance companies, which warrants further exploration. Notably, in this study, Tawuniya rejected more than 90% of patients' insurance claims due to missing personal data or exceeding the approved limit. Also, it rejected more than 60% of cases due to missing medical data and duplicate claims. There are several reasons for insurance claim rejections, including incorrect personal information, missing documents during claim submission, inaccurate clinical diagnosis, exhausted sum insured limits, non-coverage, duplicate claims, coding issues, and typo errors (The Economic Times Wealth, 2025; HDFC ERGO Team, 2024; Maryland Local Health Department, 2015; Glenwood Systems, 2025). Additionally, Saudi Arabia has faced challenges in adopting electronic health records (EHRs), including a lack of technical support and connectivity issues. These issues can result in incomplete or inaccurate records, directly affecting the processing of insurance claims, as complete and accurate documentation is essential for claim approval (Alzghaibi, 2023). Another noteworthy observation from this study is that all claims against the Tawanaya company were rejected, and all related to system mode, i.e., technical problems. Further exploration of the data for the first four months of 2023 (January to April) revealed that hospitals submitted claims on paper-based methods to Tawanaya Company, despite the company only accepting claims through the Wassel portal. As a result, all claims submitted on paper form during this period were rejected by Tawanaya because the hospitals did not use the required submission method. In comparison, other insurance companies had different reasons for claim rejections, such as non-covered services, missing personal or medical data, referral issues, duplicate submissions, and claims exceeding approved time limits. Tawanaya's rejection rate was nearly double that of other companies because it not only rejected claims for the same reasons but also all paper-based submissions that did not go through the Wassel portal.

In addition, this study revealed that age, cost, department type (inpatient/outpatient), and the month in which claims were submitted are significant predictors of the number of claim rejections at a tertiary AMC in Saudi Arabia. The month in which claims were made is the strongest predictor, indicating a seasonal trend in rejections. Inpatients experienced a higher rate of health insurance claim rejections than outpatients (Park et al., 2012), and elderly patients were more likely to have their insurance claims rejected than patients in other age groups (Shahbar, 2024). In the elderly, comorbidities – the co-occurrence of multiple chronic illnesses – are prevalent and complicate health management. Higher healthcare costs and utilization may result, prompting insurance companies to investigate more thoroughly and potentially reject claims (Tolentino et al., 2017). Furthermore, this study found that gender, insurance companies, and clinical diagnosis were not significant predictors of insurance claim rejection. Ironically, an earlier study in Saudi Arabia found that demographic variables, such as age, sex, ethnicity, and marital status, significantly influenced the amounts of individual health insurance claims (Osman & Ali Ismail, 2018). Future studies are necessary, as the number of insured individuals, insurance companies, and healthcare organizations has increased over time.

Despite this study revealing important observations, some limitations must be acknowledged. First, this study is limited to 1 year of retrospec-

tive data on health insurance claim rejections retrieved from a single AMC, “King Fahad Hospital of the University (KFHU)”, Saudi Arabia. The authors used KFHU as a case in this study and attempted to generalize the findings, as all health insurance claims processes are standardized across Saudi Arabia. In addition, similar studies can be conducted using larger retrospective data from academic medical centers in various Saudi Arabian provinces. Second, future studies can reveal variations in health insurance claim rejections between public and private hospitals. This is because private hospitals have been more successful in adopting standardized billing systems like the Saudi Billing System (SBS), which enhances transparency and supports a value-based healthcare financing model (Reka et al., 2023) and on the other hand, public hospitals in Saudi Arabia face significant challenges in implementing effective revenue cycle management (RCM) systems, which are crucial for efficient billing and claims processing (Alradhi & Alanazi, 2023). Moreover, the reasons for rejecting insurance claims and their relationship with sociodemographic variables can be deeply investigated in the future. More quantitative studies are also needed to explore the association between insurance types or companies and the reasons for rejecting claims. Besides, the differences in claim rejection rates by gender and nationality can be addressed. Further qualitative research can be conducted to uncover the hidden perceptions of insurance beneficiaries regarding the difficulties they face with claim rejections.

CONCLUSION AND RECOMMENDATIONS

This study is the first to uncover health insurance claims rejected at a tertiary care AMC in Saudi Arabia and to examine their association with rejection reasons, insurance company type, gender, and patient age groups. According to this study, the top three reasons insurance claims are denied are missing medical data (20%), system error problems (27%), and non-coverage of clinical conditions (35%). This study concludes that there is an association between insurance claim rejection and the insurance company, and that each insurance company rejects claims for various reasons, including missing personal data, exceeding the approved claim limit, incomplete medical data, and duplicate claims. Likewise, there is a significant association between gender and insurance companies’ claim rejections, with claims made by females more often denied than those by males, and these rejections are mainly due to factors such as non-coverage of clinical conditions, system mode, and missing medical data. The authors also highlight age, cost, department type (inpatient versus outpatient), and the month of the claim as the most significant predictors of rejected health insurance claims. Notably, the month in which claims were made is the top predictor, representing a seasonal trend in rejections. Nevertheless, gender, insurance companies, and clinical diagnosis were not significant predictors for health insurance claim rejection.

The findings would aid insurance companies and patients in understanding the trend of claim rejections and the reasons behind them, thereby enabling them to take necessary preventive and corrective measures to avoid or reduce future claim rejections. The authors have provided some key recommendations based on the findings derived from this study, including: the healthcare policy makers should unify the regulations for insurance claim acceptance across all the insurance companies operating in Saudi Arabia; the required data set to reimburse/recover the healthcare expenditure through insurance should be clearly defined, including the type of clinical conditions covered under each insurance scheme, and it is essential to unify the claim form for all insurance companies when submitting it.

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APPENDIX A

Table A1. Chi-square statistic showing the association between insurance claim rejection reasons concerning different insurance companies

Reasons for Rejection	Name of various insurance companies covered									Chi-square (p-value)
	Al Rajhi-Takaful	AllianzS.F-SNC	GIG	Malath	MedGulf	NextCare	SAICO	Tawuniya	Walaa-SNC	
Duplication of Claims	2 (7.1)	2 (7.1)	0	4 (14.3)	1 (3.6)	0	1 (3.6)	17 (60.7)	1 (3.6)	744.797 (0.000)*
Claims Exceed approved limit – days	0	0	0	2 (8.0)	0	0	0	23 (92.0)	0	
Medical data missing	24 (10.7)	4 (1.8)	0	9 (4.0)	16 (7.1)	1 (0.4)	10 (4.4)	156 (69.3)	5 (2.2)	
Non-coverage of clinical conditions	31 (8.0)	28 (7.2)	53 (13.6)	50 (12.9)	39 (10.0)	1 (0.3)	5 (1.3)	171 (44.0)	11 (2.8)	
Personal data missing	0	1 (2.0)	0	0	0	0	0	46 (93.9)	2 (4.1)	
Referral problems	69 (70.4)	0	0	9 (9.2)	2 (2.0)	0	4 (4.1)	14 (14.3)	0	
System-Mode	0	0	0	0	0	0	0	303 (100.0)	0	

APPENDIX B

Table B1. Linear regression showing those independent variables predicting insurance rejection claims

Model	Unstandardized Coefficients		t	Sig.	95.0% Confidence Interval for B		Collinearity Statistics	
	B	Std. Error			LCL	UCL	Tolerance	VIF
(Constant)	5.439	.426	12.780	.000	4.604	6.274	–	–
Gender (Male or female)	–.044	.086	–.516	.606	–.212	.124	.976	1.025
Department type (Inpatient or outpatient department)	.351	.177	1.979	.048	.003	.698	.937	1.067
The month in which health insurance claims are made	–.247	.013	–19.562	.000	–.271	–.222	.920	1.086
Insurance companies	.031	.018	1.790	.074	–.003	.066	.851	1.176
Cost	–.051	.022	–2.312	.021	–.095	–.008	.858	1.166
Age	.124	.030	4.198	.000	.066	.183	.808	1.237
Clinical Diagnosis	–.015	.014	–1.048	.295	–.042	.013	.956	1.046