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RESEARCH ARTICLE OPEN ACCESS

Investigating the Effect of Healthcare Management Practices on Patient Satisfaction in Saudi Arabia: A Cross-Sectional Study Protocol

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Abstract:

This paper presents a comprehensive study protocol for investigating the effect of healthcare management practices on patient satisfaction in Saudi Arabia, examining the mediating roles of staff training and service quality. The study employs a quantitative cross-sectional design at King Salman Medical City (KSMC), Madinah. Two participant groups will be recruited: healthcare professionals (n=316) through simple random sampling and patients (n=150) through convenience sampling. Data collection utilizes validated instruments including Healthcare Management Practices scale, Staff Training effectiveness measure, HEALTHQUAL for service quality, and PSQ-18 for patient satisfaction. Structural equation modeling using SmartPLS will test seven hypotheses examining direct and mediated relationships. This protocol provides methodological foundations for empirical investigation aligned with Saudi Vision 2030 healthcare transformation objectives, offering replicable procedures for studying management-satisfaction relationships in healthcare contexts.

Keywords — Study protocol, healthcare management practices, patient satisfaction, staff training, service quality, structural equation modeling, SmartPLS, Saudi Arabia.

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I. INTRODUCTION

Patient satisfaction constitutes a fundamental indicator of healthcare system effectiveness, reflecting how well services meet patient expectations and needs [1]. Within the Saudi Arabian healthcare context, improving patient satisfaction represents a strategic priority aligned with Vision 2030 national transformation objectives [2]. The National Transformation Program explicitly targets enhanced healthcare quality, accessibility, and patient experience through systematic organizational reforms [3].

Research suggests that healthcare management practices significantly influence patient satisfaction, though the relationship may operate through intermediate mechanisms including staff competency development and service quality enhancement [4]. Understanding these complex relationships requires rigorous empirical investigation with appropriate methodological designs capable of testing both direct and mediated effects [5].

Despite growing interest in patient satisfaction determinants, limited research has systematically examined how healthcare management practices influence satisfaction outcomes within Saudi Arabian healthcare settings [6]. This gap is particularly significant given ongoing healthcare transformation initiatives requiring evidence-based strategies for quality improvement [7]. Furthermore, the mediating mechanisms through which management practices translate into patient outcomes remain inadequately investigated in Middle Eastern healthcare contexts [8].

This paper presents a comprehensive study protocol designed to investigate the effect of healthcare management practices on patient satisfaction in Saudi Arabia, with specific attention to the mediating roles of staff training and service quality. The protocol details research design, study setting, participant recruitment, instrumentation, data collection procedures, and analytical approaches. By articulating methodological foundations, this protocol contributes to research transparency and provides replicable procedures for investigating management-satisfaction relationships in healthcare contexts.

The significance of this protocol extends beyond its immediate research objectives to encompass broader contributions to healthcare management scholarship. Methodologically, the protocol demonstrates rigorous approaches for investigating complex mediation relationships in healthcare settings. Practically, the procedures described provide templates for similar investigations across diverse healthcare contexts. Theoretically, the protocol operationalizes

constructs derived from established frameworks in ways that enable empirical testing and theoretical refinement.

II. RESEARCH OBJECTIVES

A. General Objective

To examine the overall impact of healthcare management practices on patient satisfaction in Saudi Arabia, with focus on the mediating roles of staff training and service quality.

B. Specific Objectives

The study addresses seven specific objectives corresponding to hypothesized relationships:

1. To analyze the direct impact of healthcare management practices on patient satisfaction.

2. To assess the influence of healthcare management practices on staff training effectiveness.

3. To evaluate the effect of healthcare management practices on service quality.

4. To examine the relationship between staff training and patient satisfaction.

5. To investigate the relationship between service quality and patient satisfaction.

6. To test the mediating role of staff training in the management practices-satisfaction relationship.

7. To test the mediating role of service quality in the management practices-satisfaction relationship.

III. RESEARCH DESIGN

A. Study Design

This study employs a quantitative cross-sectional research design. The cross-sectional approach enables assessment of relationships among variables at a single point in time, which is appropriate for testing the hypothesized model examining associations between healthcare management practices, mediating variables, and patient satisfaction outcomes [9]. The quantitative methodology facilitates statistical testing of theoretically derived hypotheses and assessment of relationship strengths [10].

B. Research Approach

The study adopts a deductive research approach, moving from theoretical propositions to empirical testing [11]. The conceptual framework integrating Resource-Based View theory, SERVQUAL model, and Donabedian's quality framework provides theoretical foundations for hypothesis development. Structured survey instruments operationalize theoretical constructs, enabling quantitative hypothesis testing through statistical analysis.

C. Analytical Framework

Structural Equation Modeling (SEM) using Partial Least Squares (PLS) approach will be employed for data analysis. PLS-SEM is appropriate for this study given its capability to handle complex models with multiple constructs and relationships, its effectiveness with smaller sample sizes compared to covariance-based SEM, and its suitability for prediction-oriented research [12]. SmartPLS software (version 4.0) will be utilized for model estimation and hypothesis testing.

IV. STUDY SETTING

The study will be conducted at King Salman Medical City (KSMC), located in Madinah, Saudi Arabia. KSMC operates as a major tertiary healthcare complex under the Ministry of Health, comprising multiple specialized hospitals, outpatient clinics, and support facilities [13]. The institution serves the Madinah region population and receives referrals from surrounding areas, providing comprehensive healthcare services across medical specialties.

KSMC employs approximately 1,750 healthcare staff including physicians, nurses, and allied health professionals. The institution has been actively implementing healthcare quality improvement initiatives aligned with Vision 2030 objectives, including management system enhancements, staff development programs, and service quality improvements [14]. These characteristics make KSMC an appropriate setting for investigating the relationships among management practices, workforce development, service quality, and patient satisfaction.

The selection of KSMC as the study site reflects several strategic considerations. First, as a large tertiary institution, KSMC provides sufficient population diversity for meaningful statistical analysis. Second, the institution's active engagement with Vision 2030 transformation initiatives creates a relevant context for examining management practice effects. Third, the presence of established management systems, training programs, and quality monitoring mechanisms provides observable phenomena for investigation.

V. POPULATION AND SAMPLING

A. Study Population

The study targets two distinct participant populations:

Healthcare Professionals: This group includes physicians, nurses, allied health professionals, and healthcare managers employed at KSMC. Healthcare professionals provide perspectives on management practices, training experiences, and institutional performance factors. Inclusion criteria comprise: (1) current KSMC employment for minimum six months; (2) direct involvement in patient care or healthcare management; and (3) willingness to provide informed consent.

Patients: This group includes individuals receiving outpatient or inpatient care services at KSMC. Patients provide perspectives on service quality perceptions and satisfaction evaluations. Inclusion criteria comprise: (1) age 18 years or older; (2) receipt of healthcare services at KSMC within the past three months; (3) cognitive capacity to complete survey instruments; and (4) willingness to provide informed consent.

B. Sample Size Determination

Sample size calculations follow established guidelines for PLS-SEM analysis. For healthcare professionals, the target population is approximately 1,750 staff. Using Krejcie and Morgan's [15] sample size table and Stephen Thompson's formula verification, the required sample size is 316 participants. This calculation accounts for 95% confidence level, 5% margin of error, and population size parameters.

For patients, a sample of 150 participants is targeted based on practical considerations for descriptive analysis of patient perspectives. This sample size provides adequate statistical power for descriptive statistics and correlation analyses involving patient satisfaction variables [16].

TABLE I
SAMPLE SIZE SUMMARY

Participant Group	Population	Sample	Sampling Method
Healthcare Professionals	~1,750	316	Simple Random
Patients	Variable	150	Convenience
Total	-	**466**	-

C. Sampling Procedures

Healthcare Professionals: Simple random sampling will be employed to ensure representative and unbiased participant selection. A complete staff roster will be obtained from KSMC Human Resources department. Using random number generation, potential participants will be selected and invited via official communication channels. This probability sampling approach enhances generalizability of findings to the broader healthcare professional population [17].

Patients: Non-probability convenience sampling will be utilized for patient recruitment. Participants will be identified through Electronic Health Records (EHR) and recruited in clinical settings including outpatient clinics, inpatient wards, and discharge areas. Research assistants will approach eligible patients, explain study purposes, and obtain informed consent. While convenience sampling has limitations regarding generalizability, it provides practical and ethical advantages for patient recruitment in clinical settings [18].

VI. INSTRUMENTATION

A. Questionnaire Structure

Data collection will employ structured questionnaires comprising five parts with a total of 44 items plus demographic questions. All measurement items utilize five-point Likert scales ranging from 1 (strongly disagree) to 5 (strongly agree) or equivalent response options appropriate to each construct [19].

TABLE II
RESEARCH INSTRUMENTS

Part	Construct	Source	Items
A	Demographics	Researcher-developed	6
B	Healthcare Management Practices	Zhao et al. (2023)	6
C	Staff Training	Bai et al. (2018)	10
D	Service Quality	HEALTHQUAL (Lee, 2017)	12
E	Patient Satisfaction	PSQ-18 (Marshall & Hays, 1994)	10
	Total Items		**44**

B. Instrument Descriptions

Healthcare Management Practices (HMPs): This construct is measured using 6 items adapted from Zhao et al. [20]. The scale assesses organizational management activities including planning, resource allocation, quality assurance, and performance monitoring. Sample items include statements about leadership effectiveness, resource management, and quality improvement initiatives.

Staff Training: Training effectiveness is measured using 10 items adapted from Bai et al. [21]. The scale assesses training program availability, quality, relevance, and impact on job performance. Items address training needs assessment, program design, delivery methods, and learning transfer to practice.

Service Quality: Service quality is measured using the 12-item HEALTHQUAL instrument developed by Lee [22]. This healthcare-specific adaptation of the SERVQUAL framework assesses five service quality dimensions: tangibles, reliability, responsiveness, assurance, and empathy within healthcare contexts.

Patient Satisfaction: Patient satisfaction is measured using 10 items from the Patient Satisfaction Questionnaire Short-Form (PSQ-18) developed by Marshall and Hays [23]. The scale assesses overall satisfaction with healthcare services including technical quality, interpersonal manner, communication, and accessibility dimensions.

C. Translation and Cultural Adaptation

All instruments were originally developed in English and will undergo systematic translation for Arabic-speaking participants. The translation process follows established

forward-backward translation procedures [24]. Bilingual healthcare experts will conduct forward translation from English to Arabic, followed by independent backward translation to English. Translation discrepancies will be resolved through expert committee review ensuring semantic equivalence and cultural appropriateness for Saudi healthcare contexts.

VII. PILOT STUDY

A pilot study will be conducted with 30 participants to assess questionnaire clarity, reliability, and feasibility prior to main data collection [25]. The pilot sample will include healthcare professionals (n=20) and patients (n=10) meeting inclusion criteria but excluded from the main study sample.

Pilot study objectives include: (1) assessing instrument comprehension and clarity; (2) identifying ambiguous or problematic items; (3) estimating completion time; (4) calculating preliminary reliability coefficients; and (5) testing data collection procedures. Participants will provide feedback on item clarity, response option appropriateness, and overall questionnaire format.

TABLE III
EXPECTED RELIABILITY THRESHOLDS

Construct	Items	Expected α	Threshold
Healthcare Management Practices	6	≥ 0.70	Acceptable
Staff Training	10	≥ 0.80	Good
Service Quality	12	≥ 0.85	Good
Patient Satisfaction	10	≥ 0.80	Good

Note: Reliability thresholds based on Hair et al. [26] and Nunnally & Bernstein [27] guidelines.

VIII. DATA COLLECTION PROCEDURES

A. Preparation Phase

Following ethical approval, the research team will coordinate with KSMC administration to facilitate data collection. Research assistants will be trained on recruitment procedures, informed consent processes, and questionnaire administration. Data collection materials including consent forms, questionnaires, and tracking documents will be prepared in both English and Arabic versions.

B. Healthcare Professional Recruitment

Selected healthcare professionals will receive official invitation letters through institutional email and internal communication systems. The invitation will explain study purposes, participation requirements, confidentiality protections, and voluntary nature of participation. Interested participants will access questionnaires through secure online platforms or receive paper-based alternatives upon request. Follow-up reminders will be sent at two-week intervals to non-respondents, with maximum of three contact attempts.

C. Patient Recruitment

Research assistants will approach eligible patients in designated clinical areas during regular operating hours. After explaining the study and obtaining informed consent, participants will complete questionnaires independently or with research assistant support as needed. Completed questionnaires will be collected immediately and securely stored. Data collection from patients will continue until the target sample size is achieved.

IX. DATA ANALYSIS PLAN

A. Preliminary Analysis

Data analysis will proceed through systematic phases. Preliminary analysis includes data screening for missing values, outliers, and normality assessment. Missing data patterns will be evaluated, with appropriate imputation methods applied if missingness is random and below acceptable thresholds [28]. Outlier analysis will identify extreme cases requiring investigation or removal. Normality will be assessed through skewness and kurtosis statistics, with values within ±2 considered acceptable for PLS-SEM [12].

B. Descriptive Statistics

Descriptive analysis will characterize sample demographics and summarize variable distributions. Frequencies and percentages will describe categorical variables. Means, standard deviations, and ranges will summarize continuous variables. Demographic comparisons between healthcare professional and patient samples will identify any systematic differences requiring analytical consideration.

C. Measurement Model Assessment

The measurement model will be assessed for reliability and validity prior to structural model testing [29]. Internal consistency reliability will be evaluated using Cronbach's alpha (≥0.70 acceptable) and composite reliability (≥0.70 acceptable). Convergent validity will be assessed through Average Variance Extracted (AVE ≥0.50 acceptable) and indicator loadings (≥0.70 acceptable). Discriminant validity will be evaluated using Fornell-Larcker criterion and Heterotrait-Monotrait (HTMT) ratio (<0.85 acceptable).

D. Structural Model Assessment

Following satisfactory measurement model assessment, the structural model will be evaluated. Path coefficients (β) will indicate relationship direction and strength. Statistical significance will be assessed through bootstrapping with 5,000 subsamples [30]. Effect sizes (f^2) will be interpreted as small (0.02), medium (0.15), or large (0.35). Model explanatory power will be assessed through R^2 values for endogenous

constructs. Predictive relevance will be evaluated through Stone-Geisser Q^2 values (>0 indicates predictive relevance).

E. Mediation Analysis

Mediation effects will be tested following established PLS-SEM procedures [31]. Indirect effects through staff training and service quality will be calculated as products of constituent path coefficients. Bootstrap confidence intervals will assess indirect effect significance. Variance Accounted For (VAF) will indicate mediation strength: VAF <20% suggests no mediation, 20-80% suggests partial mediation, and >80% suggests full mediation [32].

The mediation analysis will examine both individual mediating pathways and the combined indirect effects. For staff training as mediator, the indirect effect equals the product of the path from healthcare management practices to staff training and the path from staff training to patient satisfaction. Similarly, for service quality as mediator, the indirect effect equals the product of the path from healthcare management practices to service quality and the path from service quality to patient satisfaction. Total indirect effects represent the sum of both mediation pathways.

Specific indirect effects will be tested for significance using bias-corrected bootstrap confidence intervals. If the confidence interval excludes zero, the indirect effect is considered statistically significant. Additionally, the nature of mediation will be classified based on the significance of direct and indirect effects: complementary mediation (both significant, same direction), competitive mediation (both significant, opposite direction), indirect-only mediation (only indirect significant), direct-only non-mediation (only direct significant), or no-effect non-mediation (neither significant).

X. ETHICAL CONSIDERATIONS

The study will be conducted in accordance with the Declaration of Helsinki principles for ethical research involving human subjects [33]. Ethical approval will be obtained from the Institutional Review Board (IRB) of King Salman Medical City and the Research Ethics Committee of Lincoln University College prior to data collection commencement. The study protocol, informed consent documents, and data collection instruments will be submitted for ethical review.

Informed consent will be obtained from all participants prior to data collection. Consent forms will clearly explain study purposes, procedures, risks, benefits, voluntary participation, and withdrawal rights. Participants will be assured that non-participation will not affect their employment status (healthcare professionals) or healthcare services (patients). Participants may withdraw from the study at any time without providing reasons and without any negative consequences.

Data confidentiality will be maintained through secure storage, restricted access, and anonymization procedures. Questionnaires will not collect identifying information. Data files will be password-protected and stored on secure institutional servers. Only the research team will have data access. Research findings will be reported in aggregate form without individual identification. All data will be retained for five years following study completion and then securely destroyed.

Potential risks to participants are minimal, limited to time required for questionnaire completion and possible discomfort when reflecting on workplace or healthcare experiences. Benefits include contribution to healthcare improvement knowledge and potential indirect benefits from resulting quality improvements. The risk-benefit ratio is favorable for study participation.

XI. STUDY TIMELINE

The study is planned for completion over a 36-month period organized across six phases: (1) Proposal development and approval (Months 1-6); (2) Research design and instrument preparation (Months 7-12); (3) Ethical approval and pilot testing (Months 13-18); (4) Data collection (Months 19-24); (5) Data analysis (Months 25-30); and (6) Thesis writing and submission (Months 31-36). Detailed timeline with milestone activities is presented in the Gantt chart accompanying this protocol.

XII. EXPECTED OUTCOMES

This study is expected to generate several significant outcomes. First, empirical evidence regarding the relationships among healthcare management practices, staff training, service quality, and patient satisfaction within the Saudi healthcare context. Second, identification of the relative importance of direct versus mediated pathways through which management practices influence satisfaction outcomes. Third, practical recommendations for healthcare administrators seeking to improve patient satisfaction through management, training, and service quality interventions.

The findings will contribute to the evidence base supporting Vision 2030 healthcare transformation initiatives by providing empirically grounded guidance for organizational improvement strategies. Additionally, the study will contribute validated measurement instruments adapted for Saudi healthcare contexts, facilitating future research in this domain.

From a theoretical perspective, the study outcomes will empirically test an integrated conceptual model combining Resource-Based View, SERVQUAL, and Donabedian's frameworks. The findings will indicate whether the proposed dual-mediation structure adequately explains the management-satisfaction relationship and whether modifications to the theoretical model are warranted based on empirical observations.

From a practical perspective, the study will generate specific recommendations for healthcare organizations. If staff training emerges as a significant mediator, organizations should prioritize workforce development investments. If service quality demonstrates stronger mediating effects, resources should focus on service delivery improvements. The relative strength of mediation pathways will inform resource allocation priorities for satisfaction improvement initiatives.

XIII. CONCLUSION

This paper has presented a comprehensive study protocol for investigating the effect of healthcare management practices on patient satisfaction in Saudi Arabia. The protocol details a rigorous methodological approach including quantitative cross-sectional design, dual participant sampling, validated instrumentation, and structural equation modeling analysis. By articulating these methodological foundations, the protocol contributes to research transparency and provides replicable procedures for healthcare management research.

The study addresses significant gaps in understanding how healthcare management practices influence patient satisfaction through staff training and service quality mechanisms. The findings will provide evidence-based guidance for healthcare administrators and policymakers pursuing patient satisfaction improvement aligned with Saudi Vision 2030 objectives. As healthcare systems globally prioritize patient-centered care, understanding the organizational factors that drive satisfaction becomes increasingly essential for achieving healthcare excellence.

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