Saudi Journal of Health Systems Research

Research Article

Saudi J Health Syst Res 2022;2:146–155
DOI: 10.1159/000526867

Received: June 3, 2022
Accepted: August 19, 2022
Published online: October 7, 2022

Application of Mechanistic versus Organic Organizational Structure Models in Dental Services: Cross-Sectional Study and Review

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Keywords
Organizational models · Organic organization · Mechanistic organization · Leadership · Dental organizations

Abstract

Introduction: It is critical to understand both mechanistic and organic managerial models, as different approaches of management may need to be applied in different tasks within the same organization. ***Methods:*** This is a cross-sectional, single-facility-based study in dental care. A bilingual, electronically generated questionnaire (Arabic and English) was used at a large-scale dental center and distributed through a social media platform to a convenience sample (150 individuals). The questionnaire included demographic data, educational level, and Yes/No/I Don't Know questions. Descriptive statistics were used for data summarization and presentation. ***Results:*** The response rate was 77%, with the age range from 18 to 54 years and female-to-male distribution of 34–66%, respectively. Participants were either clinical (75 [64.66%]) or administrative (41 [35.34%]) employees. One-hundred participants (94.83%) preferred the presence of clear job description, and 101 (87.07%) preferred working with the presence of organizational chart. In addition, when participants were asked about the possibility of training employees for performing tasks other than their own qualifications, there was some uncertainty in answers (Yes [40.52%]; No [49.14%]; I Don't Know [10.34%]). There was a general agreement among the majority of participants that delegation of authority to lower-level employees is beneficial to the work environment (73.28%) and to the quality of provided dental services (78.45%), which is a more organic approach. When we asked our employees if they agree it is best to base workplace communication relationships on trust and cooperation and not on hierarchy and identified job description, the vast majority (81.90%) answered "Yes." In addition, informality of communication was the main preference for most participants (61.21%), reflecting their preference for the organic model in the communication aspect. ***Discussion/Conclusion:*** It is concluded that contingency and situational theories are more preferred in participants working in dental settings. Mechanistic structures, in terms of the presence of an organizational chart, defined job descriptions, and workers performing tasks appropriate to their qualifications, seem to be preferred with dental workers. Furthermore, there is general agreement that delegation of authority as an organic approach is beneficial for the work environment in dental settings and has a positive effect on employee loyalty. Finally, informal organic communication methods are preferred by dental workers.

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Introduction

Healthcare medical or dental organizations are complex in nature [1]. Management of these organizations faces challenges, as services provided are considered nonphysical and difficult to evaluate. Moreover, due to the nature of the targeted customers, which includes working on human bodies and initially uncomfortable patients, medical professionals face high stress working environments.

Since modern technology and industry are directly affecting cultural and social behavior, people's dependency on each other is eventually increased [2]. This leads directly and indirectly to the formation of today's different organizational shapes.

In the mechanization approach of management, the working system (structure, process, relations, and outcome) is designed as a machine. One of the reasons behind the development of this approach was to ensure that the individual will behave in a way that advances the organizational goals and objectives rather than their own [3]. Mechanization includes the presence of unity in commands, a clear scalar chain, a well-defined span of regulations (plan, organize, and control), and structured authorities and responsibilities in the form of organizational chart. In addition to that, stability of tenure of the personnel is dependent on the productivity and on how the employee is following the predetermined job description.

However, this approach has been described as bureaucratic, and this could create difficulty for an organization to adapt to the environmental changes. In addition, it has been found that certain aspects of this management approach can have dehumanizing effects upon employees, especially those at the lower levels of the organizational hierarchy [4]. This method is working very well in conditions where there is a straightforward task to be performed in a stable environment by compliant professionals, when one wishes to produce the same product over time and when precision is at a premium [4]. However, where the environment is not stable and where immediate actions and reactions are needed, machines are usually not expected to work well. In these cases, flexibility to adapt to situations is of higher importance. Such flexibility requires more satisfied workers arranged in a more even level of authority, with special concentration on their motivation. This organizational structure is named an organic approach.

Kanten et al. [5] investigated the effects of organizational structures and learning organization on job embeddedness and individual adaptive performance. They found that mechanistic organization structure affects job embeddedness positively, while it has no direct effect on individual adaptive performance. In addition, they found that learning organization affects both job embeddedness and individual adaptive performance positively. This reflects the importance of organizational structure and its effects on staff level.

When we understand organization as a socio-technical system, it will adapt better to the continually changing environment. This is referred to as an organization with an open system thinking approach of management. It is a method of self-leadership in which individuals effectively participate in the movement of an organization with their own strengths [6]. This leads to a decentralized structure of the organization and eventually to faster decision-making, lower overhead, and leaders who are more in touch with their followers [7].

It is important to understand both approaches, as different styles of management may need to be applied in different tasks within the same organization. To the extent of our knowledge, there are no data in the literature regarding adoption of organizational theory to dentistry-based organizations.

As a newly developed, large-scale dental referral center, it was important to start with using the mechanistic approach. Taking some determinants in our environment such as population needs, competitors, politics, regulations, threats, and opportunities, we defined our mission, vision, and values. This was followed by creating our organizational structure with defined positions and prescribed jobs. A strategic plan was established, and departmental vision and mission were defined with their objectives based on the center's goals, vision, and mission.

Once our center was established, we faced many challenges, as our approach to management did not define some tasks and processes. Strategies and objectives became less adaptive to environmental/socio/economical changes. Using problem-solving tools such as root cause analysis methodology, including the fish bone and five whys techniques, we came to the conclusion that there was a need for flattening the chart and instituting changes in the level of organizational structure. To solve this issue, we initiated multidisciplinary teams in the form of organized committees. This moved part of the center's processes toward an organic approach. The aim of our present study was to evaluate the application of both organizational structure approaches in the form of a questionnaire, which includes scenarios, and to review both organizational models.

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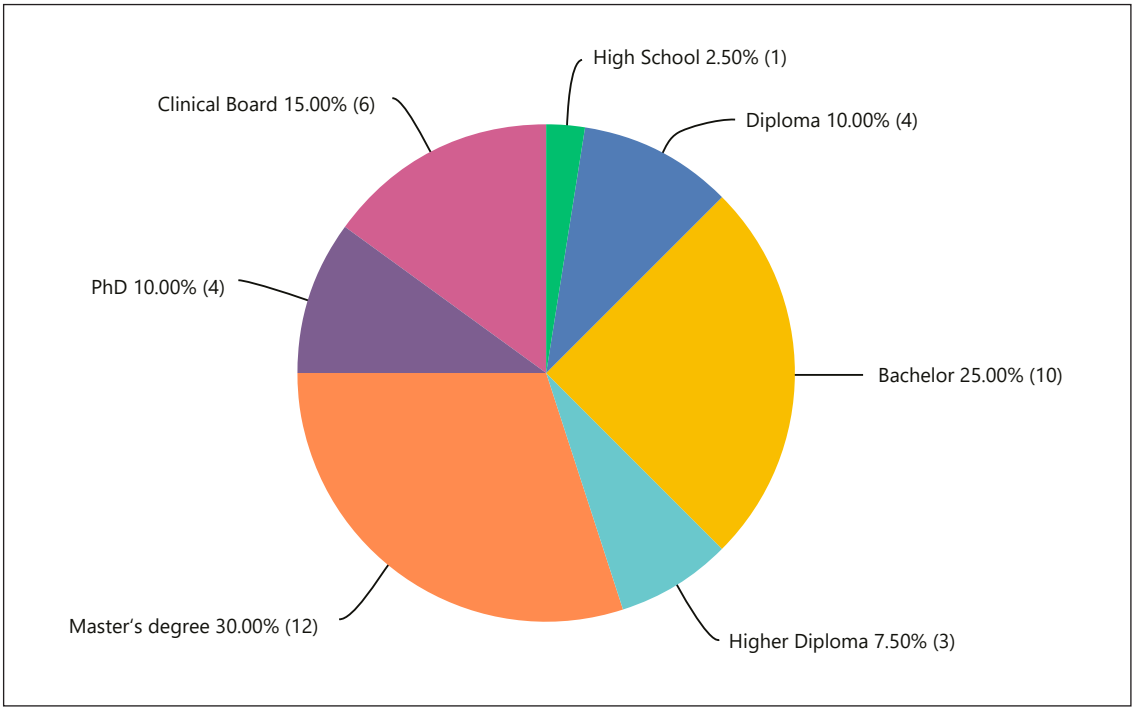

Fig. 1. Education levels of participants.

Materials and Methods

This is a cross-sectional, dental-facility-based survey. The study followed the American Association for Public Opinion Research reporting guidelines. Approval from the Regional Research Ethics Committee in Qassim was received before the initiation of this study. An electronically generated questionnaire was used and sent to the employees of the Regional Dental Center in Qassim (RDCQ) in a convenience sampling method that allowed one-time participation for each user. Electronic informed consent was provided by all survey participants prior to their enrollment. Participants could terminate the survey at any time they desired. The survey was anonymous, and confidentiality of information was assured. The survey was conducted from March 27th, 2022, to April 1st, 2022.

Study Participants

A total of 116 individuals participated in the study. All the participants were staff at the RDCQ, located in Buridah, Saudi Arabia. The center is a public healthcare facility with 50 dental clinics that occupies multidental specialties, a digital 3D radiology department, a dental prosthetic laboratory, an infection control department, a public health unit, the Central Sterilization Services Department, and a medical engineering department. Residents of different dental specialties and dental interns are also practicing within different scopes of service in the facility. In addition to clinical departments, different administrative units are present to support work processes within the facility including human resources management, quality and excellence in performance, compliance department, patient experience, communications (internal and external), change management, information technology, statistics and clinical audit log, self-resources and finance, safety and security, medical and nonmedical supports, supply, and maintenance.

Distribution of age, gender, jobs, and qualifications of participants were collected. The pretested questionnaire was bilingual in English and Arabic. The questionnaire contained 20 questions, using Yes/No/I Don't Know scaling style and covering the following domains: (1) demographic data; (2) organizational structure; (3) tasks and hierarchy (4) decision approaches; (5) method of communication; (6) readiness to change; and (7) knowledge about organizational structure models.

Statistical package for social sciences (SPSS) Version 22 was used to analyze the results. Descriptive statistics was used for the data analysis.

Results

Out of the 150 employees in RDCQ, a total of 116 individuals participated in this study, with a 95% confidence level and 5% margin of error. The response rate of the survey was 77%, which is quite acceptable. The female respondents were almost 32% and male 68%. The ages of participants ranged between 20 and 54 years and are distributed as shown in Table 1. Level of education ranged widely, from high school to doctorate degree (Fig. 1). The

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Table 1. Age groups within the sample

Years	*n*	%
20–30	18	15.52
31–40	64	55.17
41–54	34	29.31

majority of participants (95%) had a higher educational level (diploma, bachelor's degree, higher diploma, master's degree, PhD, clinical boards, and fellowships). More than two-thirds of the sample (69.36%) was younger than 40 years old, reflecting a young culture (Table 1). Thirty-nine of the participants (33.62%) were in a supervising position, while 77 participants (66.38%) had a nonsupervisory role.

Clinical participants (75 [64.66%]) were considered dental consultants/specialists, general practitioner dentist, or dental assistants. Nonclinical, administrative participants (41 [35.34%]) were those with jobs in human resources management, quality and excellence in performance, compliance, patient experience, communications (internal and external), change management, information technology, statistics and clinical audit logging, self-resources and finance, safety and security, medical and nonmedical supports, supply, and maintenance. The following are the main domains tested in the questionnaire (please refer to Table 2 for detailed questions and answers).

Organizational Structure (Q1–Q2) (Table 2)

When participants were asked if they prefer the presence of a job description and an organizational chart in the center, the majority answered by yes, (110 [94.83%]) and (101 [87.07%]), respectively.

Tasks and Hierarchy (Q3–Q5) (Table 2)

Most of participants preferred to distribute work tasks upon individual qualifications (73 [62.93%]). On the other hand, participants showed less certainty when they were asked if employees can be trained for tasks that are not related directly to their qualifications: Yes (47 [40.52%]); No (57 [49.14%]); I Don't Know (12 [10.34%]). Similarly, when participants were questioned if it is possible to standardize medical services, as in the situation with materialistic products: Yes (45 [38.79%]); No (39 [33.62%]); I Don't Know (32 [27.59%]).

Decision Approaches (Q6–Q9) (Table 2)

On the other hand, most of the participants support making decisions by committees that contain members from different specialties and administrative units: Yes (99 [85.34%]); No (10 [8.62%]); I Don't Know (7 [6.03%]). Furthermore, majority of participants believe that delegation of unlimited authority for every employee within his/her work specialty will positively affect the work environment (85 [73.28%]) and the provision of services to patients (91 [78.45%]). Moreover, 92 (79.31%) participants believe that restriction of an employee's authority is negatively affecting employee's loyalty to the workplace.

Method of Communication (Q10–Q11) (Table 2)

Ninety-five participants (81.90%) do agree to base workplace communication relationships on trust and cooperation and not on hierarchy and identified job description. However, when participants were asked about the method of communication and if they support the communication type between employees to be by official means, their answers were: Yes (71 [61.21%]); No (37 [31.90%]); I Don't Know (8 [6.90%]).

Readiness to Change (Q12) (Table 2)

When staff were asked about what they think of the upcoming organizational transformation and the positive effects on optimizing the work environment in dental centers, they showed uncertainty in their answers: Yes (63 [54.31%]); No (21 [18.10%]); I Don't Know (32 [27.59%]).

Knowledge about Organizational Models (Q13) (Table 2)

Finally, most of the dental participants (76 [65.52%]) had not heard about organizational structure models.

Discussion

Burns and Stalker's (1961) theory of organic and mechanistic structures is one of the most widely studied and applied management theories, and arguably one of the most successful constructs in modern organizational studies [8]. This cross-sectional, single-center survey conducted at the RDCQ, Saudi Arabia provides an appraisal of staff preferences toward mechanistic versus organic organizational models in dental services. Seven different domains were tested, including (1) demographic data; (2) organizational structure; (3) tasks and hierarchy; (4) decision approaches; (5) method of communication;

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Table 2. Questions and answers of questionnaire participants

Domain	Questions	Yes, *n* (%)	No, *n* (%)	I don't know, *n* (%)
Organizational structure	1. Do you prefer the presence of a job description that outlines the responsibilities of each employee?	110 (94.83)	3 (2.59)	3 (2.59)
	2. Do you prefer the presence of an organizational chart in the center, where it is not allowed to bypass the direct manager?	101 (87.07)	8 (6.90)	7 (6.03)
Tasks and hierarchy	3. Do you prefer to distribute work tasks in the center strictly upon individual qualifications?	73 (62.93)	35 (30.17)	8 (6.90)
	4. Do you think that employees can be trained for tasks that are not related directly to their qualifications?	47 (40.52)	57 (49.14)	12 (10.34)
	5. Do you believe that it is possible to standardize medical services, as in the situation with materialistic products?	45 (38.79)	39 (33.62)	32 (27.59)
Decision approaches	6. Do you prefer making decisions in the center by committees that contain members from different specialties and administrative units?	99 (85.34)	10 (8.62)	7 (6.03)
	7. Do you believe that delegation of unlimited authority for every employee within his/her work specialty will positively affect the work environment?	85 (73.28)	21 (18.10)	10 (8.62)
	8. Do you believe that delegation of unlimited authority for every employee within his/her work specialty will positively affect the provision of services to patients?	91 (78.45)	15 (12.93)	10 (8.62)
	9. Do you believe that restriction of an employee's authority is negatively affecting employee loyalty to the workplace?	92 (79.31)	17 (14.66)	7 (6.03)
Methods of communication	10. Do you agree to base workplace communication relationships on trust and cooperation and not on hierarchy and identified job description?	95 (81.90)	16 (13.79)	5 (4.31)
	11. Do you support the communication type between employees to be by official means (e.g., official emails, SAHAL panel, BAIN panel, and official writing)?	71 (61.21)	37 (31.90)	8 (6.90)
Readiness to change	12. Do you think that the upcoming organizational transformation, which includes privatizing the medical services, will optimize the work environment in dental centers?	63 (54.31)	21 (18.10)	32 (27.59)
Knowledge about organizational models	13. Have you heard before about mechanistic and organic organizational models?	17 (14.66)	76 (65.52)	23 (19.83)

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(6) readiness to change; and (7) knowledge about organizational structure models.

Contingency theories are those suggesting that there is not one best way to structure an organization. Instead, structure depends mainly on situational factors. For instance, Lawrence and Lorsch (1967) focus on differentiation and integration as a function of the external environment, while Thompson's (1967) model focuses on handling uncertainty, and Woodward's (1965) model refers to the structure that is contingent on production technologies [8–11]. However, in the present study, when we asked our participants directly if they prefer the presence of a clear job description and organizational chart, the answer was Yes for 110 participants (94.83%) and 101 (87.07%), respectively (Table 2). This preference for a general mechanistic structure may reflect the complex nature of dental services, where it forks and where it may overlap in certain areas. Currently, at the RDCQ, we use both an approved organizational chart and a clear job description for every individual.

Since medical sciences and services are fast-developing fields, more specialized professions are coming out. However, in healthcare systems, professionalism creates certain challenges. One of these is how best to ensure the consistent delivery of high quality and safe care to patients in a complex, multiprofessional care setting [12]. This could be attributed to the fact that care is delivered by a range of professionals with different distinct cultures, education, identities, workplace experience, and objectives, which leads to some inter- and intraprofessional boundaries. Such boundaries could negatively affect the intended patient-care delivery [13, 14]. However, to limit the impact of these challenges, certain solutions are suggested, such as expanding knowledge sharing between the healthcare provider team, [14] the use of "competitive power" and "collaborative power" in the negotiated order of health services [15], and by specialist team formation [12].

In our dental-based center, the majority of participants (73 individuals [62.93%]) preferred to distribute work tasks strictly based on employee qualifications (Table 2). However, there was no definitive conclusion about the possibility of standardizing the dental service regarding materialistic products, where 38.79% answered Yes, 33.62% answered No, and 32% answered I Don't Know (Table 2). In practice, the only way to standardize the dental work is by creating clinical pathways and application of scientific guidelines, which is less common in dental work compared to other clinical sciences.

On the other hand, when participants were asked about the possibility of training employees for performing tasks other than their own qualifications (Table 2), there was some uncertainty in answers (Yes [40.52%]; No [49.14%]; I Don't Know [10.34%]). However, in a research report released by the Health and Care Professions Council (2014), it was suggested that, rather than a set of discrete skills, professionalism may be better regarded as a meta-skill, comprising situational awareness and contextual judgment, and that the true skill of professionalism may be not so much in knowing what to do but when to do it [16]. Further analysis and testing about the applicability of such an approach in dental services is needed.

Another way to correct some limitations that result from professional differences and variety in qualifications is by creating organizational learning and self-correcting and development concepts. Organizational learning is the process of gaining knowledge through experience, leading to changes in behavior and thought within the organization [17]. In other words, organizational learning allows the organization to customize problem-solving techniques and to adapt to the dynamic changes that affect the organization based on its experience and evidence. Furthermore, it allows the transforming of individual knowledge and experience into organizational knowledge and experience [18]. Organizational learning is a continuous process that requires a complex, interconnected system where all members must have common background knowledge along with sharing the gained meta-knowledge [19].

According to the Department of Health report in 2000, both organizational culture and reporting systems constitute a barrier that can prevent active learning from taking place. This can be solved by creating a safety culture and nonblame reporting system [20].

As a large-scale referral dental center, our priority is to connect departments together under the umbrella of patient care. The RDCQ established a good reporting system to facilitate the single-loop learning. We are currently working hard to create a just culture that is encouraging and does not fault its members for reporting. To encourage the staff to report, the center director announced a good appraisal for the department that reports the most. This led to a higher reporting rate, demolished borders, and fair restrictions between the staff.

Zhao et al. [21] investigated the factors influencing medical professions willingness to report incidents voluntarily. Organizational trust was found to, directly and indirectly, affect the healthcare provider's willingness to report their own incidents. Compared with perceived

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risk, perceived benefit was a more important predictor for willingness of reporting and a more important mediator in the effect of organizational trust on willingness of reporting. This is consistent with the RDCQ center direction to appreciate and encourage the employees who tend to report more.

In addition, team sharing information was encouraged during multidisciplinary regular committee meetings. The quality department was facilitating and coordinating these meetings. On the other hand, certain challenges are still facing us in regard to organizational learning, and this includes resistance from senior-aged employees, employees who are closed and restricting themselves to their profession, the paper-based reporting system that slows the process of reporting, and the high turnover rate for center directors.

One of the pillars of the mechanistic model is to base authority on a hierarchic structure of control, causing operations and working behavior to be governed by decisions issued by superiors, and reinforcing the hierarchic structure exclusively at the top of the hierarchy, where the final reconciliation of distinct tasks and assessment of relevance is made [8]. Radević et al. [22] explored the role of knowledge transfer, hierarchical organizational structure, and trust as important organizational factors that influence knowledge management practices on the quality of healthcare services. They found a significant and positive relationship between knowledge transfer and quality of healthcare services, and a significant and negative relationship between hierarchical organizational structure and quality of healthcare services. In addition, trust is found to act as a moderator in the relationship between knowledge transfer and quality of healthcare services.

Hales et al. [23] examining the relationships among perceived autonomy and decision-making power in the organizational climate, and individual levels of organizational commitment and burnout over a 12-month period in public healthcare organizations. Their findings indicate that, staff member's commitment to the organization predicted future states of perceived autonomy and decision-making power. In addition, individual commitment to the organization may be a driving factor in how staff members experience and perceive the service environment, which is consistent to our finding.

In the present study, there was a general agreement between the majority of participants that delegation of authority to lower-level employees would be beneficial to the working environment (73.28%) and to the quality of provided dental services (78.45%) (Table 2), which leans toward an organic approach. In addition, more than two-thirds of participants (85.34%) preferred making decisions by committees that contain members from different specialties and administrative units. This is again supporting the preference of employees at dental-based services for an organic approach in the decision-making process. In addition, the vast majority of participants (79.31%) addressed the issue of restriction of authority in the mechanistic model negatively affecting their loyalty to their workplace (Table 2).

The organic model is characterized by a network structure of control, authority, and communication, and a lateral rather than a vertical direction of communication. When we asked our employees if they agreed to base workplace communication relationships on trust and cooperation and not on hierarchy and identified job description, the vast majority (81.90%) answered Yes. In addition, informality of communication was the main preference for most of the participants (61.21%), reflecting their preference toward the organic model in a communication aspect (Table 2).

Tekingündüz et al. [24] investigated the effect of the organizational trust, job satisfaction, and several personal characteristics (e.g., age, education status, gender) on the organizational commitment in healthcare organizations. They found that cognitive trust, communication, the structure of work, were the significant predictors of affective commitment, which is consistent to our findings.

Nowadays, there is a large, organizational transformation in the healthcare system in Saudi Arabia, and this includes privatization of the public healthcare system. Making a situational change causes many challenges in terms of vision alteration, employee resistance, funding limitations, and sometimes, slow progress. In addition, adapting to change and preserving wins are as important and challenged as creating the change.

As human beings, we are more comfortable when dealing with familiar situations and tend to be resistant to change [25]. However, organizational change is considered essential for short-term competitiveness and long-term survival [26].

Change is a complex process involving unfreezing of organization behavior, creating new behavior, and then refreezing again [27]. However, behavioral reaction to change from employees is expected since the process of change involves going from the known to the unknown.

Several factors have been identified by Kotter explaining why organizational change usually fails. These include allowing for too much complacency, poor commu-

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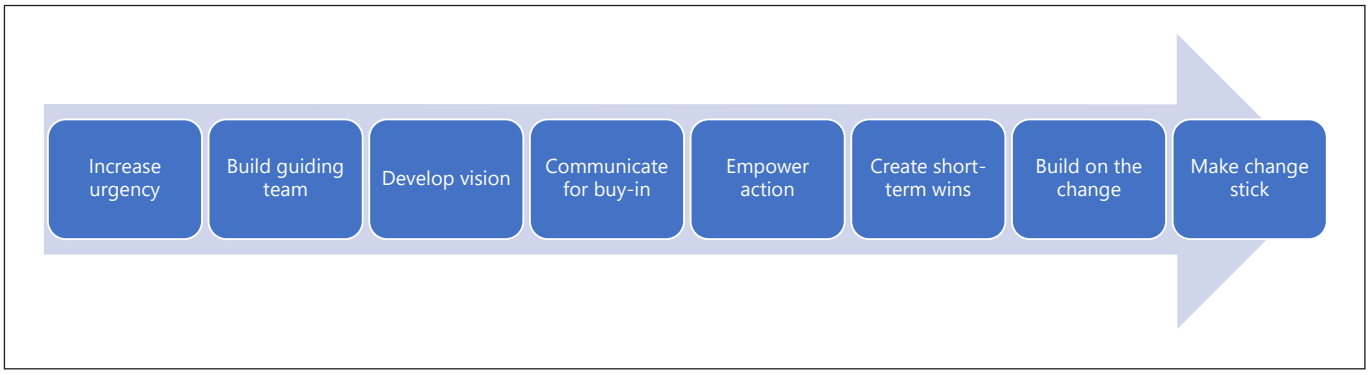

Fig. 2. Kotter's eight-stage model of change [28].

nication, not creating a sufficiently powerful guiding coalition, underestimating the power of vision, allowing obstacles to block the vision, failing to create short-term wins, announcing victory too early, and loosely anchoring changes in organization [28]. To manage the complex process of change, several models have been suggested in literature. At our dental referral center, we will follow Kotter's eight-stage model of change (Fig. 2) [28].

Leadership plays a major role for change to succeed. Staff preparation, sharing the vision, participating leadership, and understanding the "why"? are all essential elements to consider before implementing change. A good leader communicates change to the system. Leaders also influence employees effectively and motivate them to drive the change themselves. It is not leadership if the vision is only for top managers and decision makers. The vision should be communicated to every employee in an organization. Transferring the responsibility of change and uniting visions and goals to all levels of organization is leadership.

Employee engagement in the change process is vital for its success. When an employee believes that it is their battle, the change will succeed. This requires a high level of clear communication and commitment between all levels in the organization.

On the other hand, center's staff found to be uncertain about the upcoming organizational transformation and how it carries a positive effect on optimizing the work environment in dental centers. This emphasizes the need for more staff preparation for the upcoming organizational transformation.

In addition, as most of the dental participants (65.52%) had not heard about organizational structure models, this may reflect the gap of knowledge between dental staff and managerial sciences, which needs to be further evaluated and tested. Basic leadership and administrative training courses are suggested for incorporation into dental and medical education, which may lead to a higher level of management in healthcare systems, including dental.

Overall, from the present study and discussion of the current scientific literature, we recommend the following to leaders and policy makers in dental field:

- Well-structured organizational chart and defined job descriptions seem to be beneficial for dental-based organizations.
- Interdisciplinary committees are important for coordination between clinical and managerial department and should be available in dental-based organizations.
- It is important to apply an organizational learning and self-correcting concepts including the establishment of well-constructed reporting system with blame-free culture.
- To decrease variables in outcome and service, it is recommended to create clinical pathways and application of scientific guidelines.
- Delegation of authority seems to matter to workers in dental field which necessitate further analysis and evaluation.
- Organizational change management is important aspect in healthcare system and special tools (e.g., Kotter change management concept) can be applied for staff preparation.
- Leadership and administrative training courses are suggested for incorporation into dental and medical education.
- There is a need for more research about organizational models in dental field.

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Conclusion

It might be concluded that contingency theories are more preferred to participants working in dental settings where there is no single approach, neither organic nor mechanistic approach, fit for all situations and aspects. The mechanistic structure, in terms of the presence of an organizational chart, defined job descriptions, and workers completing tasks according to their qualifications, seems to be preferred among dental workers. Furthermore, delegation of authority as an organic approach is found to be beneficial for the working environment in dental settings and positively affects employee loyalty. In addition, informal organic communication methods are preferred by dental workers. Finally, there is a need for further application of change preparation, as it seems that workers are still not ready for the upcoming organizational transformation.

Statement of Ethics

Prior to starting the study, this study was reviewed and approved by the Regional Research Ethics Committee in Qassim Province (General Directorate of Health Affairs in Al-Qassim Region), approval number [607-43-1477]. Informed consent to participate was not directly obtained but inferred by completion of the questionnaire.

Conflict of Interest Statement

The authors have no conflicts of interest to declare.

Funding Sources

There is no funding or sponsorship for this research.

Author Contributions

Wesam Talal Alsalman (first author) created the research group, providing the main idea, study design, introduction, questionnaire design, literature review, statistics, discussion section, and communication with the Ethics Committee and journal. Saad Mulhi Alharbi (second author), Naif Sultan Almutairi (third author), Mohammed Brahim Almuzaini (fourth author), and Abeer Hani Albattah (fifth author) participated in the study design, introduction, questionnaire design, literature review, and discussion section.

Data Availability Statement

All data generated or analyzed during this study are included in this article. Further inquiries can be directed to the corresponding author.

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