

Organizational Culture and the Integrated Chronic Diseases Management Model Implementation Fidelity in South Africa

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Keywords: Denison Organizational Culture, Context, Implementation Research, Integrated Chronic Disease Management Model

Posted Date: December 27th, 2019

DOI: <https://doi.org/10.21203/rs.2.19656/v1>

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Abstract

Organizational culture could facilitate or impede the implementation of new interventions or policies. The Integrated Chronic Disease Management (ICDM) model was introduced in clinics across South Africa to strengthen delivery of care and improve clinical outcomes for patients with chronic conditions, but the determinants of its implementation have not been assessed. This study assessed whether organizational culture influences the fidelity of implementation of the ICDM model at primary health care (PHC) clinics in South Africa. The abbreviated Denison organizational culture survey tool was administered to 90 staff members to assess three cultural traits: involvement, consistency and adaptability of six PHC clinics in two health districts in South Africa. Each cultural trait has three indices with five items, giving a total of 45 items. The items were scored on a Likert scale ranging from one (strongly disagree) to five (strongly agree), and mean scores were calculated for each item, cultural traits and indices. Descriptive statistics were used to describe participants and clinics, and Pearson correlation coefficient to assess association between fidelity and culture. Participants' mean age was 38.8 (SD = 10.35) years, and 54.4% (49/90) were nurses. The overall mean score for the Denison organizational culture was 3.63 (SD = 0.58). The involvement (team orientation, empowerment and capability development) cultural trait had the highest (3.71; SD = 0.72) mean score, followed by adaptability (external focus) (3.62; SD = 0.56), and consistency (3.56; SD = 0.63). There was a weak, non-statistically significant negative correlation between fidelity level and organizational culture scores ($r = -0.117$; $p = 0.272$). There were no statistically significant differences in cultural indices and cultural traits scores between the six PHC clinics. However, culture scores were significantly different by health districts. Leadership intervention is required to purposefully align the organizational culture of clinics with their mission.

Introduction

There is often a gap or lag between the growing knowledge of efficacious evidence-based interventions and public health practice [1-3]. Implementation science closes this gap by examining the process of how new research findings or interventions are translated into routine practice (implementation), and how contextual and other factors affect implementation [2, 4]. Effective implementation of interventions is vital for achieving the intended outcomes [5]. Implementation is a purposefully specified set of activities constructed to accomplish the practice of an intervention or policy [2]. It is therefore important to understand how implementation effectiveness can be achieved through organizations and individuals that exist within multi-layered contexts, the possible challenges and strategies to navigate the complex process of implementation [5].

All the four phases (exploration, adoption, active implementation and sustainment) of implementation of a new intervention can be affected by factors relating to the intervention itself, the implementers, and the organizational context within which the intervention is applied [5]. The organizational contextual factors include leadership, policies, funding, communication style, decision-making processes and culture [5, 6]. Quality improvements, adoption and sustainment of new interventions needs to take into consideration these contextual factors as well as the required resources, skills, and receptive organizational climate and culture that are necessary for an organization to implement the changes [7]. The culture needs to be understood and purposefully shaped if necessary to perfect implementation of policies and interventions [8, 9].

Organizational culture is defined as the shared beliefs, values and behaviour that a group has adopted over a course of time as a way to survive and succeed [10-12]. Organizational culture can either hinder or support the implementation of new interventions or innovations [5, 13].

An enhanced understanding of the impact of organizational culture on the implementation of new interventions or policies would be useful to inform strategies for improving implementation effectiveness, and ultimately intervention effectiveness [10]. This understanding is important in South Africa where a new innovation, the integrated chronic disease management model (ICDM), a chronic care model was introduced in PHC clinics to improve health outcomes for patients with chronic diseases by integrating care delivery and improving operational efficiencies [14]. However, it remains unclear whether PHC clinics possess organizational cultures that are flexible and conducive to effective implementation of the ICDM model innovation.

Organizational culture and implementation of new innovations

Organizational culture has been described as a behaviour that is influenced by the structure and design of an organization and could have three (artefacts, values and assumptions) levels [15]. It is also regarded as a foundation for organizational management principles and practices [10]. Therefore, organizational culture assessments are important as they could assist leaders to understand the impact organisational culture may have on translating new interventions or policies into practice within their contexts and how to make the appropriate organisational cultural changes to improve implementation effectiveness [10, 13].

Items to assess prior to starting a new initiative could include whether the organizational culture is conducive to support successful implementation and if there is necessary initiative and participation of staff members [10]. A culture that is resistant to change could slow down the process and increase the costs of implementing a new intervention [16]. Whereas a culture that is receptive to new interventions usually has communications processes that promote openness to change and minimizes other competing demands [5, 16]. A positive culture is one of the contextual factors that accelerates organizational learning and improves the adoption of evidence-based practices [17]. Implementation effectiveness can affect the performance of an organization [17]. Leadership is critical in shaping the organizational systems and processes, culture and communication style to be aligned with the new proposed strategies and facilitate the adoption of new innovations [13]. In the healthcare sector, positive (collaborative, supportive, cohesive and inclusive) organizational culture has been associated with improved service outcomes indicated by patient satisfaction and quality of care [18]. Implementation of new interventions without understanding the cultural forces might have unpredicted or unwanted outcomes [19]. For example, a negative culture in an organization could make staff members have emotional burnout, become depersonalized and less innovative, which negatively affect implementation effectiveness of interventions [19, 20].

The integrated chronic diseases management model

The ICDM is a chronic care model that was introduced in three provinces in South Africa as a pilot implementation phase in 2011 [14]. In the current setting of the South African healthcare system context

where primary healthcare reengineering is a key focus, the ICDM model is amongst several PHC system strengthening strategies being followed to improve quality of services and patient outcomes [14]. The ICDM was introduced as a result of an increasing prevalence of non-communicable diseases (accounting for 51.3% of all deaths) in the background of an epidemic of communicable diseases like HIV/AIDS and Tuberculosis (TB) [21, 22], which resulted in a surge of multi-morbidity [23], to which a health system that is fragmented, inefficient and overcrowded is struggling to respond [24, 25]. The ICDM is an integral part of the ideal clinic initiative which started in 2013 as part of PHC re-engineering and evolved into the Ideal Clinic Realisation and Maintenance (ICRM) programme in 2014 – a programme supporting clinics to attain and maintain recommended standards for clinical and other dimensions of quality [26].

The ICDM model includes prescriptive guidelines on facility re-structuring to improve patient flow, clinical supportive management, strengthening of service delivery support systems and assisted self-management [14]. Other administrative recommendations under the ICDM model include booking of patients, design of waiting areas and consultation rooms and dispensing of medication [14]. All these are structural initiatives requiring leadership support and change of work routines. Effective management of chronic conditions like diabetes, asthma and heart failure has been enhanced by the chronic care models resulting in less adverse events and better health outcomes [27]. However, the effectiveness of the ICDM model has not been adequately demonstrated, necessitating the research on how efficiently it has been implemented.

Previous assessments have indicated that some of the factors that may affect the scale-up of this ICDM innovation are cultural factors such as lack of clinical leadership and negative attitudes and behavior of staff towards prescribed operational changes [28]. The objective of this study was therefore to apply the Denison model to understand the organizational culture of six PHC clinics that were pilot sites for the implementation of the ICDM model, and assess how culture could influence implementation effectiveness. The study uses existing data on fidelity as the marker of implementation effectiveness.

The Denison organizational culture model

There are different recommended models, tools, and approaches [15, 29], for culture assessment of an organization, each with varying foci, strengths and weaknesses [9, 29-31]. The Denison organizational culture (DOC) model seemed most appropriate for this study on examining the organizational culture of primary healthcare (PHC) clinics in South Africa, and impacts of culture on implementation of a new intervention, the ICDM model. The DOC model approach is appropriate as it focuses on linking the culture to the organization's objectives and performance indicators like quality and effectiveness [10, 11, 15, 29, 32]. The DOC model has been validated and applied previously on organizations with different sizes and industries [33]. The DOC survey has also been used previously in a South African healthcare context, and it's easy to implement and applies to all levels (executive management to workers) of an organization [29, 32].

The DOC model and survey tool was developed following research into various sectors and companies of different sizes, to assess four interrelated cultural determinants (traits) that have been linked to bottom-line performance indicators like quality, profit and effectiveness [10, 11]. The four (mission, adaptability, involvement and consistency) cultural traits that Denison describes as affecting the organization's sustainability and long-term effectiveness are as follows [10, 11]:

- *Mission*: Long-term strategic intent and direction with clear objectives
- *Adaptability*: The organization's ability to understand the needs of their customers and to respond to the external environment changes in an innovative way
- *Involvement*: Building empowered, collaborative employees that have a sense of ownership and responsibility
- *Consistency*: Common set of core values are communicated and reinforced

In the DOC model, successful organizations are the ones that have strengths in all the four cultural traits [10, 11]. Although overall balance in all the traits is the objective, the results of the DOC survey can also be utilized to build on a particular area of the culture [10, 11] depending on the objectives of the organization at a specific time.

Methods

Study design and setting

This was a cross-sectional study conducted in six PHC clinics in two health districts in South Africa between November 2018 and August 2019, Dr. Kenneth Kaunda (DKK) in North West Province and West Rand (WR) in Gauteng province. This study was part of a larger study assessing the fidelity and costs of implementing the ICDM model in South Africa [34].

There are fifty-two health districts across the nine provinces in South Africa, and although the planning supervision and administration is supposed to be decentralized to districts, management is still very centralized with decision making at national and provincial level [35]. Both study districts were pilot sites for the ICDM model since 2011. Both districts provide primary care services ranging from community-based, through PHC clinics, to district hospital platforms (Table 1). PHC clinics usually provide primary care services 8–12 hours a day, and managed by facility managers (commonly with a nursing training) who are accountable to the health district management [35].

Table 1
Characteristics of High, Moderate and Low Implementation Fidelity Clinics

Variable	All clinics	High Fidelity	Medium Fidelity	Low Fidelity	P-value
Participants' Demographics	N = 90	N = 30	N = 30	N = 30	
Females (N; %)	78 (86.7)	25 (83.3)	28 (93.3)	25 (83.3)	0.421
Age (Mean; SD)	38.8 (10.35)	39.4 (9.38)	38.7 (12.07)	38.6 (9.73)	0.951
Years in this role (Mean; SD)	6.4 (6.26)	6.03 (6.45)	7.0 (7.19)	6.2 (5.12)	0.810
Role (N; %)					
Nurses	49 (54.4)	15 (30.6)	17 (34.7)	17 (34.7)	
Administrators	18 (20.0)	7 (23.3)	6 (20.0)	5 (16.7)	
Other support staff	23 (25.6)	8 (26.7)	7 (23.3)	8 (26.7)	
Clinic Characteristics					
	N = 6 clinics Mean (SD)	N = 2 clinics Mean (SD)	N = 2 clinics Mean (SD)	N = 2 clinics Mean (SD)	
Personnel					
Nurses	10 (5.67)	6 (1.41)	8 (4.24)	16 (6.36)	0.231
Medical Officers (generalist doctors)	2 (1.63)	1 (0.00)	3 (2.82)	1 (0.00)	0.465
Administrative staff	5 (3.08)	3 (1.41)	7 (4.95)	4 (2.83)	0.619
Ratio: head counts per Nurse	410 (179.21)	532 (281.7)	423 (75.1)	274 (92.61)	0.445
Ratio: headcounts per Doctor	2847 (1250.14)	2992 (938)	1597 (1108)	3953 (308.3)	0.150
Patient Consultations					
Total PHC consultations per month	3389 (825.31)	2992 (938)	3224 (1194)	3953 (308)	0.592
Patients > 20 years per month	2420 (592.47)	1994 (656)	2372 (697)	2895 (142)	0.390
Adults in care for HIV/AIDS	1724 (744.89)	1490 (1113)	1605 (657)	2077 (846)	0.797
New TB diagnosis per month	6 (4.91)	3 (1.65)	4 (1.53)	11 (6.36)	0.233
Diabetic patient consultation per month	88 (39.21)	81 (24.28)	126 (41.60)	56 (17.32)	0.199
* Max = maximum possible fidelity score. # Statistically significant at the 0.05					

Variable	All clinics	High Fidelity	Medium Fidelity	Low Fidelity	P-value
Hypertensive patient consultations per month	385 (207.32)	294 (71.06)	617 (212.60)	244 (24.87)	0.115
Mental Health patients in care	98 (68.59)	15 (9.19)	147 (45.25)	133 (16.26)	0.330
ICDM Implementation Fidelity score					
Facility Re-organization (max: 37)	27.7 (2.16)	28.0 (1.41)	28.5 (2.12)	26.5 (3.54)	0.735
Clinical Supportive Management (max: 39)	28.8 (5.81)	35.0 (2.83)	28.0 (1.41)	23.5 (4.95)	0.920
Assisted Self-Management (max: 39)	32 (4.24)	36.5 (0.71)	30.5 (4.95)	29.0 (1.41)	0.164
Strengthening of Support Systems (max: 43)	32 (4.38)	35.5 (2.12)	33.5 (2.12)	27.0 (2.83)	0.075
Overall Fidelity score (max: 158)	120.5 (13.05)	135.0 (1.41)	120.5 (0.71)	106.0 (2.83)	0.001 [#]
* Max = maximum possible fidelity score. # Statistically significant at the 0.05					

As part of the ideal clinic initiative, PHC clinics in South Africa are assessed against multiple service provision and quality standards, and can receive a maximum score of 100% [26]. In the ICRM programme clinics that score $\geq 90\%$ are considered platinum; $\geq 80\%$ gold; $\geq 70\%$ as silver and those that score below 70% as not achieved ideal clinic status [26]. Over the years, there has been a steady increase in clinics that have been assessed and those that scored 70% or above increased from 139 to 513 by 2016 [26].

Sampling and study participants

The six PHC clinics were selected from the sixteen clinics included in our broader study analyzing the fidelity of implementation (FOI) and cost of implementing the ICDM model [34]. As part of the broader study, we measured FOI at clinics, and categorized them into one of three groups: high (gold, fidelity score $\geq 80\%$), medium (silver, $\geq 70\%$, $< 80\%$), and low (not achieved, $< 70\%$) level of FOI following the ICRM programme guidelines [26]. For the organizational culture assessment for this paper, we randomly selected two clinics each (with comparable monthly patient loads) from the high, medium and low level of FOI categories. Two clinics (one high and one medium FOI score) were based in West Rand and four (one high, one medium and two low FOI score) in Dr. Kenneth Kaunda health district.

At each of the six clinics in our sample, the clinic staff members that were involved in the implementation of the ICDM model were eligible for enrollment if they had worked in the study clinic for more than six months and were willing to provide written informed consent for participation. All staff members that offer services (administration, adherence support, clinical care and allied health services) to patients with chronic diseases

were approached in person to request their participation in the study. We purposively recruited 90 clinical and administrative staff members, 15 per clinic.

Data collection

An abbreviated DOC survey tool was used to collect data on the participants' rating of the cultural traits of their respective facilities, with only three of the four cultural traits in Denison's framework were assessed in our study. The mission trait of the DOC framework was not included as long-term strategic and vision development are outlined at district and provincial departments of health levels, not a PHC clinic level. The abbreviated DOC survey tool used in our study therefore assessed the three cultural traits: involvement, consistency and adaptability (Figure 1), with each trait comprising three indices [10, 11, 15].

Involvement. The three cultural indices of involvement are empowerment, team orientation and capability development. A high level of empowerment in an organization indicates that employees have a greater sense of ownership and authority to initiate and manage the work. A team-orientated organization values working cooperatively to complete tasks. Capability development includes investment in developing staff members' skills to give the organization a competitive advantage.

Consistency. Core values, agreement, and coordination and integration are the three cultural indices under the consistency cultural trait. The core values give employees a clear set of expectations and could make it easier to agree on crucial matters. An organization that has a high level of coordination and integration is simple to bring staff members from different units to work together.

Adaptability. The three cultural indices under the adaptability trait are creating change, customer focus and organizational learning. An organization that has a high score of adaptability is innovative, constantly reviewing the environment and responding appropriately while anticipating upcoming changes. This also includes understanding the customer current and possible future needs and flexibility to change processes and crucial behavior if necessary. The adaptability cultural trait has an external focus.

Each of the three indices has five items, giving a total of 45 items for our abbreviated Denison scale. Each item is presented as a statement scored on a Likert scale ranging from one to five, with one being strongly disagree and five being strongly agree. The statements are in simple everyday language, yet provide a comprehensive analysis of the organizational culture by assessing the underlying cultural traits and management [10].

In addition, we collected data on the clinic characteristics such as personnel by category, monthly patient headcount for a period of six months and ratio of nurse or medical officer to the patient headcount. The number of patients that consult for chronic diseases (HIV/AIDS, hypertension, diabetes, mental health) per month over the same period and new cases of Tuberculosis diagnosed per month was included to compare workloads of clinics. Existing data on FOI of the ICDM model was used to compare the overall level of fidelity and on the four (facility re-organization, clinical supportive management, assisted self-management and strengthening of support systems) major components of the ICDM model.

Interpretation of results: The guidelines provided in the literature on the DOC survey [10, 11, 33] were followed in the interpretation of the results of the survey. The focus of the DOC model is to link organizational culture scores and key performance indicators like innovation, quality, and employee and customer satisfaction [11]. For example, high scores on involvement and consistency indicate the strength of internal focus and that the organization has quality operations and high employee satisfaction [11]; while high scores in adaptability and involvement demonstrate a flexible organization that is innovative and strives to understand the external environment and meet the needs of their clients [11]. Therefore the DOC survey results can be linked to the organizations' goals to identify gaps that need to be addressed [11].

Data were collected by trained research assistants interviewing the 90 participants using the paper-based abbreviated DOC survey from August 2018 to August 2019. The research assistants explained the study, the survey tool, interviewed participants and manually completed the survey tool. All interviews were conducted in English and or Zulu/Sotho/Tswana. A few of the participants requested to complete the survey on their own.

Data management and analysis

The collected data was captured into a REDCap electronic database [36]. As part of the data quality management plan, data were checked for missing variables, obvious discrepancies and incorrect data. The data was exported from REDCap into excel and Statistical Package for Social Science (SPSS version 25 Inc.) for analysis [37]. Descriptive statistics (means, standard deviations and proportions) were calculated to describe the demographics of the participants and clinics' characteristics. Six questions in the survey tool were negatively worded [33] and the scores for those questions were reversed prior to analysis. The abbreviated DOC score was determined by calculating the mean score from the three cultural traits scores. Mean scores and standard deviations (SD) were used to describe the overall PHC clinic organizational culture score and mean scores for each of the three traits. The Pearson correlation coefficient was calculated to measure the association between DOC scores and the degree of FOI of the ICDM model. In addition, clustered univariate and multivariate modeling was conducted to assess the risk factors for low culture scores. We utilized the independent sample t-test, chi-square, and the one way ANOVA to assess for statistically significant differences in clinic characteristics, participants demographics and DOC scores between clinics with high, medium and low ICDM model FOI scores. The level of significance was set at 0.05. The *Cronbach's alpha* test was calculated for three cultural traits and nine cultural indices.

Ethical approvals

This study was approved by the human research ethics committee. The participants provided individual written informed consent. Each facility and participant were allocated a study identification number and no identifiers were included in the electronic password-protected database.

Results

Characteristics of clinics and participants demographics

Of the 90 staff members enrolled in the abbreviated DOC survey and interviewed, almost half (49/90; 54.4%) were nurses. Others were administrative personnel (data capturers, administrators) (18/90; 20%) and counselors/health promoters/support staff (23/90; 25.6%). These participants had been working in their roles for a mean of 6.4 (SD = 6.26) years. The mean age of the participants was 38.8 (SD = 10.35) years, and 86.7% (78/90) were females (Table 1), and there were no significant differences in the demographics of participants across the three clinic categories by FOI. A mean of 2420 (SD = 592.47) patients above 20 years received healthcare services per month per clinic. There were no significant differences in the number of personnel and ratio of nurse or medical officer to patients between clinics with a high, medium or low FOI scores (Table 1). However, the overall implementation fidelity of the ICDM model was significantly different ($p = 0.001$) with the one-way ANOVA test. Further analysis indicated that the difference was significant between the high and low fidelity ($p = 0.002$) and between the low and the medium, as well as the high and medium ($p = 0.013$), fidelity level clinics.

Denison organizational culture scores

Cultural Traits: The *Cronbach's alpha* test of reliability for the overall survey was 0.94. The *Cronbach's alpha* test for involvement was 0.89; while for consistency was 0.86 and adaptability was 0.81. The overall mean DOC score was 3.63 (SD = 0.58). The involvement cultural trait had the highest mean score (3.71; SD = 0.72), followed by adaptability (3.62; SD = 0.56) and consistency (3.56; SD = 0.63).

Interpretation: A high involvement score might signify that the workers understand the connection between their work and the objectives of the organization. The overall pattern of the DOC survey for the six clinics shows an organization that has a balanced both the internal (involvement and consistency) and external (adaptability) focus.

Cultural Indices: The top three mean scores on the indices of the DOC survey (Table 2) were on team orientation (3.88; SD = 0.90), core values (3.79; SD = 0.68) and empowerment (3.76; SD = 0.89). The lowest three mean scores were on creating change (3.44; SD = 0.76), agreement (3.44; SD = 0.80) and coordination and integration (3.45; SD = 0.78). Capability development (3.47; SD = 0.74) was the lowest under involvement trait. Customer focus (3.67; SD = 0.66) scored lower than organisational learning (3.75; SD = 0.65) under the adaptability cultural trait. Core values scored higher (3.79; SD = 0.68) than agreement (3.44; SD = 0.80) under the consistency trait. The *Cronbach's alpha* test of reliability for the nine cultural indices ranged from 0.58 to 0.82 (Table 2).

Table 2

The Abbreviated Denison Organizational Culture Scores: Comparing high, medium and low ICDM model implementation fidelity in PHC Clinics

Cultural Traits	Culture Indices	Overall mean scores for all PHC Clinics		Level of implementation fidelity of the ICDM model						p-value
				High PHC Clinics N = 30		Medium PHC Clinics N = 30		Low PHC Clinics N = 30		
		Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Involvement	Empowerment ($\alpha = 0.82$)	3.76	0.89	3.66	0.96	3.65	0.84	3.99	0.84	0.246
	Team Orientation ($\alpha = 0.82$)	3.88	0.90	3.95	0.89	3.64	1.05	4.05	0.68	0.177
	Capability Development ($\alpha = 0.58$)	3.47	0.74	3.49	0.69	3.35	0.71	3.57	0.83	0.533
	Overall Involvement Cultural Trait ($\alpha = 0.89$)	3.71	0.72	3.70	0.77	3.55	0.74	3.87	0.64	0.228
Consistency	Core Values ($\alpha = 0.67$)	3.79	0.68	3.72	0.71	3.65	0.68	4.01	0.60	0.098
	Agreement ($\alpha = 0.72$)	3.44	0.80	3.46	0.86	3.30	0.93	3.56	0.58	0.453
	Coordination and Integration ($\alpha = 0.74$)	3.45	0.78	3.41	0.92	3.53	0.67	3.43	0.74	0.818
	Overall Consistency Cultural Trait ($\alpha = 0.86$)	3.56	0.63	3.53	0.74	3.49	0.65	3.66	0.50	0.548
Adaptability	Creating Change ($\alpha = 0.72$)	3.44	0.76	3.39	0.83	3.37	0.73	3.55	0.72	0.595
	Customer Focus ($\alpha = 0.59$)	3.67	0.66	3.70	0.62	3.67	0.70	3.63	0.67	0.926
	Organisational Learning ($\alpha = 0.58$)	3.75	0.65	3.63	0.65	3.81	0.62	3.80	0.67	0.490

*SD – Standard deviation α = Cronbach's Alpha Reliability Coefficient

Cultural Traits	Culture Indices	Overall mean scores for all PHC Clinics		Level of implementation fidelity of the ICDM model						p-value
				High PHC Clinics N = 30	Medium PHC Clinics N = 30	Low PHC Clinics N = 30				
	Overall Adaptability Cultural Trait (α = 0.81)	3.62	0.56	3.58	0.59	3.62	0.56	3.66	0.55	0.839
	Overall Denison organisational culture (α = 0.94)	3.63	0.58	3.60	0.66	3.55	0.59	3.73	0.50	0.476
*SD – Standard deviation α = Cronbach's Alpha Reliability Coefficient										

Comparison between high, medium and low FOI clinics: The low FOI clinics attained higher scores on all the three cultural traits, involvement (3.87; SD = 0.64), consistency (3.66; SD = 0.50) and adaptability (3.66, SD = 0.55). The high FOI clinics mean scores were higher for involvement (3.70; SD = 0.77 vs 3.55; SD = 0.74) and consistency (3.53; SD = 0.74 vs 3.49; SD = 0.65) compared to the medium FOI clinics. The differences on mean scores of cultural traits between the three groups of clinics were not statistically significant. When comparing the PHC clinics' Denison organizational cultural indices, the low fidelity level clinics had higher scores on three (team orientation, core values and empowerment) indices compared to the medium and high-fidelity clinics (Table 2). The lowest three indices scores were under the medium FOI clinics as follows: agreement (3.30; SD = 0.93), capability development (3.35; SD = 0.71) and creating change (3.37, SD = 0.73). Customer focus cultural index was scored as one of the highest indices in the high FOI clinics. The cultural indices survey results were also not statistically different between the three sets of clinics (Table 2). Moreover, the overall pattern of the organizational culture of the three sets of clinics is similar, with features like the lower score on capability development compared to empowerment and team orientation under involvement trait and core values attaining a higher score than agreement and coordination and integration under consistency trait.

Pearson's correlation coefficient: There was a weak negative correlation between the overall FOI of the ICDM model and the DOC scores ($r = -0.117$; $p = 0.272$). A similar association was also observed with facility re-organization ($r = -0.114$; $p = 0.287$), clinical supportive management ($r = -0.184$; $p = 0.083$) and strengthening of support systems ($r = -0.123$; $p = 0.247$) fidelity scores and culture scores. However, there was a weak positive correlation between fidelity scores on assisted self-management and DOC mean scores ($r = 0.076$; $p = 0.474$)

Comparison between the two health districts: At the health district level, there were statistically significant differences on all three (involvement, consistency and adaptability) cultural traits (Table 3). Consistency cultural trait scored the lowest in both health districts. When comparing the DOC indices mean scores across the two health districts, DKK health district had higher scores on all the nine indices, and the difference was statistically significant on creating change, core values and team orientation (Figure 2). In both health districts, agreement scored lower than coordination and integration and core values under the consistency cultural trait.

The highest scoring cultural indices in WR were customer focus (3.65; SD = 0.64), organisational learning (3.51, SD = 0.56) and core values (3.49, SD = 0.77) while in DKK it was team orientation (4.1, SD = 0.70), core values (3.94; SD = 0.57) and empowerment (3.92; SD = 0.76). Controlling for gender, age and role, the clustered multivariate analysis showed that clinics in WR health district are associated with lower mean organizational culture scores compared to clinics in DKK health district (Table 4).

Table 3
The Abbreviated Denison Organizational Culture Traits Mean Scores
Results compared between the two health districts

Cultural Traits	WR Health District N = 30		DKK Health District N = 60		p-values
	Mean	SD	Mean	SD	
Involvement	3.39	0.87	3.84	0.60	0.011*
Adaptability	3.40	0.54	3.73	0.54	0.007*
Consistency	3.34	0.77	3.68	0.52	0.034*
*Statistically significant at the 0.05 level					

Table 4
Clustered univariate and multivariate analysis of the factors associated with Denison
organizational culture mean scores

Variable	Univariate		Multivariate	
	Est (SE)	p-value	Est (SE)	p-value
Overall Fidelity Score	-0.006 (0.008)	0.499		
District: WR vs. DKK	-0.381 (0.083)	0.010	-0.379 (0.082)	0.010
Age	-0.0002 (0.006)	0.971		
Gender: Female vs. Male	-0.030 (0.178)	0.874	-0.048 (0.175)	0.793
Role: Clinical vs. Non-Clinical	0.008 (0.123)	0.952		

Discussion

This study provides timely information on the organizational culture of six PHC clinics that were assessed for the implementation fidelity of the ICDM model and how culture could have affected the implementation fidelity of this intervention. Organizational culture improvements are the focus of many healthcare organizations [8]. The abbreviated DOC survey results showed that the strongest cultural trait was involvement, and adaptability and consistency scored the lowest. The highest scoring cultural indices were team orientation, core values and empowerment and the lowest were creating change, agreement and coordination and integration. In the involvement trait, capability development scored the lowest compared to empowerment and team orientation. Core values scored higher than coordination and integration, and agreement under the consistency cultural

trait. Creating change was the lowest scoring index under adaptability trait, compared to customer focus and organizational learning. Organizational learning scored the highest in the low and medium FOI clinics. There was a weak negative correlation between organizational culture and the degree of FOI of the ICDM model. Although the low FOI clinics had higher scores on three of the indices, there were no statistically significant differences in mean scores of cultural traits and indices between the clinics that had low, medium and high FOI of the ICDM model. However, there were some statistically significant differences between the two health districts' on all three cultural traits (involvement, consistency and adaptability) and indices (creating change, core values and team orientation). WR district was associated with lower mean culture scores.

The strongest cultural trait in these six clinics that participated in the study was involvement, adaptability and consistency had lower scores. Involvement cultural trait covers empowerment, team orientation and capability development. These are indispensable cultural strengths for an organization that is aiming to improve the performance indicators and quality of services [33]. Employee involvement has been positively associated with a large number of significant changes in quality care improvements and chronic illness management as engaged employees collaborate, perform at a higher level and are innovative [9, 38]. A qualitative study on constraints for adopting health innovations into practice indicated that the hierarchical culture of the South African health system does not support innovation and creating change at facility level [39]. Creating change cultural index also obtained a low score in this study. Decisions on what new innovative interventions to be introduced are usually concluded at higher (district and provincial) management level with very little bottom-up communication or consultation [39]. Adaptability cultural trait is a critical strength in an organization that's undergoing a transformation [11], and this trait would need to be fortified in these PHC clinics as part of the primary healthcare reengineering. Adaptability cultural trait is even more crucial in this setting as the proposed changes under the ICDM model support customer focus and coordination and integration.

In the six clinics that participated in this study, team orientation, core values and empowerment scored the highest on the DOC survey. A lower score for capability development compared to empowerment and team orientation might indicate that some employees in the PHC clinics are making decisions that they may not be capable of making and comply with team dynamics without much commitment and ownership [11]. A high level of teamwork and involvement were also observed in another study that assessed organizational culture in an HIV program, and this protected the staff members from burnout, emotional exhaustion and depersonalization [20]. In a study on organizational values and culture of primary healthcare services in Cape Town, South Africa, the cultural values that were aligned with primary healthcare reengineering were teamwork and community partnership [40].

The lowest scoring indices were creating change, agreement and coordination and integration in our study. A higher score for core values compared to agreement (under the consistency trait) might imply that even if the organization has good intentions, the leadership is unresponsive to employees' concerns [11]. In the adaptability cultural trait organizational learning scored higher than customer focus, which suggests that the organization might be excellent at recognizing best practices and creating new guidelines but unable to translate this knowledge into routine practice [11]. An ideal organizational culture in the healthcare sector is one that emphasizes patient-centered care (customer focus) and fosters less emphasis on profits [8]. A supportive cultural environment that is characterized by team orientation, customer orientation, collaboration

and sharing of information was the most desired cultural trait by staff members over-emphasis on rewards cultural qualities in a PHC setting in Cyprus [41].

Capability development scored the lowest compared to empowerment and team orientation in the involvement trait. Although empowerment and team orientation are important organizational culture strengths, capability development is also essential to enhance staff skills and engagement in the implementation of new changes in an organization [42]. In the consistency cultural trait, core values scored higher than coordination and integration, and agreement.

Customer focus was scored lower in the medium and low FOI clinics compared to high FOI clinics. Patient experience was also observed to have a low organizational value in primary healthcare service in Cape Town metro [40]. The employees in private health facilities in South Africa have been reported to view customer focus as the strongest cultural index of their organization and scored coordination and integration and empowerment lower [29]. The organizational culture in the private health sector is different from the public health sector in that the customer focus was scored higher than the organizational learning and creating change, which might denote that the sector understands the current needs of their customers but is not anticipating and preparing for future changes in the external environment [10, 29]. The inference from this survey as perceived by other researchers is that South Africa has adequate legislature and guidelines to provide quality health services, but governance and stewardship need to be improved to achieve these good intentions [24, 43]. The implementation fidelity of the ICDM model would have been facilitated by a culture that is customer-focused as the objectives of the model are to improve patient satisfaction with the service and their health outcomes [14]. Similarly, it is also a good intervention to introduce to organizations that have low coordination and integration cultural index.

There were no statistically significant differences in mean scores of cultural traits and indices between the clinics that had low, medium and high implementation fidelity of the ICDM model, although the low fidelity clinics had three higher scores. In another study on organizational culture conducted amongst staff members from 42 PHC facilities, the differences on predominant cultural dimensions were observed between gender groups, years of experience in their role and not at clinic level [41]. Gender, age and role were not correlated with DOC survey results in this study. The consistent cultural traits scoring between the clinics that had low, medium and high implementation fidelity of the ICDM model might also be an indication of the impact of central management of PHC facilities by the health district leadership [35]. When comparing the DOC survey results between the two health districts, there were statistically significant differences in all the three cultural traits and three indices (creating change, core values and team orientation). Desired and experienced cultural values were noted to be similar for healthcare workers based in two health districts in a Botswana study [44].

Many healthcare organizations have commenced organizational culture enhancements and purposefully influence the cultural environment to be conducive to effective implementation of policies and interventions [8, 9]. For example, a two-year "Leadership Saves Lives" intervention that aimed to support hospitals to improve their culture and promote learning, psychological safety, commitment and senior management support have resulted in improvements in the use of evidence-based strategies and better health outcomes [17]. Adherence to clinical guidelines on treating tobacco use in a PHC setting was shown to be associated with "group" (human resource development) and hierarchical (stable) cultural context [45]. In our study setting, any

interventions that promote organizational cultural changes will need to include the district leadership and not just focus at the PHC clinic level. Cultural changes also require a high level of leadership support to foster the new mission and provide the necessary resources to implement the change [42]. There is evidence that cultural changes are feasible and sustainable especially if the vision is aligned with actions, the change implementation is collaborative and small-scale at a time [42]. Some of the recommendations for organizational change in the study clinics to promote effective implementation of the ICDM model could include an emphasis on customer feedback processes and rewarding staff members that demonstrate patient-centered care as part of improving customer focus. A participatory management style has also been recommended as another strategy to facilitate bottom-up communication and consultation and innovations adoption [39].

Strengths and Limitations

The strength of this study is that it addresses an evidence gap from low and middle-income countries by describing the organizational culture of the PHC clinics under the government sector in South Africa. This will contribute to the knowledge of how the public health sector culture might affect the implementation of new interventions. Some of the limitations of the study are that the research was conducted in only six PHC clinics, with a few purposively selected staff members which might be an under-representation of PHC clinics and healthcare workers. The survey was conducted with employees while at their place of work. Although attempts were made to conduct them within their places of work where there was privacy, the risk of social desirability bias could have influenced responses. Lastly, the results from these clinics were not compared to other organizations within the large DOC global database as recommended [11] due to costs.

Conclusion

This is a timely study that provides more understanding of the organizational cultural environment in PHC clinics that are the focus of healthcare system reform. The strongest organizational cultural trait in these clinics was involvement, while consistency and adaptability were their weaker cultural traits. Overall, the clinics' culture had more internal than external focus, and need improvement on customer focus, capability development and coordination and integration. There were no significant differences in cultural traits between the clinics that had a low, medium and high level of implementation fidelity of the ICDM model. Nonetheless, organizational learning scored higher in the medium and high implementation fidelity clinics. However, there were differences in the results of the culture by the health districts.

The leadership of the clinics (at facility and district levels) need to explore ways of engaging the patients and staff members on how to purposefully shape the culture to improve healthcare services. The weaker cultural traits that need enrichment are customer focus, capability development, and coordination and integration to make the context more conducive for the implementation of an intervention like the ICDM model that promotes coordinated, integrated, patient-centered care. The results of this study can also be used to set targets for improvements on organizational cultural traits and indices that are essential as the South African healthcare system is being reformed in preparation for the implementation of the national health insurance.

Declarations

Ethics approval and consent to participate: Ethics approval for this study was obtained from the University of Cape Town (Ref: 127/2018) and the University of the Witwatersrand (Ref: R14/49) Human Research Ethics Committees. The Gauteng and North West Provincial departments of health also provided administrative approvals. Each of the healthcare workers interviewed provided written informed consent to participate in the study.

Consent for publication: Not Applicable

Availability of data and materials: The data on Organizational Culture and the Integrated Chronic Diseases Management Model Implementation Fidelity in South Africa is available on Figshare [46], via the following URL: <https://doi.org/10.6084/m9.figshare.11365721.v2>

Competing Interests: The authors have no conflict of interest to declare.

Funding: This work was supported by the South African Medical Research Council (SA MRC) under a Self-Initiated Research Grant (grant number: 494184). The views and opinions expressed are those of the authors and do not necessarily represent the official views of the SA MRC.

Authors' contributions: LL was involved in the conception, study design, data collection, data cleaning and analysis and writing of the manuscript. NK was involved in critical review and editing of the manuscript. KO contributed in the data analysis, interpretation of results and review of the manuscript. MK, OAA and TO have contributed to the conception, study design and critical review of the manuscript.

Acknowledgements: We would like to thank the two health districts management for granting us permission to conduct the study. We are also grateful to the 90 healthcare workers that were willing to participate in the study.

References

1. Jardine MJ, Kasiske B, Adu D, Alrukhaimi M, Ashuntantang GE, Basnet S, et al. Closing the gap between evidence and practice in chronic kidney disease. *Kidney international supplements*. 2017;7(2):114-21. Epub 2017/10/01. doi: 10.1016/j.kisu.2017.07.006. PubMed PMID: 30675425; PubMed Central PMCID: PMC6341014.
2. WHO. A guide to implementation research in the prevention and control of noncommunicable diseases. Geneva; Switzerland World Health Organization; 2016.
3. Bates DW, Kuperman GJ, Wang S, Gandhi T, Kittler A, Volk L, et al. Ten commandments for effective clinical decision support: making the practice of evidence-based medicine a reality. *Journal of the American Medical Informatics Association : JAMIA*. 2003;10(6):523-30. Epub 2003/08/20. doi: 10.1197/jamia.M1370. PubMed PMID: 12925543; PubMed Central PMCID: PMC6341014.

4. MEASURE. Implementation Research Technical Working Group, Fundamentals of Implementation Research. 2012.
5. Aarons G. A., Hurlburt M., Horwitz S. M. Advancing a conceptual model of evidence-based practice implementation in public service sectors. *Adm Policy Ment Health* Jan doi 101007s1048801003277. 2011;38(1):4-23. doi: 10.1007/s10488-010-0327-7.
6. Sanson-Fisher RW. Diffusion of innovation theory for clinical change. *Medical Journal of Australia*. 2014;6(180).
7. Albers B, Mildon R. Implementation best practice: A rapid evidence assessment. . Sydney, Australia. : Parenting Research Centre for the Royal Commission into institutional Response to Child Sexual Abuse, 2016.
8. Swensen S, Mohta N. Leadership Survey: Organizational Culture Is the Key to Better Healthcare 2019 31 October 2019; (April). Available from: <https://catalyst.nejm.org/organizational-culture-better-health-care/>.
9. Mannion R, Davies H. Understanding organisational culture for healthcare quality improvement. *Bmj*. 2018;363:k4907. Epub 2018/11/30. doi: 10.1136/bmj.k4907. PubMed PMID: 30487286; PubMed Central PMCID: PMC6260242.
10. Denison RD, Neale WS. Denison Organizational Culture Survey, The Facilitator Guide 1999.
11. Denison Consulting. Getting Started with your Denison Organizational Culture Survey. 2009 31 October 2019. Available from: <https://www.denisonconsulting.com/docs/CultureGettingStarted/UsersGuideV7.pdf>.
12. Schneider B, Ehrhart MG, Macey WH. Organizational climate and culture. *Annual review of psychology*. 2013;64:361-88. Epub 2012/08/04. doi: 10.1146/annurev-psych-113011-143809. PubMed PMID: 22856467.
13. Ceașu I, Murswieck R, Kurth B, Ionescu R. The organizational culture as a support of innovation processes. *International Journal of Advanced Engineering and Management Research*. 2017;(2):2392.
14. National Department of Health of South Africa. Integrated Chronic Disease Management Manual, A step-by-step guide for implementation. South Africa: 2012.
15. Yang LJ, Killey; Harry, Herbert, Ballard. The relationship between organisational culture and effectiveness in the Western Cape banking industry. Cape Town, South Africa: Cape Peninsula University of Technology; 2009.
16. Christensen M. Communication as a Strategic Tool in Change Processes. *International Journal of Business Communication*. 2014;51(4):359-85. doi: 10.1177/2329488414525442.
17. Curry LA, Brault MA, Linnander EL, McNatt Z, Brewster AL, Cherlin E, et al. Influencing organisational culture to improve hospital performance in care of patients with acute myocardial infarction: a mixed-methods intervention study. *BMJ quality & safety*. 2018;27(3):207-17. Epub 2017/11/05. doi: 10.1136/bmjqs-2017-006989. PubMed PMID: 29101292; PubMed Central PMCID: PMC5867431.
18. Braithwaite J, Herkes J, Ludlow K, Testa L, Lamprell G. Association between organisational and workplace cultures, and patient outcomes: systematic review. *BMJ Open*. 2017;7(11):e017708. doi: 10.1136/bmjopen-2017-017708.

19. Gholam A, Ahmady; Aghdas, Nikooravesh; Marya, Mehrpour. Effect of Organizational Culture on Knowledge Management Based on Denison Model. *Procedia - Social and Behavioural Sciences* 2016;230:387-95. doi: 10.1016/j.sbspro.2016.09.049.
20. Ginossar T, Oetzel J, Hill R, Avila M, Archiropoli A, Wilcox B. HIV health-care providers' burnout: can organizational culture make a difference? *AIDS care*. 2014;26(12):1605-8. Epub 2014/07/16. doi: 10.1080/09540121.2014.936819. PubMed PMID: 25025453.
21. Statistics South Africa. Mortality and causes of death in South Africa Findings from death notification Statistics South Africa, Pretoria, South Africa: 2014.
22. UNAIDS. HIV and AIDS estimates2015.
23. Oni T, Youngblood E, Boule A, McGrath N, Wilkinson RJ, Levitt NS. Patterns of HIV, TB, and non-communicable disease multi-morbidity in peri-urban South Africa-a cross sectional study. *BMC Infect Dis*. 2015;15(1):s12879-015. doi: 10.1186/s12879-015-0750-1.
24. Conmy A. South African health care system analysis. *Public Health Review*. 2018;1(1):1-8.
25. Keeton C. Bridging the gap in South Africa. *Bulletin of the World Health Organization*. 2010;88:803-4.
26. Hunter JR, Chandran TM, Asmall S, Tucker JM, Ravhengani NM, Mokgalagadi Y. The Ideal Clinic in South Africa: progress and challenges in implementation. Durban, South Africa: 2017.
27. Coleman K, Austin BT, Brach C, Wagner EH. Evidence on the Chronic Care Model in the new millennium. *Health affairs (Project Hope)*. 2009;28(1):75-85. Epub 2009/01/07. doi: 10.1377/hlthaff.28.1.75. PubMed PMID: 19124857; PubMed Central PMCID: PMC5091929.
28. Mahomed OH, Asmall S, Voce A. Sustainability of the integrated chronic disease management model at primary care clinics in South Africa. *African journal of primary health care & family medicine*. 2016;8(1):e1-e7. doi: 10.4102/phcfm.v8i1.1248. PubMed PMID: 28155314.
29. Zwaan L. Assessing organisational culture in a Private Hospital in Western Cape. Faculty of Economic and Management Science: Universtiy of Western Cape; 2006.
30. Scott T, Mannion R, Davies H, Marshall M. The Quantitative Measurement of Organizational Culture in Health Care: A Review of the Available Instruments. *Health services research*. 2003;38(3):923-45. doi: 10.1111/1475-6773.00154.
31. Prem S. The adaptation and evaluation of a measure of organizational culture in the mining industry in South Africa: University of South Africa; 2011.
32. Davidson G, Coetzee M, Visser D. Organisational Culture and Financial Performance in A South African Investment Bank. *South African Journal of Industrial Psychology*. 2007 33(1):38-48.
33. Denison D, Janovics J, Young JaC, H. J. Diagnosing Organizational Cultures: Validating a Model and Method2006 07 October 2019.
34. Lebina L, Alaba O, Kawonga M, Oni T. Process evaluation of fidelity and costs of implementing the Integrated Chronic Disease Management model in South Africa: mixed methods study protocol. *BMJ Open*. 2019;9(6):e029277. doi: 10.1136/bmjopen-2019-029277.
35. Kawonga M, Blaauw D, Fonn S. The influence of health system organizational structure and culture on integration of health services: the example of HIV service monitoring in South Africa. *Health Policy Plan*. 2016.

36. REDCap Technical Review [Internet]. 2014.
37. IBM Corp. IBM SPSS Statistics for Macintosh, Version 25.0. Armonk, NY: IBM Corp. ; 2017.
38. Rao V. Innovation through employee engagement. *Asia Pacific Journal of Advanced Business and Social Studies*. 2016;2(2):337 - 45.
39. Brooke-Sumner C, Petersen-Williams P, Kruger J, Mahomed H, Myers B. 'Doing more with less': a qualitative investigation of perceptions of South African health service managers on implementation of health innovations. *Health Policy Plan*. 2019;34(2):132-40. Epub 2019/03/14. doi: 10.1093/heapol/czz017. PubMed PMID: 30863845; PubMed Central PMCID: PMC6481285.
40. Mash RJ, Govender S, Isaacs AA, De Sa A, Schlemmer A. An assessment of organisational values, culture and performance in Cape Town's primary healthcare services. *South African Family Practice*. 2013;55(5):459-66. doi: 10.1080/20786204.2013.10874396.
41. Zachariadou T, Zannetos S, Pavlakis A. Organizational culture in the primary healthcare setting of Cyprus. *BMC Health Serv Res*. 2013;13:112. Epub 2013/03/26. doi: 10.1186/1472-6963-13-112. PubMed PMID: 23522058; PubMed Central PMCID: PMC3637359.
42. Willis CD, Saul J, Bevan H, Scheirer MA, Best A, Greenhalgh T, et al. Sustaining organizational culture change in health systems. *Journal of health organization and management*. 2016;30(1):2-30. Epub 2016/03/12. doi: 10.1108/jhom-07-2014-0117. PubMed PMID: 26964847.
43. Rispel LC, de Jager P, Fonn S. Exploring corruption in the South African health sector. *Health Policy Plan*. 2016;31(2):239-49. Epub 2015/06/25. doi: 10.1093/heapol/czv047. PubMed PMID: 26104821.
44. Nkomazana O, Mash R, Phaladze N. Understanding the organisational culture of district health services: Mahalapye and Ngamiland health districts of Botswana. *African Journal of Primary Health Care & Family Medicine*. 2015;7:1-9.
45. Hung DY, Leidig R, Shelley DR. What's in a setting?: Influence of organizational culture on provider adherence to clinical guidelines for treating tobacco use. *Health care management review*. 2014;39(2):154-63. Epub 2013/05/03. doi: 10.1097/HMR.0b013e3182914d11. PubMed PMID: 23636103.
46. Lebina L. Denison Organisational Culture scores. : Figshare; 2019.

Figures

Figure 1: Diagrammatic representation of the Denison organisational culture

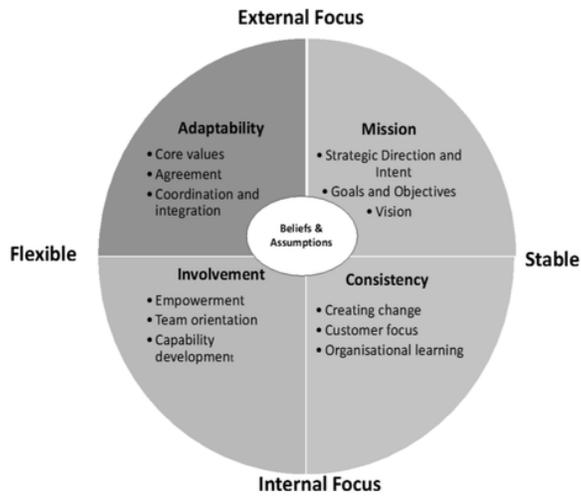
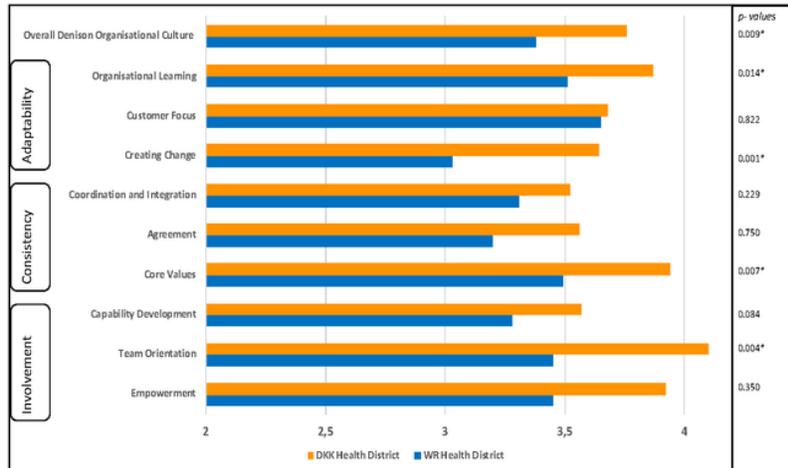


Figure 1

Diagrammatic representation of the Denison organisational culture

Figure 2: The Abbreviated Denison Organizational Culture Indices Mean Scores comparing the two health districts



*Statistically significant at the 0.05 level

Figure 3

The Abbreviated Denison Organizational Culture Indices Mean Scores comparing the two health districts