UNIVERSITY OF NAIROBI

SCHOOL OF COMPUTING AND INFORMATICS

HEALTH PROFESSIONAL SUB-CULTURES INFLUENCE ON ADOPTION OF HEALTH INFORMATION SYSTEM

CASE OF UNIVERSITY OF NAIROBI HEALTH SERVICES

BY

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Submitted in partial fulfillment of the requirements for the award of Master of Science degree in Information systems

DECLARATION

I declare that this project work as presented in this report is my own original work and has not been presented anywhere else for any award.

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This work has been submitted as part of the fulfillment of the requirements for the award of Master of Science in Information Systems degree at the University of Nairobi with my approval as the University supervisor.

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ABSTRACT

Health information systems are developed and implemented to improve health care quality and increase patient and physician satisfaction. This paper describes the influence of health professional sub-cultures on adoption of health information system. It measured the professional sub-cultures and tested their relationship with HIS attitude and also their relationship with HIS satisfaction. We administered OCI and user satisfaction survey to doctors, nurses, pharmacists and record clerks in the University of Nairobi health service clinics. We performed correlation and regression analysis on the data. According to the results from the study, doctors perceived an aggressive culture style whereas nurses, record clerks and pharmacists perceived a constructive culture.

Keywords*: Professional Sub-Cultures, HIS, HIS attitude, HIS satisfaction, HIS adoption, Organizational Culture Inventory, Culture styles*

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HMIS - Health Management Information system

IS – Information Systems

UHMIS – University Health Management Information System

UHS – University of Nairobi Health Services

OC – Organizational Culture

OCAI – Organizational Culture Assessment Instrument

OCI – Organizational Culture Inventory

1.0 CHAPTER ONE: INTRODUCTION

1.1 Background

Health information systems are developed and implemented to improve health care quality and increase patient and physician satisfaction. According to Winter et al. (2004), Health Information Systems (HIS) or Health Management Information Systems (HMIS) are used to collect, analyze, retain, retrieve and evaluate health information.

The following benefits are associated with HIS.

1. Accessibility to patient's information at any time within the network, saving time of physician to access information,
2. avoiding duplication of the examination and,
3. Assisting physician to diagnose fast and quickly initiate accurate treatment.

However, with all the benefits the implementations of these systems have not fully succeeded. As Marc (2001) states, "the implementation of comprehensive information systems in health care practices has proved to be a path ridden with risks and dangers. It has become evident that there are many more failure stories to tell than there are success stories".

Today, despite the immense investments in health information system in hospitals, the problem is that, not all hospital staff adopts information systems such as Health Information System without any difficulties. As Mahbod (2008) states, "the greatest barrier to Health Information System adoption is the resistance by the physicians and nurses". This observation is also seen in most hospitals in Kenya, patients' diagnosis and treatment are still paper-based and the areas which are computerized are only the administration of the patient and financial affairs. For example the Agakhan hospital has a system (care 2000) which is used for booking and billing the patients but not used by the physicians, the same applies to the University of Nairobi health service clinics where a system is only used for booking patients and capturing drugs dispensing information. Other areas such as laboratory might have computerized system of their own but it does not join the main system hence recording everything for a patient.

As noted by Manhod (2008), resistance by physicians and nurses is a source of implementation failures. Research has indicated that organizational culture can support linkages between technology adoption and organizational growth, and can thus be a critical success factor in the implementation of information systems. In addition organizational culture can be expressed through professional cultures. This research seeks to explore the impact of hospital professional subcultures in the implementation of HIS.

1.2 Problem Statement

In the recent past in Kenya, there have been several projects supported by various stakeholders in the health sector to automate health provision systems. To date the Kenyatta Hospital, one the largest hospital in Kenya is not yet fully automated and only portions of processes have been computerized. It is apparent that due to the emerging technology many health providers are spending money on buying or developing and implementing health information system to help them in effective and efficient patient data management.

The University of Nairobi health service clinics has for the recent last five years attempted to automate its operations by implementing an in-house developed HIS, the University Health Management Information System (UHMIS). However despite development being successful, efforts have received little success and the adoption of this system by the intended users especially the physicians, nurses and Pharmacists has been rather slow. Organizational culture has been one major factor that has been pointed out to influence change interventions, such as information system adoption and use. The slow pace of acceptance and use of the systems by the professionals listed has elicited interest to investigate their subculture, professional beliefs and attitudes towards HIS.

1.3 Research Objective

To measure the health professional sub-cultures in relation to attitudes towards, and satisfaction with Health Information System, with a view of improving adoption and use of HIS in Kenya using the UHMIS as a case study.

1.4 Research questions

1. What is the relationship between the professional subcultures and attitudes towards health information systems?

2. What is the relationship between the professional subcultures and the satisfaction of health information systems?

3. How does the relationships in 1 and 2 above influence adoption of health information systems?

1.5 Justification and Significance of the study

As the value of health information systems is becoming increasingly obvious, there is little study which measures hospital sub-cultures and links this to the use of a Health Information System. After identifying this gap the research seeks to provide such a study.

The study will highlight the views and experiences of different players involved directly or indirectly in implementation of health information system which can be used for better understanding of how professional subcultures influence the adoption of HIS. The study will help health professionals and information system professionals interested in implementing HIS. For researchers it will provide an overview of different issues to carry out future research on professional subcultures, beliefs and attitudes towards health information systems implementation and adoption.

1.6 Assumptions

1. It was assumed that all sampled user groups will be willing to participate in the study.
2. Respondents to any research tool used will be truthful and knowledgeable enough to answer questions asked.

1.7 Definition of terms

1. Organizational culture - The behavior of humans who are part of an organization and the meanings that the people attach to their actions.

2. Professional subcultures - These are the subunits such as departments, hierarchical levels or teams.

3. Attitude – way of thinking or feeling about something, typically one that is reflected in a person's behavior.

4. Satisfaction – fulfillment of one's expectations or needs.

2.0 CHAPTER TWO: LITERATURE REVIEW

2.1 Overview of the Adoption of Health Information System

Rogers (1995), states that adoption is conceived as a social change process, in which an innovation is communicated over time among members of a social system. Adoption includes the evaluation of an innovation to determine if it will best satisfy the needs of the prospective adopting organization, as well as the sustained use of the innovation (commonly referred to as full implementation).

According to a study published in the international journal of information and communication technology research by Kilwake Juma et. al (2012), the government of Kenya in partnership with the private sector has made important strides towards creating an environment suitable for the uptake of e-Health. The release of the Standards and Guidelines for Electronic Medical Records(EMR) in Kenya(2010), Strategic Plan for Health Information Systems (HIS)(2009-2014), Kenya ICT policy(2006), and Kenya Communications Act(2009) marks important milestones towards creating an environment with legal and regulatory framework conducive to development and adoption of e-Health in Kenya. Currently, e-Health solutions and applications are at their infancy.

2.2 Organizational Culture

According to Shili (2008), organization culture is the "set theory" of important values, beliefs, and understandings that members share in common, culture provides better (or the best) ways of thinking, feeling and reacting that could help managers to make decision and arrange activities of organization.

Kim S. Cameron et al. (1999) stated the definition of organizational culture as follows:
"*An organization's culture is reflected by what is valued, the dominant leadership styles, the language and symbols, the procedures and routines, and the definitions of success that make an organization unique*."

Edger schein offers another definition as *"A pattern of shared basic assumptions that a group has learned as it solved its problems of external adaptation and internal integration that has worked well enough to be considered valid and therefore, to be taught to new members as the correct way to perceive, think, and feel in relation to those problems."*

Kim S. Cameron et al (2006), further explains that in an organization, subunits such as functional departments, product groups, hierarchical levels, or even teams may also reflect their own unique cultures. Difficulties in coordinating and integrating processes or organizational activities, for example are often a result of culture clashes among different subunits. This concept is also referred to as professional subcultures by Edger Schein.

The study of cultural pattern enables us to understand the beliefs, values, norms, and practices that drive corporate behavior. Corporations are composed of many subcultures that represent differences in meanings and cognitive patterns. The most extensive form of sub cultural patterning is associated with the type of job organizational members do. (Oranuch P. et. al, 2013).

As Hofstede (1991) has noted, the employees' behavior in their workplace is influenced by three different cultures: their national, their occupational and their organizational culture. More specifically, an individual's attitudes and beliefs toward his/her occupation are chiefly influenced by his/ her personal values and ideals, which have been achieved in the frame of family during his/ her earlier development. Secondly, a person's specific views, perceptions and ambitions are formed during school and professional life and belong to the occupational culture shared among partners. Finally, organizational culture is a product of occupational relations among employees and between employees and customers, thus it is likely to reform and adapt to the institution's goals and strategies. Therefore, an organization's internal culture should be studied and measured as part of its employees' national culture, demographic characteristics and individual features.

Many previous studies have assumed culture in the organization to be uniform and consistent culture across all sub-units studies. However, Martin (1992) presents a different conceptualization of organizational culture and introduces the notion of organizational sub-cultures. Subcultures are the influence of the practices, values and beliefs of various subgroups which are different from the overall organizational culture. The assumption of organizational culture as uniform and consistent is termed the integrative paradigm by Martin. It is one of three perspectives on organizational culture, differentiated and fragmented perspectives being the other two.

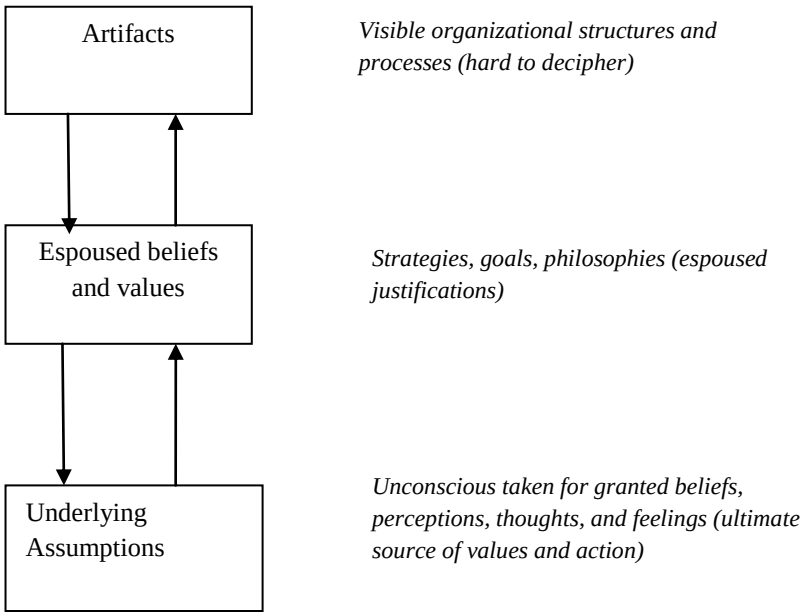
2.3 Models of Organizational Culture

There are a variety of cultural models that handles organizational culture from several perspectives. The Hofstede cultural model focuses on comparing cultures between nations. Schien's cultural model takes into consideration the cultural levels related to personnel, groups, and organizations, while Cameron and Quinn cultural model presents organizational culture by two dimensions, which are internal focus vs. external focus, and stability and control vs. flexibility and discretion.

2.3.1 Schein's Three Levels of Culture Model

Edgar H. Schein's model focuses on three different levels of culture which move from the visible to the tacit, or invisible. The first level consists of visible artifacts such as myths, rites, stories and symbols. The second level consists of espoused values which are strategies, goals or philosophies that characterize a specific way of thinking within a company. The third and most basic level of organizational culture consists of basic assumptions or unconscious, often taken-for-granted beliefs, perceptions, thoughts and feelings. These basic assumptions, such as the perception of human nature, the nature of human interaction or the basic understandings of time or truth, are often implicit and not consciously known to employees.

Figure 1: Schein's Model

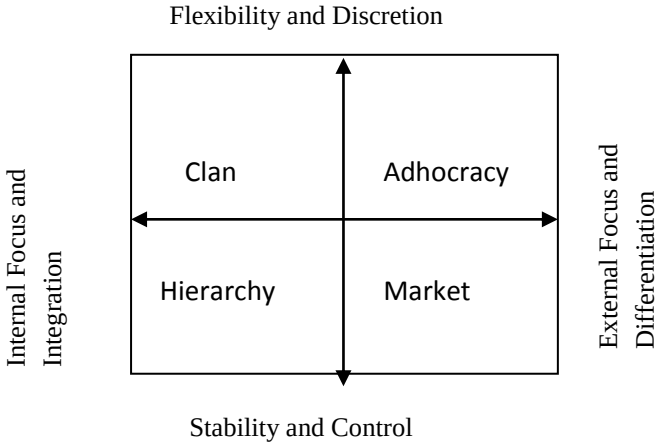


Source: Edgar H. Schein (2004).

2.3.2 Cameroon's Competing values Model

The Competing Values Framework was developed by Kim S. Cameron and Robert E.Quinn. It is a broadly applicable model that is intended to foster successful leadership; improve organizational effectiveness; and promote value creation. It helps leaders think differently about value creation and shows them how to clarify purpose, integrate practices and lead people. The Competing Values Framework can tell you if your organization's predominant culture falls into one or two of four types: the hierarchy culture; the market culture, the clan culture; or the adhocracy culture. The predominant culture is then explored and strategies are suggested on how to move from the baseline to a preferred future. (Info-pack, 2009)

Figure 2: Competing values framework



Source: Kim S. Cameron (2006) pg. 32

The Hierarchy Culture is based on Weber's theory of bureaucracy and values tradition, consistency, cooperation, and conformity. The Hierarchy model focuses more on internal than external issues and values stability and control over flexibility and discretion. This is the traditional "command and control" model of organizations, which works well if the goal is efficiency and the organizational environment is stable and simple-if there are very few changes in customers, customer preferences, competition, technology, etc.

The Market Culture also valued stability and control but focused more on external (market) rather than internal issues. This culture tends to view the external environment as threatening, and seeks to identify threats and opportunities as it seeks competitive advantage and profits.

The Clan Culture focuses on internal issues and values flexibility and discretion rather than seeking stability and control. Its goal is to manage the environment through teamwork, participation, and consensus.

The Adhocracy Culture focuses on external issues and values flexibility and discretion rather than seeking stability and control; its key values are creativity and risk taking. Organizational charts are temporary or nonexistence; roles and physical space are also temporary.

According to Cameron K. S. et al (1999) the six key dimensions of organizational culture are Dominant Characteristics, Organizational Leadership, Management of Employees, Organizational Glue Strategic Emphasis, and Criteria for (judging) Success.

The competing values model uses OCAI. The OCAI is very useful in determining the degree to which an organization's culture supports its mission and goals, and in identifying underlying elements in the culture which may work against full achievement of its mission and goals. And it is very useful when an organization is deliberately seeking to re-define itself and its culture, and seeks to identify cultural elements which best support and those which hinder its change efforts.

2.3.3 Hofstede Model

Hofstede considers the organizational culture in the four dimensions of masculinity vs. femininity, individualism vs. collectivism, ambiguity tolerance and uncertainty, and power distance (Hofstede, 1997).

Masculinity vs. femininity: - refers to the person's belief about the difference of sexual roles in society. In masculine societies, peoples believe that the roles of men and women should be distinct. In these types of societies, men are expected to be hardy and aggressive and emphasize the financial success. Women are also expected to be modest and sensitive and emphasize the quality of life. However, in feminine societies people believes the unity of sexual roles (Hofstede, 1997). It means that both the men and women are expected to accent the interpersonal relationships, quality of life, help to others, and less emphasize town needs (Hofstede, 1997).

Individualism vs. collectivism: - refers to the relationship between a person and a set of persons in a society. In individualist societies, people have loose relationships with others, and people are expected to pay attention to their personal favorites. However, in collectivism societies, people have near relationships with the society members, accept the group's values and beliefs, and follow the collective favorites (Hofstede, 1997).

Ambiguity tolerance and uncertainty: - refers to this fact that how people face with unknown aspects of the future and find the ambiguous situations dangerous. These types of cultures are concern about the future and prevent the risks by preventing procedures such as religion, rules, social patterns, and written and unwritten roles. In contrast, those cultures that are confident of the future less prevent the ambiguity (Hofstede, 1980).

Power distance: - refers to extent to which the less powerful members in organizations (like schools) accept the inequity of power. In societies with a high level of power distance, people accept the mastery more simple than the people who live in societies with a low level of power distance, which considers the people and categories as a value (Hofstede, 1980).

2.4 Measuring Organizational culture

Apart from the various types and models that have been suggested for the description of organizational culture, quite a big number of instruments for the measurement of organizational culture have been developed as well. In the last few decades, both academics and practitioners in management science have focused on studying possible ways to measure the dimensions of organizational culture and how such measures relate to the effectiveness and competitiveness of an organization (Mobley et al., 2005).

A famous instrument of measuring organizational culture is the Organizational Culture Inventory (OCI), developed by Cooke and Lafferty (1987). It includes 120 items which assess shared norms and expectations that are likely to affect the ways of thinking and behavior of group members, resulting 12 styles: humanistic/helpful, affiliative, approval, conventional, dependent, avoidance, oppositional, power, competitive, competence/perfectionalist, achievement, self-actualization. After analyzing those styles, three factors arise: people/security culture, satisfaction culture and task/security culture.

In 1987 as well, Glaser et al. carried out the Organizational Culture Survey, designed to address six empirical factors: teamwork and conflict, climate and morale, information flow, involvement, supervision, meetings. It includes 31 items and the responses were given in a 5-point scale.

In 1990, Hofstede et al. carried out a qualitative and quantitative study of 20 cases using Hofstede's Organizational Culture Questionnaire. The questionnaire included 135 items given in 5-point scales, which were based on three values: need for security, importance of work and need for authority. Within these, there are six factors relating to practice issues: process vs outcome, employees vs task, parochial vs professional, open vs closed system, loose vs tight control, and normative vs pragmatic.

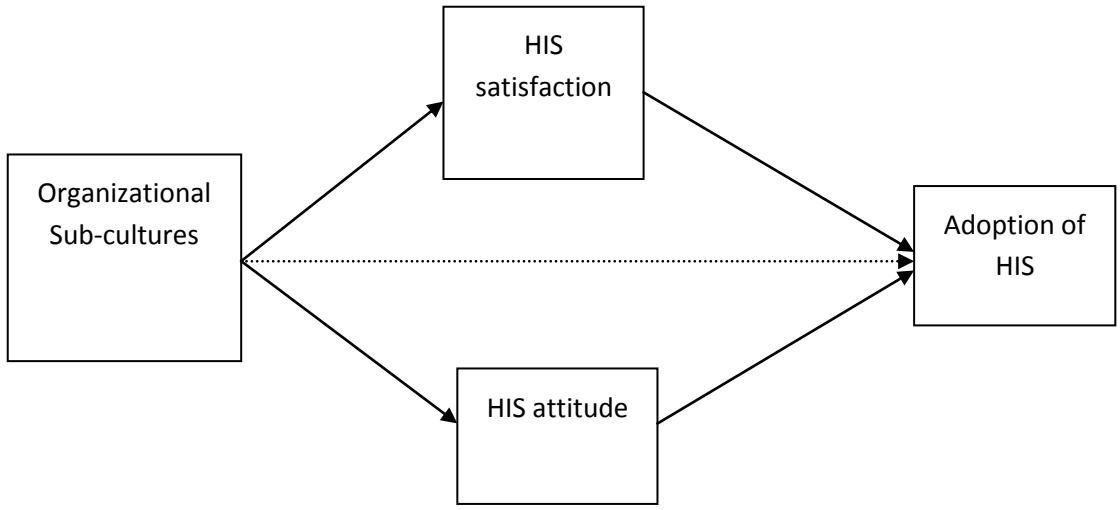
Cameron and Quinn (2006) created the famous Organizational Culture Assessment Instrument (OCAI), based on the four culture types. The evaluation of a culture is made through those four core values, in a 2 x 2 competing values, Flexibility and discretion opposing Stability and control and Internal focus and integration versus External focus and differentiation. According to Jones et al. (2006), internal versus external focus separates the organizational improvements driven by mostly internal business processes and people caring from the ones caused by external stakeholder Organizational Culture and Job Satisfaction: A Review 138 wishes. Stability versus flexibility distinguishes between organizations that are more stable and organizations that promote innovation, personal growth, continuous organization improvement and change.

The competing values cross upon six dimensions: Dominant characteristics, Organizational leadership, Management of employees, Organizational glue, Strategic emphasis and Criteria of success.

2.5 The conceptual Model

Figure below displays the conceptual model in terms of the three research questions. The Conceptual model was used to help us know, understand, and simulate the subject matter.

Figure 3: Research Conceptual Model



Source: Developed by researcher

To answer the three questions, organizational culture inventory survey will be used to measure the professional sub-cultures and user satisfaction survey will be used to test the model. This will establish whether there is any relationship between the hospital professional sub-cultures and the attitude towards health information system and how it affects the adoption of health system. It will also find out if there is any relationship between the hospital professional sub-cultures and health information systems satisfaction hence the adoption.

3.0 CHAPTER THREE: METHODOLOGY

This chapter describes the methodology applied in carrying out the research. It addresses the research design chosen, sources of data for the study, tools and procedures for collecting data, sample size, data analysis method. Quantitative research method was used where numerical data was collected and analysed using mathematically based methods. This was useful because it was a baseline survey and it is independent of the researcher and one should get similar results no matter who carries out the research.

3.1 Research design

Case study methodology was used to do the research based on University of Nairobi Health Services and questionnaires were used as a means of data collection. This is because a case study focuses on a particular unit. The Case study enabled the researcher to do an analysis of a group of professionals.

3.2 Case Setting

The case setting was university-based healthcare. The University of Nairobi Health Services (UHS) served as the host site, which is comprised of eight clinics. The UHS delivers care to university staff and their dependents and the students. Out of the total number of staff which is 137 inclusive of laboratory technologists, counselors, clinical officers and theatre surgeons, 84 members of staff forms the sample data which is the total number of doctors, nurses, pharmacists and record clerks.

3.3 Target Population

Since the main objective of this study was to investigate the relationship between professional sub-cultures and attitude towards, and satisfaction with health information systems and especially the physicians, nurses, pharmacists and record clerks, the population of interest was defined from these group working at the university of Nairobi health service different clinics where the health information system had been implemented but they were not fully using it. Since it was an organizational health facility which involved only University of Nairobi health service clinics the target population was 84 (physicians=20), (nurses=35), (Pharmacists=19) and (Record Clerks=10).

3.4 Sampling Technique

Since the study was targeting only physicians, nurses, pharmacists and record clerks within the university of Nairobi health service clinics where health information system had been implemented, the method non-probability based on the judgment of the researcher to conform to the desired criteria of sampling was used. Non-probability sampling represents a group of sampling techniques that help researchers to select units from a population that they are interested in studying. A core characteristic of non-probability sampling techniques is that samples are selected based on the subjective judgment of the researcher, rather than random selection. In judgmental sampling the researcher selects units to be sampled based on their knowledge and professional judgment. It is more commonly known as purposive sampling. In this type of sampling, subjects are chosen to be part of the sample with a specific purpose in mind. With judgmental sampling, the researcher believes that some subjects are better fit for the research compared to other individuals. The process involves nothing but purposely handpicking individuals from the population based on the authorities or the researcher's knowledge and judgment.

3.5 Data Collection Design, Procedure and Instruments

Data collection instrument is highly influenced by the strategy chosen to conduct the research. Two survey instruments an organizational culture inventory; and a user satisfaction survey were used.

A pilot study was done for the purpose of correcting the questionnaire by eliminating potential problems. Ten respondents were selected and asked to answer the questions and report anything in the questionnaire that would cause any misunderstanding or was not clear. A sample questionnaire was as shown in appendix B.

Questionnaire was chosen for research because it tends to give accurate and precise data and also it is more suitable especially where sampling is employed as it was the case in this study. Other reasons for choosing this method are:-

1. The researcher is able to contact large numbers of people quickly, easily and efficiently using a postal questionnaire (since all he / she has to do is identify the group that will be targeted and post them the list of questions).

2. Questionnaires are relatively quick and easy to create code and interpret (especially if closed questions are used). In addition, the respondent not the researcher does the time consuming part of completing the questionnaire

3. A questionnaire is easy to standardize e.g., every respondent is asked the same question in the same way. The researcher, therefore, can be sure that everyone in the sample answers exactly the same questions, which makes this a very reliable method of research.

4. Questionnaires can be used to explore potentially embarrassing areas (such as sexual and criminal matters) more easily than other methods. The questionnaire can, for example, be both anonymous and completed in privacy. This increases the chances of people answering questions honestly because they are not intimidated by the presence of a researcher

3.6 Study Instruments

3.6.1 Organizational Culture Inventory (OCI)

OCI is an instrument designed to evaluate the culture of organizations in terms of behavioral norms and expectations related to the shared beliefs and values held by organizational members. The OCI measures what individuals and groups within a company regard as expected of them and will be reinforced and rewarded. It also allows organizational members to consider a culture that, for them, would be ideal for maximizing business performance, and what types of behaviors would be expected of them in that ideal culture. Therefore, differences between the current and ideal cultures of an organization can be measured by the OCI (Acumen International, 2000).

The OCI measures 12 sets of normative beliefs and shared behavioral expectations that may influence the thinking and behavior of organizational members, their motivation and performance, and their satisfaction and stress. Normative beliefs are defined as "cognitions held by an individual regarding others' expectations for his behavior as a member of a particular group or organization." Shared behavioral expectations are "those normative beliefs that are held in common by members of a group or organization" (Cooke & Szumal, 1993).

The OCI is an instrument that can be used in any organizational setting and has many applications. According to Human Synergistics (2000), the OCI is "the most widely used and thoroughly researched tool for measuring organizational culture in the world." The OCI can be used for many things including: identifying areas where change is needed, developing a vision for cultural changes, evaluating the effects of organizational change efforts, and managing diversity and international relations. Therefore, the OCI is a general instrument that can be tailored to meet the needs of almost any organization.

Table 1: Organizational cultural styles and behavioral norms

Organizational cultural styles	Behavioral norms which constitute the cultural style
Constructive style Members are encouraged to work cooperatively and to their full potential resulting in high levels of motivation, satisfaction, teamwork and service quality.	1. Achievement: Members are expected to set challenging but realistic goals and pursue them with enthusiasm 2. Self-actualising: Members are expected to be concerned about their own growth, communicate ideas and think in unique and independent ways 3. Humanistic/encouraging: Members are expected to be supportive and resolve conflicts constructively 4. Affiliative Members are expected to cooperate with others and think in terms of the group's satisfaction
Passive/defensive style Members are expected to 'go along with others', not 'rock the boat', please those in positions of authority and wait for others to act first.	5. Approval: Members are expected to agree with, gain the approval of, and be liked by others 6. Conventional: Members are expected to conform, follow the rules, and make a good impression 7. Dependent: Members are expected to do what they are told and clear all decisions with supervisors 8. Avoidance: Members are expected to take few chances, shift responsibilities to others and avoid being blamed for mistakes
Aggressive/defensive style Members are expected to oppose new ideas, play 'politics' to gain influence, compete rather than co-operate and appear competent and independent.	9. Perfectionist: Members are expected to avoid making mistakes, work long hours and keep 'on top' of everything 10. Competitive: Members are expected to operate in a 'win-lose' framework and work against their peers to be noticed 11. Power: Members are expected to take charge and 'control' others and make decisions autocratically 12. Oppositional: Members are expected to gain status and influence by being critical and constantly challenging one another

Source: Adapted from: Szumal (1998), OCI Interpretation and Development Guide.

3.6.2 User satisfaction survey

A user satisfaction questionnaire was developed which consisted of closed questions relating to the impact of health information system on work practices and patient care, and the professionals' satisfaction with, and attitudes to the system. It was used to measure the relationship between sub-culture style and attitudes towards health information system and the relationship between sub-culture style and satisfaction with health information system as indicated on the conceptual model.

3.7 Data analysis

This section explains statistical analysis both descriptive and inferential statistics and the role of each in the study e.g. descriptive statistics used to describe the basic features of the data in a study. They provide simple summaries about the sample and the measures. Together with simple graphics analysis, they form the basis of virtually every quantitative analysis of data. In this case study descriptive analysis was used to describe findings such as the dominant professional culture and the age and gender distribution with the professional groups. Inferential statistics was used to measure the relationships between the professional sub-cultures and HIS attitude, professional sub-cultures and HIS satisfaction and finally relationship between professional sub-cultures and HIS adoption.

In this study, data from both surveys was analyzed using the Statistical Package for Social Science (SPSS) and correlation coefficients were used to measure the relationships between variables.

4.0 RESULTS AND ANALYSIS

4.1 Introduction

This chapter presents the analysis and the results of the research. Most of the analysis was based on frequencies distribution on each variable tested. The conceptual model as show from research methodology was tested using correlation and linear regression method.

4.1.1 Correlation

Pearson Correlation (r), the most commonly used bivariate correlation technique, measures the relationship between the independent variable and dependent variable. In this case constructive culture style, passive culture style, and aggressive culture styles are independent variables, while HIS adoption is dependent variable.

The measure of association between two variables using Pearson correlation coefficient reports 3 aspects: First it reports on the strength of the association. The scale used has value ranging from negative 1 to positive 1. When Pearson correlation coefficients has a value closer to positive 1 or negative 1, then the association or correlation is said to be strong. A value closer to zero on either side indicates a weak relationship.

Secondly it reports on the direction which can either be positive or negative. Positive values means that an increase in independent variable values causes an increase in associated dependent variables while negative direction means increase in independent variables causes a decrease in independent variables.

The third report is that it reports on the significance. When the significance is less than 0.05 the correlation is significant while when the value is more than 0.05 the correlation is not significant.

4.1.2 Regression

Regression is a statistical technique to determine the linear relationship between two or more variables. Regression is primarily used for prediction and causal inference. In its simplest (bivariate) form, regression shows the relationship between one independent variable (X) and a dependent variable (Y), as in the formula below:

$$Y = \beta_0 + \beta_1 X + u$$

The magnitude and direction of that relation are given by the slope parameter (β_1), and the status of the dependent variable when the independent variable is absent is given by the intercept parameter (β_0). An error term (u) captures the amount of variation not predicted by the slope and intercept terms. The regression coefficient (R^2) shows how well the values fit the data (Dan & sherlock, 2008).

4.1.3 Data reliability

Cronbach's alpha is a measure of internal consistency; it is expressed as a number between 0 and 1. It describes the extent to which all the items in a test measure the same concept. The reason why internal consistency should be determined before a test can be employed for research is to ensure validity that is the measuring instrument measures what it is supposed to measure.

Reliability of the tool used was tested and a score of 0.820 using Cronbach's Alpha analysis was obtained which is higher than the minimum acceptable score of 0.7

Table 2: Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.820	.860	34

Source: Research

4.2 Population and Respondents

From the targeted group of 84 professionals within the university health service clinics (15 doctors, 30 nurses, 17 pharmacists and 10 record clerks completed the questionnaires on culture, attitude and satisfaction (response rate of 86%).

4.3 General Information

On the first section of the questionnaire where I sought to know the gender and the age group of the respondents, the following results were obtained. The professions are coded as follows:-

D – Doctors, R- Record Clerks, N- Nurses, P- Pharmacists

Table 3: Gender distribution among the Profession

			Gender		Total
			M	F	
Profession	D	Count	6	9	15
		% within Profession	40.0%	60.0%	100.0%
	R	Count	5	5	10
		% within Profession	50.0%	50.0%	100.0%
	P	Count	7	10	17
		% within Profession	41.2%	58.8%	100.0%
	N	Count	7	23	30
		% within Profession	23.3%	76.7%	100.0%
Total		Count	25	47	72
		% within Profession	34.7%	65.3%	100.0%

Source: Research

From the results above majority of respondents in each category were female with nursing field being dominated by female at 76.7%. An exception was observed with record clerks where gender distribution was more evenly distributed with 50% female and 50% male. The numbers in each profession are as shown below.

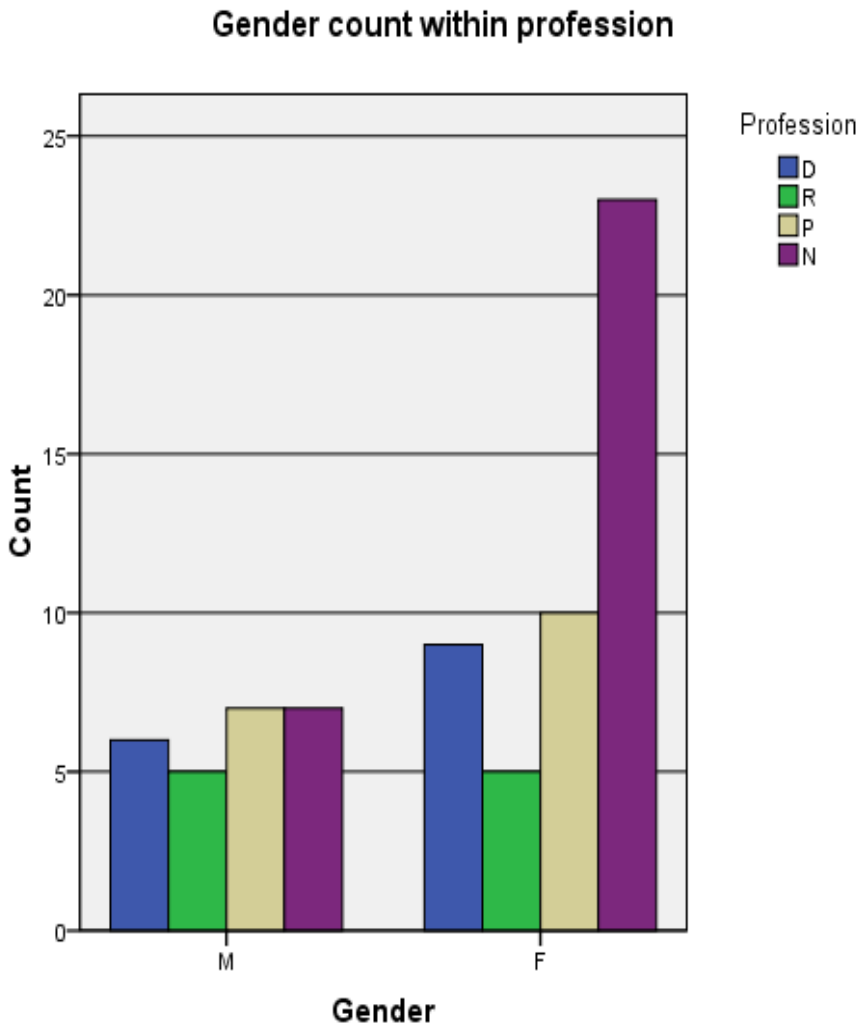
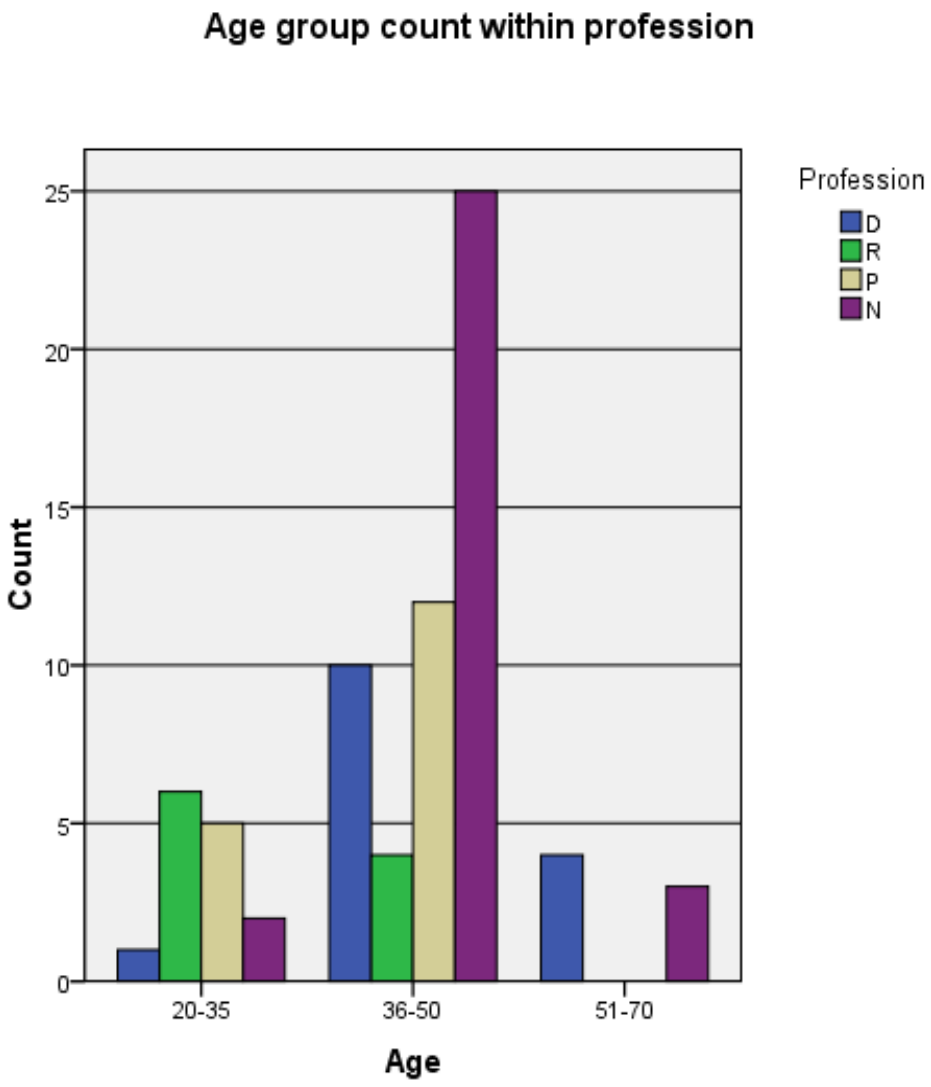

Gender count within profession
Profession
D
R
P
N
25
20
15
10
5
0
Count
M
F
Gender

Table 4: Age distribution among the Profession

			Age			
			20-35	36-50	51-70	Total
Profession	D	Count	1	10	4	15
		% within Profession	6.7%	66.7%	26.7%	100.0%
	R	Count	6	4	0	10
		% within Profession	60.0%	40.0%	.0%	100.0%
	P	Count	5	12	0	17
		% within Profession	29.4%	70.6%	.0%	100.0%
	N	Count	2	25	3	30
		% within Profession	6.7%	83.3%	10.0%	100.0%
Total		Count	14	51	7	72
		% within Profession	19.4%	70.8%	9.7%	100.0%

Source: Research

For the age group majority of the respondents in the clinics were between 36 years and 50 years of age (70.8%). It is also clear that in the records there was high percentage of the young staff between 20 years and 35 years of age (60%). Only few respondents are of the age group between 51 and 70 years who are doctors and nurses. The count on age in each profession is as shown below.


Age group count within profession
Profession
D
R
P
N
Count
25
20
15
10
5
0
20-35
36-50
51-70
Age

4.4 Professionals' Perception of Culture

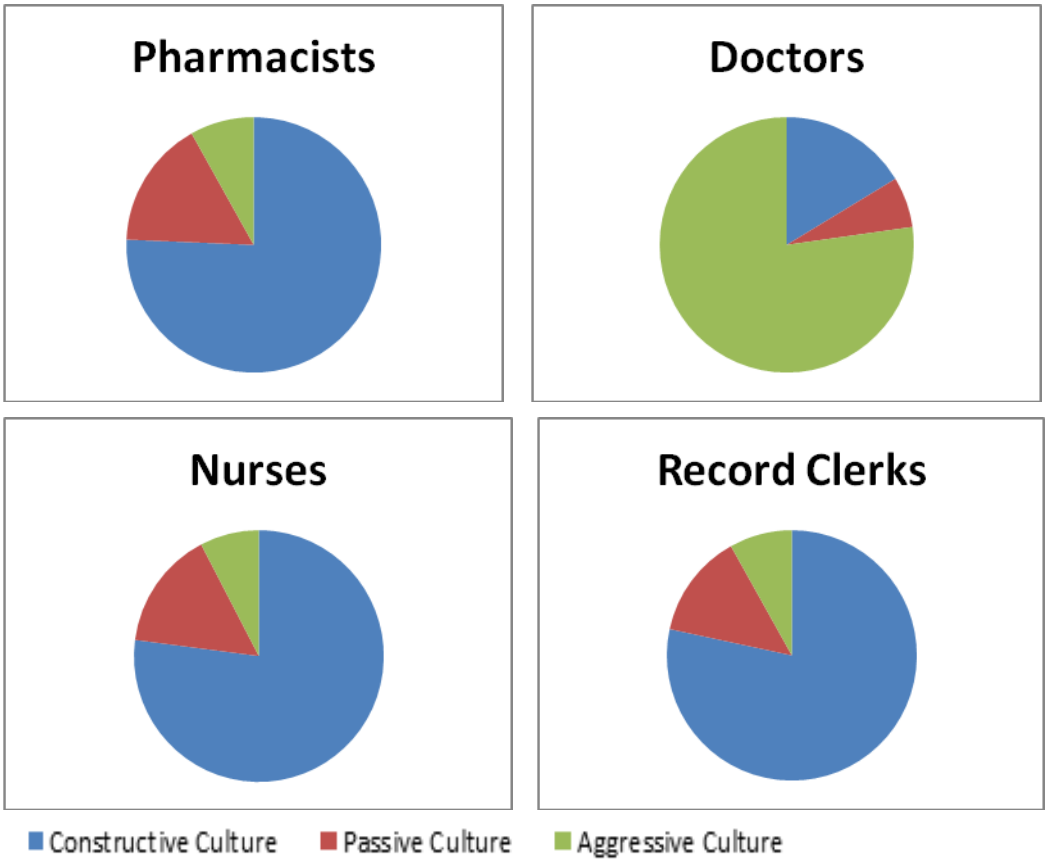
In the second section of the questionnaire I sought to know in which culture style each group of profession belongs. The culture questions were grouped in to three groups each with four questions (Constructive style, Passive style and Aggressive style). Percentage response for those who agreed was calculated and the mean of each of the four questions calculated which was used to determine the dominant culture style for each group. The results are as shown in table 5.

Table 5: Percentage score of organizational culture as perceived by each group

Constructive Culture	Record Clerks (10)	Doctors (15)	Nurses (30)	Pharmacists (17)
Achievement style	80	13	83	70.5
Self-actualising style	80	20	90	88.2
Encouraging style	60	20	70	88.2
Affiliative style	70	13	56.6	82.3
Mean	**72.5**	**16.5**	**74.9**	**82.3**
Passive Culture				
Approval style	0	13	26.6	35.3
Conventional style	20	7	13	17.6
Dependent style	20	0	10	11.8
Avoidance style	10	6	10	5.9
Mean	**12.5**	**6.5**	**14.9**	**17.65**
Aggressive Culture				
Perfectionistic style	30	46.6	6.6	23.5
Competitive style	0	73	10	5.9
Power style	0	93	3	0
Oppositional style	0	100	10	5.9
Mean	**7.5**	**78.15**	**7.4**	**8.825**

Source: Research

The results show that doctors perceived an aggressive culture style whereas nurses, record clerks and pharmacists perceived a constructive culture. The pie charts below represents each profession perceived culture style where the culture style with the highest percentage is the most perceived.



Analysis of variance was done to see if there are any differences between the professions by comparing the mean differences of the culture. This is because one-way analysis of variance (ANOVA) is used to determine whether there are any significant differences between the means of three or more independent groups. First the means were calculated for each culture style as shown below.

COMPUTE Constructive=RND(MEAN(Con1,Con2,Con3,Con4)).
EXECUTE.
COMPUTE Passive=RND(MEAN(Pas1,Pas2,Pas3,Pas4)).
EXECUTE.
COMPUTE Aggressive=RND(MEAN(Agg1,Agg2,Agg3,Agg4)).
EXECUTE.

Table 6: Mean difference between professional groups

Dependent Variable	(I) Profession	(J) Profession	Mean Difference (I-J)	Std. Error	Sig.
Constructive	D	R	-1.53333*	.21954	.000
		P	-1.45098*	.19050	.000
		N	-1.36667*	.17005	.000
	R	D	1.53333*	.21954	.000
		P	.08235	.21431	.702
		N	.16667	.19636	.399
	P	D	1.45098*	.19050	.000
		R	-.08235	.21431	.702
		N	.08431	.16325	.607
	N	D	1.36667*	.17005	.000
		R	-.16667	.19636	.399
		P	-.08431	.16325	.607
Passive	D	R	-.80000*	.20491	.000
		P	-.28235	.17781	.117
		N	-.16667	.15872	.297
	R	D	.80000*	.20491	.000
		P	.51765*	.20003	.012
		N	.63333*	.18328	.001
	P	D	.28235	.17781	.117
		R	-.51765*	.20003	.012
		N	.11569	.15237	.450
	N	D	.16667	.15872	.297
		R	-.63333*	.18328	.001
		P	-.11569	.15237	.450

Dependent Variable	(I) Profession	(J) Profession	Mean Difference (I-J)	Std. Error	Sig.
Aggressive	D	R	1.90000*	.21581	.000
		P	2.47059*	.18726	.000
		N	1.93333*	.16716	.000
	R	D	-1.90000*	.21581	.000
		P	.57059*	.21067	.009
		N	.03333	.19303	.863
	P	D	-2.47059*	.18726	.000
		R	-.57059*	.21067	.009
		N	-.53725*	.16048	.001
	N	D	-1.93333*	.16716	.000
		R	-.03333	.19303	.863
		P	.53725*	.16048	.001

Source: Research

After one-way analysis of variance (ANOVA) it showed that there was a major difference between the doctors' and other professions' perceptions on culture style ($p = 0.000$) as show on table above. The other professional groups had small significant differences of the perception on the culture styles. On constructive culture style there was no difference between nurses, pharmacists and record clerks. For the passive culture style there was a slight difference between record clerks and nurses. Pharmacists are slightly aggressive than nurses as the results show but this culture style is overtaken by the constructive culture style in pharmacists.

4.5 Relationship between the culture styles and HIS Attitude, HIS Satisfaction and HIS adoption

In the last three sections of the questionnaire I sought to know professional attitudes towards HIS, satisfaction with HIS and adoption of HIS. After data collection, tabulation was done as shown in appendix C. The results of each part were transformed in to a composite measure by doing factor analysis.

Since the model was to find out the sub-culture groups in the health services and test their relationship with HIS attitude and HIS satisfaction in affecting HIS adoption, each subculture (constructive, passive, and aggressive) was tested as an independent variable.

The causal steps method was followed to test the model.

- First by obtaining simple correlation between subculture and HIS adoption (ignoring attitude and satisfaction).

- Next by obtaining simple correlation between subculture and HIS attitude and HIS satisfaction (ignoring HIS adoption)

- Then conducting a multiple regression analysis, predicting HIS adoption from subcultures and attitude. The partial effect of subculture (controlling for attitude) must be significant.

- And a multiple regression analysis, predicting HIS adoption from subcultures and satisfaction. The partial effect of subculture (controlling for satisfaction) must be significant.

- Finally, I looked at the direct effect of subculture on HIS adoption. This is the Beta weight for subculture in the multiple regressions just mentioned. For complete effect, this Beta must be (not significantly different from) 0.

Table 7: Pearson correlation between the variables

Independent Variables	Correlation Coefficients and significance measure	REGR factor score for Adoption	REGR factor score for Attitude	REGR factor score for Satisfaction
Constructive	Pearson Correlation	.671**	.731**	.654**
	Significance (2-tailed)	.000	.000	.000
Passive	Pearson Correlation	.151	.239*	.262*
	Significance (2-tailed)	.207	.043	.026
Aggressive	Pearson Correlation	-.772**	-.600**	-.621**
	Significance (2-tailed)	.000	.000	.000
**. Correlation is significant at the 0.01 level (2-tailed).				
*. Correlation is significant at the 0.05 level (2-tailed).				

Source: Research

The results above shows the Pearson correlation coefficient between the constructive style and health information system adoption, health information system attitude and health information system satisfaction which is found to be positive at 0.671, 0.731 and 0.654 respectively and significant since the value of (2-tailed) for all is 0.000. This means that increase in the constructive style results in a corresponding rise on all the three variables. The results show that there is a positive association between constructive culture and health Information system adoption. Similarly the results show that there is a strong association between constructive culture style and attitude towards health information systems as well as satisfaction with health information systems. From the case study results it also shows that there is no correlation between passive style and health information system adoption because the significance (2-tailed) is 0.207 which is more than 0.05 threshold and hence the association is not significant, but there is a weak association between passive style and health information system attitude and satisfaction with health information system which is found to be positive at 0.239 and 0.262 respectively. Aggressive style on the other hand correlate with HIS adoption, HIS attitude and HIS satisfaction at -0.772, -0.600 and -0.621 respectively signifying a strong negative association between the variables. The correlation is significant because the value of the significance (2-tailed) is 0.000 for all. This means that increase in the aggressive style results in a corresponding drop on all the three variables. The results show very strong negative association between aggressive culture style and health information system adoption.

Also the association between HIS attitude, HIS satisfaction and HIS adoption was tested and found out that there was also a strong relationship between health information system adoption and attitude towards and satisfaction with health information system as shown below

Table 8: Pearson correlation Between HIS attitude, HIS satisfaction and HIS adoption

Intervening Variables	**Correlation Coefficients and significance measure**	**REGR factor score for Adoption**
REGR factor score for attitude	Pearson Correlation	.677**
	Significance (2-tailed)	.000
REGR factor score for satisfaction	Pearson Correlation	.668**
	Significance (2-tailed)	.000
**. Correlation is significant at the 0.01 level (2-tailed).		

Source: Research

From the conceptual model the final variable HIS adoption, has paths to it only from HIS attitude, HIS satisfaction and organizational subculture. To find the coefficients for those paths we simply conduct a multiple regression to predict HIS adoption from HIS attitude and sub-culture and also from HIS satisfaction and sub-culture. The multiple regression analysis results are as shown below:-

Table 9: Regression reports for constructive style and HIS attitude

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.820	.592		-3.074	.003
	Constructive	.480	.155	.377	3.105	.003
	REGR factor score for attitude	.401	.122	.401	3.301	.002

a. Dependent Variable: REGR factor score for analysis adoption

Source: Research

From the results of the case study constructive culture style is significantly correlated with HIS adoption, r = 0.671 and also it is significantly correlated with HIS attitude, r = 0.731. The partial effect of HIS attitude on HIS adoption, holding constructive culture constant is substantial because from the regression results Beta = 0.401, p = 0.002. The direct effect of constructive culture on HIS adoption (removing the effect of HIS attitude) is important as shown on the regression results, Beta = 0.377, p = 0.003

All the regression coefficients are statistically significant because they don't drop very much from the original. The Beta weights are the path coefficients leading to HIS adoption: 0.377 from constructive culture style and 0.401 from HIS attitude. The results show that there is partial effect because the direct effect (constructive culture) is still significant after adding HIS attitude in to the regression equation. From the results it is clear that constructive culture style affects the adoption of health information system strongly.

Table 10: Regression reports for constructive style and HIS satisfaction

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1.970	.525		-3.749	.000
	Constructive	.520	.137	.408	3.794	.000
	REGR factor score for satisfaction	.401	.108	.401	3.727	.000

a. Dependent Variable: REGR factor score for analysis adoption

Source: Research

The same results reflect for constructive culture style and health information system satisfaction because from the correlation results constructive culture style is significantly correlated with HIS adoption, r=0.671 and it is also significantly correlated with HIS satisfaction, r=0.654. Therefore the partial effect of HIS satisfaction on HIS adoption, holding constructive culture constant is significant, Beta=.401, p=0.000. The results also show that the direct effect of constructive culture on HIS adoption (removing the effect of HIS satisfaction) is significant, Beta = 0.408, p=0.000

All the regression coefficients are statistically important because they don't drop very much from the original. The Beta weights are the path coefficients leading to HIS adoption: 0.408 from constructive culture style and 0.401 from HIS satisfaction. The results show that there is partial effect because the direct effect (constructive culture) is still substantial after adding HIS satisfaction in to the regression equation.

Table 11: Regression reports for aggressive style and HIS attitude

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.312	.211		6.225	.000
	Aggressive	-.559	.085	-.572	-6.588	.000
	REGR factor score for attitude	.334	.087	.334	3.845	.000

a. Dependent Variable: REGR factor score for analysis adoption

Source: Research

Results are explained below

- Aggressive culture style is significantly correlated with HIS adoption, r = -0.772
- Aggressive culture style is significantly correlated with HIS attitude, r = -0.600
- The partial effect of HIS attitude on HIS adoption, holding aggressive culture constant is significant, Beta = -0.572, p = 0.000
- The direct effect of aggressive culture on HIS adoption (removing the effect of HIS attitude) is significant, Beta = 0.334, p = 0.000

All the regression coefficients are statistically significant because they don't drop very much from the original. The Beta weights are the path coefficients leading to HIS adoption: -0.572 from aggressive culture style and 0.334 from HIS attitude. The results show that there is partial effect because the direct effect (aggressive culture) is still significant after adding HIS attitude in to the regression equation.

Table 12: Regression reports for aggressive style and HIS satisfaction

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.334	.219		6.095	.000
	Aggressive	-.568	.088	-.582	-6.436	.000
	REGR factor score for satisfaction	.307	.090	.307	3.394	.001

a. Dependent Variable: REGR factor score for analysis adoption

Source: Research

From the above tables the results are explained below

- Aggressive culture style is significantly correlated with HIS adoption, r = -0.772
- Aggressive culture style is significantly correlated with HIS satisfaction, r = -0.621
- The partial effect of HIS satisfaction on HIS adoption, holding aggressive culture constant is significant, Beta =- 0.582, p = 0.000
- The direct effect of aggressive culture on HIS adoption (removing the effect of HIS satisfaction) is significant, Beta = 0.307, p = 0.001

All the regression coefficients are statistically significant because they don't drop very much from the original. The Beta weights are the path coefficients leading to HIS adoption: -0.582 from aggressive culture style and 0.307 from satisfaction. The results show that there is partial effect because the direct effect (aggressive culture) is still significant after adding HIS satisfaction in to the regression equation.

For the passive culture style no regression was done because the results from the zero-order correlation showed that the relationship between the culture style and HIS adoption was not significant (0.207).

Table 13: Summary of the results

Professional Sub-culture Styles	**Relation with HIS adoption**	**Explanation (can be seen from literature and results)**
Constructive style	Significant	From the study it shows that constructive culture has a strong positive relationship with health information system adoption. The results show that the professions that perceive the constructive culture style they have positive attitude towards health information systems and they are satisfied with the health information system.
Passive style	Not significant	The results of the study show that there was no relationship between passive culture style and health information system adoption.
Aggressive style	Significant	Based on the case study results aggressive culture has a strong negative relationship with health information system adoption. The results show that the professions that perceive the aggressive culture style they have negative attitude towards health information systems and they are not satisfied with the health information system.

Source: Research

4.6 Discussion

The objectives of this study was measure health professional sub-cultures and relate them to attitude towards HIS and satisfaction with HIS and how they affect the adoption of health information system. The study showed that the professional sub-cultures are not uniform within hospitals. This finding supports previous studies on culture. The study highlight the importance of identifying, explaining and measuring sub-cultures, particularly amongst professional groups before implementation to be able to develop tailored strategies to facilitate acceptance and use.

4.6.1. Professional Sub-cultures and attitudes to HIS adoptions

From the results of the case study we found out that nurses, record clerks and pharmacists reported significantly more positive views in relation to the attitude survey items compared to doctors. The relatively constructive culture of nurses, record clerks and pharmacists is one in which they will be inclined to support the uptake and implementation of a new health information system. Based on the results of the case study it is clear that the achievement, self-actualising and encouraging styles of nurses, record clerks and pharmacists makes it easy to accept new health information systems. The aggressive culture perceived by doctors would appear to discourage the uptake of new health information systems as they would by definition tend to oppose new ideas. The high perfectionistic, power and competitive styles of doctors could also be counterproductive to adoption of health information system.

4.6.2. Professional Subcultures and satisfaction to HIS adoptions

Just as with the attitude, from the results of the case study we found out that nurses, record clerks and pharmacists reported significantly more positive views in relation to the satisfaction survey items compared to doctors. The relatively constructive culture of nurses, record clerks and pharmacists is one in which they will be inclined to support the uptake and use of a new health information system. Based on the results of the case study it is clear that the achievement, self-actualising and encouraging styles of nurses, record clerks and pharmacists makes it easy to accept and use new health information systems. The aggressive culture perceived by doctors would appear to discourage the uptake or show dissatisfaction of new health information systems as they would by definition tend to oppose new ideas. The high perfectionistic, power and competitive styles of doctors could also be counterproductive to adoption of health information system.

4.6.3. Other Studies

In a study done by Ash j. (1997) which identified organizational attributes which affected diffusion of three information technologies showed that variables such as communication, participative decision making, top management support, planning, the existence of champions and reward systems were important predictors for successful diffusion of information technology. The organizational attributes identified by Ash J. (1997) are factors which contribute to the culture of the organization as they affect how organizational members perceive, think and feel in the organization. Constructive cultures, as defined by the OCI, are promoted by goal setting, communication, encouragements, supportive and cooperation. The constructive cultural attributes measured by OCI are similar to those identified in the Ash J. (1997) study as essential for diffusion of information technology.

As Amine et al. (2011), found out in their research, a greater understanding of the various dimensions of culture, as applied to IT and the people who use it, will lead to more globally acceptable IT products and better choices for IT.

A study by Wausi and Getao (2009), showed that IS that adapts to the strategic focus of an organization and, hence, the organization's values can be more acceptable and lead to IS success in an African context. Implementing and using IS often results in changes in organizational procedures, creating potential for conflict and resistance.

Also as Indeje W.G and Zheng Q. (2010) found out in their study on organizational culture and information systems Implementation, that organization culture has a strong influence on information systems development and implementation. The identification and understanding of meanings, norms and power in organizations is an important consideration when developing and implementing an information system.

The results from the organizational sub-culture at university of Nairobi health services has exposed the relationships between culture and how doctors, nurses, pharmacists and record clerks perceive and support new information systems. The different cultural perspectives of doctors, nurses, pharmacists and record clerks reflected the differences in their attitudes towards health information systems. The characteristics of sub-cultures within an organization should be taken into account given the impact of culture on the uptake of health information system.

The results of the study indicate the importance of examining sub-cultures prior to implementation to enable cultural characteristics and differences between professional groups to be taken into account. A measure of organisational culture within professional groups provides a point-in-time picture which can be used to prepare for an information system implementation by highlighting areas where cultural change might be enacted. With this kind of study certain behaviours can be encouraged or discouraged.

For those who are not using strategies can be put in place that will assist in moving members of various professional groups from a sub-culture which is not ideal to one that is more constructive and supportive of change. Systems, processes and practices which promote a constructive culture can be instituted. Strategies include performance appraisal, communication, respect for staff and employee involvement.

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This section gives a summary of the results, research limitations, statement of the conclusions and recommendations for further studies.

5.2. Summary of Results

In this case study we sought to know the cultural perceptions of the professionals in university health services and the results indicate that the doctors perceived aggressive culture style while the other three professions' (Nurses, Pharmacists and Record clerks) perceived constructive culture styles.

The study also sought to know the relationship between the sub-cultures and attitude towards health information systems adoption and the results indicate that there is a strong positive relationship between constructive sub-culture style and the attitude towards HIS adoption. This is seen from the results because the professional groups that perceive the constructive sub-culture style are seen to be using the university health management information system. For aggressive sub-culture the results showed a strong negative relationship with attitude towards health information systems and is also seen from the results that the profession group that perceived this type of culture are not using the system.

On the second question the study looked at the relationship between the sub-cultures and the satisfaction with health information systems where the results showed also a very strong positive relationship between constructive sub-culture style and the satisfaction with health information system. The results also showed that there was a negative relationship between aggressive sub-culture and the satisfaction with health information systems.

For the Passive sub-culture style there was no meaningful relationship with either attitude or satisfaction because the results showed that there was no relationship between passive sub-culture style and the health information adoption.

5.3 Limitations

The limitations of the study are those characteristics of design or methodology that impacted or influenced the interpretation of the results of the study. They are the constraints on generalizability and utility of findings. The following limitations were encountered during the study:-

1. The research was limited by time because this had to be done in a period of six months which is not enough to collect enough data.

2. The research was also affected by the sample size because some units like the record clerks even after picking the entire population it was too small hence limited the generalization of the results.

3. Accessibility to some of the doctors was a challenge hence affecting the response to questionnaire which affected the generalization of results.

4. The results may not be generalizable to other hospitals like Kenyatta National Hospital because the case study was based on a university health services which is an organizational health clinic.

5.4 Conclusion

The objective of this study has been successfully obtained, to measure the health professional sub-cultures and relate this to attitudes towards, and satisfaction with health information system, with a view of improving adoption and use of HIS in Kenya.

This case study demonstrated that the professional sub-cultures are not uniform within hospitals. In the findings it demonstrated that doctors perceived aggressive culture style while the other three professions' (Nurses, Pharmacists and Record clerks) perceived constructive culture styles.

The case demonstrated how professional sub-cultures as perceived by doctors, pharmacists, record clerks and nurses in this study relate to their attitudes towards, and satisfaction with, health information system. The relatively constructive culture of nurses, pharmacists and record clerks is one where they broadly support the uptake and implementation of a new health information system. These categories of professions did in fact have more positive views. The aggressive/defensive culture perceived by doctors would appear to discourage the uptake of health information system as they would by definition tend to oppose new ideas either openly or indirectly, or both. The high perfectionistic styles of doctors could also be counterproductive to the implementation of new health information systems

This case showed the importance of examining sub-cultures prior to implementation to enable cultural characteristics and differences between professional groups to be taken into account. A measure of organisational culture within professional groups provides a point-in-time picture which can be used to prepare for health information system implementation by highlighting areas where cultural change might be enacted.

5.5 Implication of the study

These findings have implications for implementers of health information systems. The results indicate the importance of examining sub-cultures prior to implementation to enable cultural characteristics and differences between professional groups to be taken into account. A measure of organisational culture within professional groups provides a point-in-time picture which can be used to prepare for an information system implementation by highlighting areas where cultural change might be enacted. With this kind of study certain behaviours can be encouraged or discouraged.

The study findings also have implications for designers and developers of health information systems. They need to study the professional sub-cultures prior to development to enable cultural characteristics and differences between professional groups to be taken in to account. The perfection of the systems should be considered when it comes to doctors interaction with the system.

5.6 Recommendations

For further study the following recommendations should be considered:-

Other methods of data collection like observation and interviews could have provided further evidence regarding the nature of culture within the professional groups. Such methods might determine differences between espoused and enacted values and the strength of attitudes.

The sample included doctors, nurses, pharmacists and record clerks within the university of Nairobi health services which do not include all the professional groups in health care such as lab technologists and theatre surgeons. This results may not be strictly generalized to the population of health professionals in other teaching hospitals, although given their fit with other studies the results are likely to be broadly transferable across settings.

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APPENDICES

Appendix A: Letter of introduction from University

UNIVERSITY OF NAIROBI
COLLEGE OF BIOLOGICAL AND PHYSICAL SCIENCES
SCHOOL OF COMPUTING AND INFORMATICS

Telephone: 4447870/ 4444919/4446544
Telegrams: "Varsity" Nairobi
Email: director-sci@uonbi.ac.ke

P. O. Box 30197
00100 GPO
Nairobi, Kenya

Our Ref: UON/SCI/MSC(IS)/2012

18 February 2014

To Whom It May Concern

Dear Sir/Madam

JENINA WANZA LUMUMBA – REG. NO. P56/73661/2012

The above named is a bona fide student pursuing a Master of Science in Information Systems degree at the School of Computing and Informatics, University of Nairobi. She is currently carrying out her research/survey on the project entitled: ***"How Health Professional Sub-cultures Affect Adoption of Health Information Systems".***

The main objective of this survey is to relate health professional sub-cultures to satisfaction with health information system, with a view of improving adoption and use of health information systems in Kenya. We would be grateful if you could assist Ms. Lumumba as she gathers data for her survey. You will only take a few moments of your time to answer a few questions in the attached questionnaire.

If you have any queries about the exercise please do not hesitate to contact us. The information you provide will be solely for the project.

Thank you very much for your cooperation

Yours faithfully

School of Computing & Informatics
University of NAIROBI
P. O. Box 30197
NAIROBI

PROF. W. OKELO-ODONGO
DIRECTOR
SCHOOL OF COMPUTING AND INFORMATICS

Enclosure Questionnaire

AN/ibmm/New D My docs/Project Research letter

Appendix B: Questionnaire

INSTRUCTIONS

- *Do not write your name*
- *Answer all the questions*
- *In sections where your response is based on five (5) points scales tick only one.*

1. Respondent's information (TICK YOUR CHOICE)

Question	**Answer**
Gender	Female
	Male
Age	20 - 35
	36 - 50
	51 - 70

2. Respondent's organizational culture perception

To what extend are staff members expected to adhere to the following statements? (TICK ONE CHOICE)

	Not at all (1)	**To a slight extend (2)**	**To a moderate extent (3)**	**To a great extent (4)**	**To a very great extent (5)**
1. Set challenging but realistic goals and pursue them with enthusiasm					
2. Be concerned about their own growth, communicate ideas and think in unique and independent ways					
3. Be supportive and resolve conflicts constructively					
4. Cooperate with others and think in terms of the group's satisfaction					
5. Agree with, gain the approval of others					
6. Conform, follow the rules, and make a good impression					
7. Do what they are told and clear all decisions with supervisors					
8. Take few chances, shift responsibilities to others and avoid being blamed for mistakes					
9. Avoid making mistakes, work long hours and keep 'on top' of everything					
10. Operate in a 'win-lose' framework and work against their peers to be noticed					
11. Take charge and 'control' others and make decisions autocratically					
12. Gain status and influence by being critical and constantly challenging one another					

3. Respondent's attitude towards health information system (HIS)

To what extend do you agree with the following statements regarding the feeling about the University health information system (UHMIS)? (TICK ONE CHOICE)

	Strongly disagree (1)	**Disagree (2)**	**Average (3)**	**Agree (4)**	**Strongly agree (5)**
1 The training I received was adequate					
2 I feel confident to use the system					
3 I feel my suggestions are considered					
4 The system makes my work more interesting					
5 The system is important to my work					
6 Use of the system helps me serve my clients better.					
7 I do not need the system to do my work					
8 Using the system increases my productivity					
9 Working with the system makes me uncomfortable					
10 I do not use the system for fear of making mistakes					

4. Respondent's satisfaction with health information system (HIS)

To what extend do you agree with the following statements regarding the satisfaction with the University health information system (UHMIS)? (TICK ONE CHOICE)

	Strongly disagree (1)	**Disagree (2)**	**Average (3)**	**Agree (4)**	**Strongly agree (5)**
1. The system is user friendly					
2. The system is accurate					
3. I get the support I need from ICT					
4. Allows review of prescription history					
5. Improves my productivity					
6. The system is easy to use					
7. Provides security for the patient data					
8. It provides information I need on time					
9. Using the system makes it easier to do diagnosis					
10. It provides information in a useful format					
11. The system reduced the number of prescription errors					
12. The system provides up-to-date information					

5. Adoption of health information system (HIS)

To what extend do you agree with the following statements regarding the adoption of University health information system (UHMIS)? (TICK ONE CHOICE)

	Strongly disagree (1)	**Disagree (2)**	**Average (3)**	**Agree (4)**	**Strongly agree (5)**
1. I find it easy to use UHMIS to do what I want					
2. I would like to use the system frequently					
3. I use higher percentage of my patients on the system					
4. I would recommend the system to others					

Appendix C: Data tabulation

ID	Genc	Age	Profession	Con1	Con2	Con3	Con4	Pas1	Pas2	Pas3	Pas4	Agg1	Agg2	Agg3	Agg4	Att1	Att2	Att3	Att4	Att5	Att6	Att7	Att8	Att9	Att10	Sat1	Sat2	Sat3	Sat4	Sat5	Sat6	Sat7	Sat8	Sat9	Sat10	Sat11	Sat12
1	F	20-35	Records	4	3	3	3	4	4	4	1	3	1	3	1	2	4	2	5	5	5	1	5	1	1	5	1	1	4	5	5	7	3	4	5	5	4
2	M	20-35	Records	5	5	5	4	5	4	4	1	2	1	2	2	4	4	3	4	3	4	2	4	1	1	5	1	2	1	5	4	4	4	5	3	4	3
3	M	20-35	Records	4	5	4	3	3	4	4	2	4	1	1	3	3	3	2	5	5	5	1	4	2	1	3	2	1	2	4	4	5	4	5	3	4	3
4	M	20-35	Records	5	3	5	5	3	5	4	1	2	1	1	2	4	5	3	4	5	5	1	5	1	1	5	1	3	1	5	5	4	5	5	3	5	4
5	F	36-50	Records	4	5	4	5	4	5	4	4	4	1	3	2	5	5	3	5	5	5	1	4	1	1	4	1	2	1	5	4	4	5	5	4	5	3
6	M	36-50	Records	3	4	3	4	3	4	4	3	5	1	1	1	4	5	2	5	5	5	2	5	2	2	3	2	3	3	4	4	4	4	5	4	4	4
7	F	36-50	Records	3	4	4	5	3	4	3	3	2	2	2	3	5	4	4	5	5	5	1	4	1	1	5	1	3	3	4	4	4	4	5	4	5	4
8	M	36-50	Records	4	4	3	3	4	3	3	3	3	2	2	2	3	5	4	5	5	5	2	5	2	1	5	2	3	4	5	5	5	5	5	4	5	5
9	F	20-35	Records	4	4	3	4	3	4	3	3	2	2	2	3	4	5	4	5	5	5	2	5	1	1	5	1	2	4	5	5	5	5	5	5	5	5
10	F	20-35	Records	4	4	4	4	4	4	4	4	3	1	1	1	4	4	4	4	4	4	1	3	1	1	4	4	4	4	4	4	4	4	4	4	4	4
11	M	36-50	Doctor	2	3	2	1	2	3	2	3	4	4	4	4	4	5	3	3	3	3	2	1	1	1	3	3	3	3	4	5	3	3	4	2	3	4
12	F	20-35	Doctor	3	3	3	3	3	3	2	2	4	4	4	5	3	3	2	4	2	1	1	1	2	1	3	3	3	3	4	2	2	3	3	2	2	1
13	M	36-50	Doctor	3	2	2	3	3	3	2	1	3	4	4	5	4	3	2	3	3	3	2	4	1	1	3	2	3	4	4	4	4	4	2	3	1	1
14	F	36-50	Doctor	2	2	2	2	2	3	3	2	4	4	4	5	3	3	3	4	4	2	1	2	1	1	2	3	3	2	3	4	4	4	3	3	2	2
15	F	36-50	Doctor	3	3	3	2	4	4	2	3	4	3	4	5	1	1	1	3	1	1	1	4	4	4	3	3	4	3	4	2	2	3	3	2	2	2
16	M	51-70	Doctor	2	1	2	3	3	1	2	2	3	4	4	5	2	2	3	4	2	4	2	3	1	2	3	3	3	2	2	4	2	4	1	2	3	2
17	F	36-50	Doctor	3	2	2	4	2	1	3	4	3	5	3	4	3	3	3	2	2	4	1	3	3	2	3	3	3	3	3	1	2	3	2	3	3	2
18	F	51-70	Doctor	2	3	3	3	2	2	2	3	3	3	4	5	4	4	3	2	4	2	3	2	5	4	2	5	2	3	1	4	2	1	1	3	2	3
19	F	51-70	Doctor	3	3	3	3	3	3	2	2	4	4	4	5	3	3	3	3	3	3	3	3	1	1	2	3	2	3	3	3	3	3	4	2	4	1
20	F	36-50	Doctor	2	2	3	3	4	3	2	1	3	4	5	5	4	2	2	1	3	4	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
21	F	36-50	Doctor	2	4	4	2	3	3	1	2	4	4	4	5	3	3	2	2	2	2	1	2	2	3	3	5	4	2	4	3	1	2	4	3	2	2
22	M	51-70	Doctor	3	3	3	2	3	1	1	2	3	3	4	5	3	2	2	3	3	3	3	3	3	2	4	4	2	2	1	1	1	2	3	4	3	2
23	F	36-50	Doctor	2	2	3	2	3	2	1	3	3	3	4	5	3	4	2	1	1	2	2	1	3	2	3	2	3	2	2	2	3	3	3	3	3	3
24	F	36-50	Doctor	3	3	3	3	3	3	2	2	4	4	4	5	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
25	M	36-50	Doctor	2	2	2	2	2	3	3	3	3	4	5	5	3	2	2	2	2	3	2	1	4	1	4	2	3	3	3	4	1	4	2	3	2	2
26	M	36-50	Nurse	4	4	5	4	5	3	3	2	2	3	3	2	3	3	3	3	3	4	2	3	3	2	4	4	3	4	3	3	5	4	4	5	5	5
27	F	36-50	Nurse	4	4	4	3	2	2	3	3	1	1	2	1	4	4	4	3	4	2	2	4	4	2	4	4	3	5	3	4	4	3	4	4	2	4
28	M	36-50	Nurse	4	4	4	4	4	2	2	2	2	1	3	1	4	4	3	4	4	4	4	4	2	1	5	5	2	2	3	5	5	5	4	5	5	5
29	M	36-50	Nurse	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
30	F	36-50	Nurse	4	4	4	4	4	2	2	2	4	2	2	1	4	4	3	3	3	3	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3
31	F	36-50	Nurse	4	5	4	3	2	2	3	2	3	1	1	2	4	4	4	4	4	4	3	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4
32	M	36-50	Nurse	4	4	5	5	3	3	3	2	1	1	2	3	4	4	4	4	4	4	4	4	3	2	4	4	5	5	5	5	5	5	5	5	5	5
33	F	20-35	Nurse	3	3	3	3	3	2	2	1	2	3	1	2	3	4	3	3	3	3	1	3	1	2	4	4	2	3	3	3	4	4	3	4	3	3
34	F	36-50	Nurse	5	5	5	5	4	5	2	1	3	2	1	2	4	5	4	4	5	5	2	5	2	2	5	4	2	2	5	5	5	4	5	5	5	5
35	F	36-50	Nurse	4	5	4	3	3	2	3	2	1	1	1	1	4	4	4	4	4	4	1	2	2	3	4	4	4	4	5	4	4	4	4	4	5	4
36	F	51-70	Nurse	4	4	4	3	3	4	4	2	2	2	1	1	4	4	4	4	4	4	1	4	1	1	4	4	4	4	4	4	4	4	4	4	4	4
37	M	36-50	Nurse	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
38	M	36-50	Nurse	5	4	4	4	3	3	2	2	2	1	1	1	4	4	4	4	4	4	1	3	1	1	3	3	4	3	4	3	3	4	4	4	3	3
39	F	51-70	Nurse	3	5	3	4	3	2	2	1	3	4	2	4	4	4	2	4	4	4	5	5	2	1	4	4	4	4	4	3	4	4	4	4	4	4
40	F	36-50	Nurse	4	4	5	4	3	3	3	1	2	1	1	2	4	4	3	3	4	4	4	2	4	4	3	4	4	4	4	4	4	3	4	4	4	4
41	F	36-50	Nurse	4	4	3	3	2	2	3	1	3	2	1	1	4	4	4	4	4	4	2	4	2	2	4	4	4	4	4	4	4	4	4	4	4	4
42	F	51-70	Nurse	4	5	4	4	4	2	2	4	1	3	2	1	5	5	4	4	5	5	5	5	2	1	5	3	3	5	5	5	5	5	5	5	5	5
43	M	36-50	Nurse	4	4	3	3	2	3	1	2	2	2	1	3	3	4	3	4	4	4	4	2	2	1	4	3	3	4	4	4	4	3	4	4	4	4
44	F	20-35	Nurse	5	4	5	5	3	3	3	2	2	3	1	1	5	5	5	5	5	5	5	5	5	2	2	5	4	4	5	5	4	4	5	4	5	4
45	F	36-50	Nurse	4	4	4	3	3	4	4	2	2	2	1	1	4	4	4	4	4	4	1	4	1	1	4	4	4	4	4	4	4	4	4	4	4	4
46	F	36-50	Nurse	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
47	F	36-50	Nurse	5	4	4	4	3	3	2	2	2	1	1	1	4	4	4	4	4	4	1	3	1	1	3	3	4	3	4	3	3	4	4	4	3	3
48	F	36-50	Nurse	3	5	3	4	3	2	2	1	3	4	2	4	4	4	2	4	4	4	5	5	2	1	4	4	4	4	4	3	4	4	4	4	4	4
49	F	36-50	Nurse	4	4	5	4	3	3	3	1	2	1	1	2	4	4	3	3	4	4	4	2	4	4	3	4	4	4	4	4	4	3	4	4	4	4
50	F	36-50	Nurse	4	4	3	3	2	2	3	1	3	2	1	1	4	4	4	4	4	4	2	4	2	2	4	4	4	4	4	4	4	4	4	4	4	4
51	F	36-50	Nurse	4	5	4	4	4	2	2	4	1	3	2	1	5	5	4	4	5	5	5	5	2	1	5	3	3	5	5	5	5	5	5	5	5	5
52	F	36-50	Nurse	4	4	3	3	2	3	1	2	2	2	1	3	3	4	3	4	4	4	4	2	2	1	4	3	3	4	4	4	4	3	4	4	4	4
53	F	36-50	Nurse	5	4	5	5	3	3	3	2	2	3	1	1	5	5	5	5	5	5	5	5	5	2	2	5	4	4	5	5	4	4	5	4	5	4
54	F	36-50	Nurse	4	4	4	3	2	2	3	3	1	1	2	1	4	4	4	3	4	2	2	4	4	2	4	4	3	5	3	4	4	3	4	4	2	4
55	F	36-50	Nurse	4	4	4	4	4	2	2	2	2	1	3	1	4	4	3	4	4	4	4	4	2	1	5	5	2	2	3	5	5	5	4	5	5	5
56	F	36-50	Pharmacist	4	4	4	4	4	4	4	3	2	1	2	3	4	4	3	3	4	4	4	2	1	1	3	3	1	4	4	4	2	3	4	4	4	5
57	M	36-50	Pharmacist	3	4	3	4	3	2	2	2	1	1	1	1	4	5	3	5	5	5	5	3	3	5	3	3	4	4	4	3	4	5	5	5	5	5
58	F	36-50	Pharmacist	4	4	4	4	4	3	2	3	2	1	1	1	5	5	5	4	5	2	2	2	2	2	5	5	4	5	5	5	5	5	5	5	5	5
59	M	20-35	Pharmacist	4	5	4	4	3	2	1	2	1	1	2	1	4	5	3	4	4	4	5	5	2	4	4	3	2	4	4	4	4	4	4	5	3	4
60	F	20-35	Pharmacist	3	3	4	3	3	4	3	1	1	1	1	3	4	4	4	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
61	F	36-50	Pharmacist	3	4	5	5	3	2	2	5	3	1	1	1	4	3	3	5	2	2	2	2	2	2	3	2	4	4	4	4	4	2	2	4	2	2
62	M	20-35	Pharmacist	5	4	5	5	3	2	2	3	1	1	1	1	3	4	3	5	5	4	4	1	3	1	4	3	3	4	4	4	4	4	4	4	4	4
63	M	36-50	Pharmacist	4	5	4	5	3	3	3	1	2	1	1	1	5	5	5	5	5	5	5	5	5	5	5	4	4	4	4	5	5	4	4	4	4	4
64	M	20-35	Pharmacist	5	5	4	5	4	4	4	1	2	3	2	2	5	5	4	4	4	3	4	1	1	1	5	4	4	3	5	5	4	4	4	4	5	4
65	F	20-35	Pharmacist	4	5	5	4	4	3	3	3	2	2	1	1	4	5	4	4	5	5	5	5	2	2	5	4	4	3	5	5	3	3	4	4	5	5
66	F	36-50	Pharmacist	4	4	4	4	3	2	3	2	1	1	1	1	4	4	4	4	4	4	2	1	1	1	4	4	4	4	4	3	3	4	4	4	5	4
67	F	36-50	Pharmacist	4	4	4	4	3	3	3	3	2	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
68	M	36-50	Pharmacist	3	3	3	3	3	3	3	2	2	1	1	1	3	3	3	3	3	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
69	F	36-50	Pharmacist	4	4	4	4	4	3	3	3	2	2	2	2	4	5	5	5	3	5	5	3	2	2	4	4	4	4	4	4	4	4	4	4	4	4
70	F	36-50	Pharmacist	4	4	4	4	4	1	3	3	3	1	2	2	4	5	3	5	5	5	3	3	3	3	4	4	4	3	4	4	4	5	5	4	4	4
71	M	36-50	Pharmacist	3	4	4	3	3	3	2	2	2	3	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
72	F	36-50	Pharmacist	4	4	5	4	3	3	3	3	3	1	1	1	4	4	4	4	4	4	4	3	2	2	4	4	3	3	3	3	3	3	3	4	3	4