

Nurses' Resistance to the Adoption of Information Technology in Jordanian Hospitals

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ABSTRACT: Some hospitals in Jordan have not yet converted their manual patient record systems to computerized data systems. This research paper aims to identify various factors that hinder the acceptance of nurses to a new computer system; as a result this will affect the quality of services. Questionnaire addressing the magnitude of nurses' resistance to using computer-based records within hospital systems was administered to a sample of 180 Jordanian nurses working in both private and educational hospitals. The major contributing factor to nurses' resistance toward IT adoption is the perception that their work load and responsibilities will increase once IT is adopted, and uncertainty about the future prevents them from foreseeing the benefits associated with doing so. This study can provide a simulating tool, convenient for planning and implementing new strategies that in turn helps in adapting to changes in different aspects within the workplace. In future studies on this topic, other potential factors that may influence a resistance to change should be addressed within a larger sample that covers more governorates. This paper claims that when implementing IT within hospital departments, nurses' perspectives should be taken into account, namely in planning the transition from manual file systems to digital ones. With that being said, nurses must also be trained on the value IT systems add to patient care.

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1. INTRODUCTION

Nowadays, hospitals are facing the challenge of improving their quality of work while shortages in the availability of resources continue to restrict this objective. However, the vision of information technology appears as a constructive tool to improve and maintain the quality of care.

Previous studies concerning nurses' attitudes to changing trends (Azza, et al. 2013; Khachian, et al. 2012), particularly in shifting to information technology, showed positive attitudes toward using health information technology. In contrast, nurses' fears rose as a result of the negative effects of information technology on patient care (Cheryl, 2010), where lacking the required skills formed one of the causes perpetuating that negative attitude to adapting information technology (Nkosiet al. 2011).

Other studies showed that using informaion technology has produced improvements in the level of health care and reductions in many adverse effects (Dünnebeilaet al., 2012; Whitten etal.2001; Lappé et al., 2004).

In Jordan, addressing information systems within hospital departments has not yet been disseminated. The purpose of the study is to identify the main causes of resistance to adopting information technology from the perspective of nurses. It is hoped that results of this

study will serve as a reference for other hospitals embarking on the adoption of information technology.

Nurses perform an important function in hospitals; they deal directly with the patients and serve as a link between all departments in the health care institution. Therefore, nurses are important users of information technology. When a change to an information technology system occurs within health care institutions, quality of care may be affected if no real procedures are taken to facilitate such a transition. Consequently if nurses are not driven to take part as users of the newly adopted IT system, shortcomings within the institution will inevitably occur; hence affecting the quality of care provided. Easing the acceptance of nursing staff to adopt information technology would go a long way in improving the level of care offered by the institution, while maintaining its reputation.

This study aims at identifying the major causes of change resistance among nursing staff. Moreover, this study also looks at change resistance as it relates to age, gender, and sector; along with other factors such as the method of adopting information technology, previous knowledge of skills related to information technology, management, and organizational support.

2. LITERATURE REVIEW:

Hospitals are facing challenges in dealing with many systematic problems including overstretched staff, limited resources and operational inefficiency, but training to the healthcare staff on medical knowledge and regulations can improve the quality of medical care (Harris, 2004). Also other studies highlight that there are clear links between the level of information system skills and the job satisfaction of nurses; enabling their involvement in implementing system changes. Such systemic changes in turn

increase the contribution of nurses to the implementation process (Maamari&Chaanine, 2013). So applying information technology in the medical field is a critical issue that might be a contributing factor to generating change resistance among medical staff (Figure1). There is a wide negative perception and strong resistance to using information technology which translates to a lack of support and a shortage of skills required for using IT systems. Appropriate readiness and accurate perception will facilitate understanding the need of using information systems.

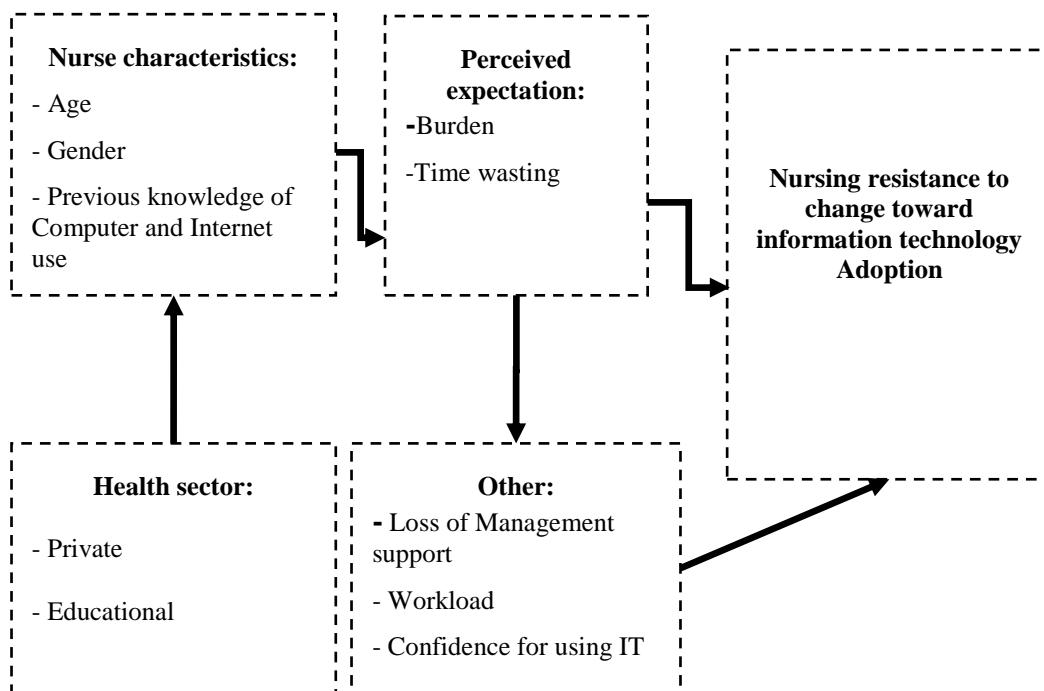


Figure (1): Factors that can have an influence on nurses' resistance to the "Adoption of Information Technology"

Explanation of the need of information systems and using an innovative approach are important components to resolve this prevalent apprehension among medical staff. Organizational routine and culture need to be kept in account, to support a teams' transition to the new technology, which will be adopted in their work (Riesenmy, 2010).

Measuring findings that relate to professional managerial discourse creates a positive impact on the acceptance of change, and decreases resistance among cross functional teams rather than non-aligned teams (Pieterse, 2012).

Also the socio-technical aspect should be kept in mind (Rosenbloomet.al, 2006; Ash et.al, 2007). Initially entering information digitally will potentially take a longer period of time until staff adjusts to the new technology (Lluch, 2011). There are other risk factors that should be considered that may also affect

staff perception; such as efficiency and the financial aspect (Ludwick& Doucette, 2009).

Anxiety and a feeling of incompetency may also develop among medical staff in reaction to what may be perceived as an overwhelming task to learn the new technology secondary to lack of computer skills, lack of access, lack of time, lack of support and budgetary constraints (Nkosi et al., 2011), which may increase resistance towards using information technology.

Other studies suggest that inertia and fear can be major sources of resistance to change (Pihlak and Alas, 2012). With that being said, these obstacles can be overcome by facilitating proper communication and offering awareness about the applied changes. (Val & Fuentes, 2003). Nurses' concerns should be evaluated carefully before beginning the transition to information technology to know what to address and how to approach the staff when transitioning.

The first thing that a manager has to figure out is whether or not the resisting individuals have the ability to acquire the new competencies (Ludwicka&Doucettea, 2009)

Experts recommended that thorough explanation of the importance of using electronic medical record should be provided to medical teams in order to reduce their resistance. Also, providing training in computer skills makes nurses feel comfortable when using information systems (Cheryl, 2010), thus with extensive training research revealed a positive relationship between the nurses' attitude and information technology adoption (Qurain&Alhashem et al.,2007).

Using information systems can significantly improve the level of health care and reduce many adverse effects that may occur while providing care (Dünnebeila&Sunyaevbet al., 2012; Whitten et al., 2001; Lappé et al., 2004). While some studies revealed that a physician willing to investigate, obtain, and employ electronic medical records is restricted by time constrain, as office hours are not sufficient to do so (Bossen, 2007)

Extrinsic and intrinsic benefits, personal fulfillment, monetary compensations, promotion, and career development, will clearly persuade nurses and medical teams to use electronic medical records in their work. These incentives have a critical role in decreasing healthcare resistance (LIuch, 2011; Oecd, 2010; Pare&Trudel, 2007) to transitioning from paper records to electronic reports using information systems. Incentives are very important factors in healthcare to the adoption of information technology (Chaudhry et al., 2004).

A positive staff attitude should be maintained and monitored carefully by enhancing their capability and experience with the new technology. Maintaining a positive staff attitude is a constructive tool to assist an organization's overall acceptance of a new technology thereby, decreasing resistance to change (Yanga&Yoob, 2004; Thompson & Hunt, 1996).

Many studies conclude that a team understanding and management perspective is critical to implement information technology systems successfully (Massey et al., 2001). Some authors were concerned that the use of health information technology could change the relationship between health professionals and patients (Flynn et al., 2009).By applying technology orientation approach at hospitals, there will be a measure of effectiveness in delivery services to patients, accompanied by high safety, cost efficiency and quality care. (Lee &Mueter, 2010)

3. RESEARCH MODEL:

This research seeks to test three hypotheses as shown in Figure 2.

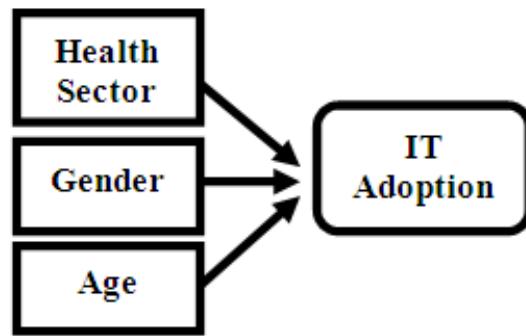


Figure (2):Research model

The main research hypotheses are:

1. There are no statistically significant variations in respondents' assessments on causes of change resistance toward IT adoption due to age.
2. There are no statistically significant variations in respondents' assessments on causes of change resistance toward IT adoption due to gender.
3. There are no statistically significant variations in respondents' assessments on causes of change resistance toward IT adoption due to working sectors.

4. THE IMPORTANCE OF RESEARCH:

Human resource management and supervision of organizational change is a key component to how successful change will be in an organization. Providing sufficient training and needed support will assist and guide employees through the process of change and lead to a more effective and efficient organization. Therefore, it is important to be acquainted with the attitudes of employees towards adopting new techniques within their premises, and if they resist, why is it that they do so? Also, in light of this study, what strategies can be taken to reduce resistance to change?

5. RESEARCH METHODOLOGY:

In this study; data were collected using close-ended questionnaires. 180 questionnaires were distributed to a random sample of nurses.141 nurses responded. Currently, in Amman; there are 2 educational hospitals and 36 private hospitals with different specialties. At present only 4 private hospitals, and 2 educational hospitals adopt information technology within their system, covering all departments and most of their procedures.

Our selection sample in this study covered 2 out of 4, from the private sector and one out of two from the educational sector. The unit of study represents 15% of the Jordanian nurses working in both sectors; 75 questionnaires were distributed to the educational hospital and 105 to the private hospitals, see (Figure 3).

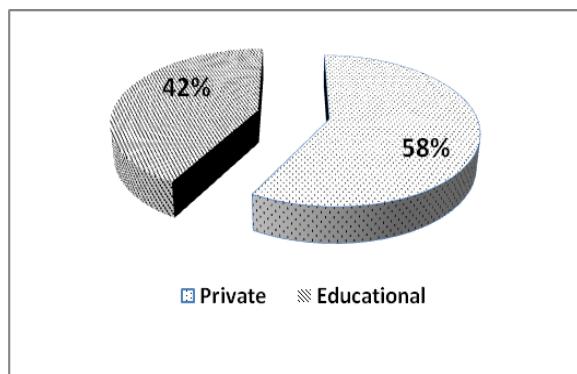


Figure (3): Respondents based on sector breakdown (Educational, Private)

6. STATISTICAL ANALYSIS

This study was conducted through a descriptive analytical approach. Percentages and frequency distributions were utilized to determine the outstanding causes of resistance to change toward information technology adoption. To disclose the degree to which each of the different factors entails resistance to administrative change among nurses in the private and educational hospitals, the mean average of response to all items pertinent to each factor is computed. Respondents' replies to causes of resistance are classified and fitted according to the following scale: responses with mean averages 1-1.99 suggest that the factor resembles no cause of resistance at all; mean averages that were between 1.99-2.99 indicate low level of resistance; 2.99-3.99 medium resistance; and 3.99-5 reflects strong cause of resistance. The impact of background characteristics on respondents' assessment of causes of resistance was studied with the

Analysis of Variance (ANOVA) statistical technique. One Sample *t*-Test comparison with $\alpha = .05$ is used to explore the location of variation according to the background traits of respondents.

7. RELIABILITY:

The SPSS test was used for a reliability measurement. The results are shown in Table (1). This reading ($\alpha = 0.871$) indicates a reliable questionnaire. (Reliability coefficient of 0.871 or higher is considered "acceptable" in most social science research situations).

Table (1): Reliability test result

Reliability Statistics	
Cronbach's Alpha	N of Items
.871	25

8. FINDINGS:

The findings of this study have rendered empirical support to the first research hypothesis. The results show that a mean of (3.02) represents the overall change resistance level and a standard deviation of (0.82).

Table (2) shows the level of change resistance toward information technology adoption, and form an initial guidance to verify research hypotheses. As medium level of strength is provided for two causes of change resistance toward information technology adoption, whereas one cause yielded high level of resistance and the response to one cause was a low level of resistance

Table (2): Causal means and levels of strength of questionnaire responses

Causes of change resistance	Mean	Level of strength
1. An increase in effort, burdens, and job requirements; changes work routine; does not fit within nurses' role	4.13	High
2. Lack of seriousness and support from higher management and organizational support	2.12	Low
3. The goals and benefits of the change are not clear to the staff	3.20	Medium
4. The change was conducted suddenly and in a confusing manner without enough training prior to implementing the change	3.35	Medium
5. Weak prior knowledge and experience with Information System	2.30	Low

As illustrated in Figure (4), the most prominent factor of change resistance to information technology adoption was the nurses' perception of the

adoption of information technology as they considered it a burden that will increase workload and job requirement.

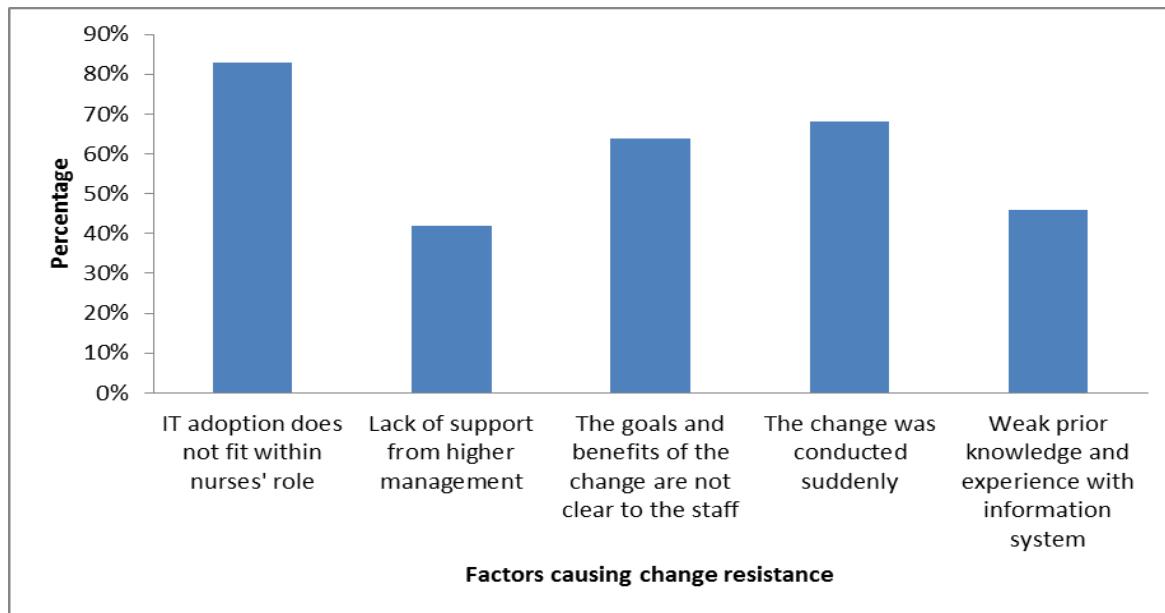


Figure (4):Factors causing change resistance toward IT adoption

Table (3) shows the relationship between the causes of change resistance and age groups. ANOVA test shows that there is a correlation between the age group and

causes of change resistance, particularly the cause related to increasing job burden and requirement, while no further correlations for other causes were found.

Table (3):Age –related causes of change resistancetowardIT

Causes of Change Resistance	Age					
	F-Ratio	Significance	Mean			
			(20-30)	(31-40)	(41-50)	(51-more)
1. An increase in effort, burdens, and job requirements; changes work routine; does not fit within nurses' role	3.73	.014*	3.83	3.18	3.63	2.79
2. Lack of seriousness and support from higher management and organizational support	.93	.42	2.90	3.08	3.04	2.00
3. The goals and benefits of the change are not clear to the staff	.49	.68	3.11	3.13	3.38	3.50
4. The change was conducted suddenly and in a confusing manner without enough training prior to implementing the change	.73	.53	3.21	3.60	3.25	3.00
5. Weak prior knowledge and experience with Information System	.73	.53	3.69	3.51	3.37	4.00

Figure (5) shows the relation between change resistance toward information technology adoption and age. The resistance varied among age groups depending on what factor they have been asked about. Groups aged between (20-30) showed high resistanceas they deemed information technology adoption unfitting with nursing role. On the other hand, the lowest factor that formed an obstacle for this group was the lack of support from higher management.

As for the group aged between (31-39), results indicated that 72 % of resistance was due to the method by which change was addressed; suddenly without sufficient training. Furthermore, the factor that scored80% for the age group(51 and above) was the weak knowledge and important skills needed to use information technology within hospital systems and daily procedures, however this group considered management support not to be the main concern for them.

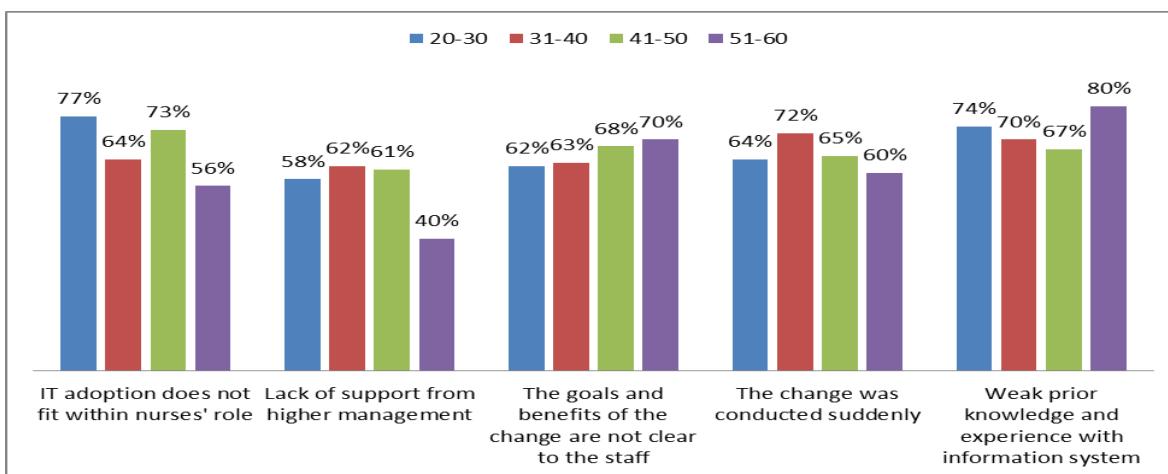


Figure (5): Main factors causing change resistance by age group

Table (4) illustrates a relation between change resistance towards information technology and health sector. ANOVA results show a significant relationship between sector type and nurses' perception that "the goals and benefits of the change are not clear to the staff".

Table (4): Causes of change resistance toward IT adoption related to health sector

Cause of ChangeResistance	Health Sector			
	F-Ratio	Significance	Mean	
			Private	Educational
1. An increase in effort, burdens, and job requirements; changes work routine; does not fit within nurses' role	.92	.33	3.82	3.60
2. Lack of seriousness and support from higher management and organizational support	.59	.44	3.06	2.90
3. The goals and benefits of the change are not clear to the staff	6.66	.01*	3.45	3.62
4. The change was conducted suddenly and in a confusing manner without enough training prior to implementing the change	2.56	.11	3.60	3.19
5. Weak prior knowledge and experience with Information System	3.14	.07	3.5	3.23

Table (5) illustrates the relationship between causes of change resistance and gender. ANOVA test results confirm that there is a significant relationship between the gender factor and nurse's staff feelings and expectation related to increasing work burden. On the other hand there is no significant relationship between gender and other causes of change resistance toward IT adoption.

Table (5):Causes of change resistance according to gender

Causes of Change Resistance	Gender			
	F-Ratio	Significance	Mean	
			Male	Female
1.An increase in effort, burdens, and job requirements; changes work routine; does not fit within nurses' role	4.06	.04*	3.92	3.01
2. Lack of seriousness and support from higher management and organizational support	.17	.68	3.41	3.06
3. The goals and benefits of the change are not clear to the staff	1.77	.18	3.87	3.66
4. The change was conducted suddenly and in a confusing manner without enough training prior to implementing the change	1.38	.24	3.55	3.23
5. Weak prior knowledge and experience with Information System	.66	.41	3.50	3.65

Figure (6) demonstrates that the resistance among male respondents was higher than that of female respondents.

Additionally, results showed that the support from top management was perceived as low from the

perspective of male respondents, while female respondents showed highest resistance to the aspect of adopting information technology.

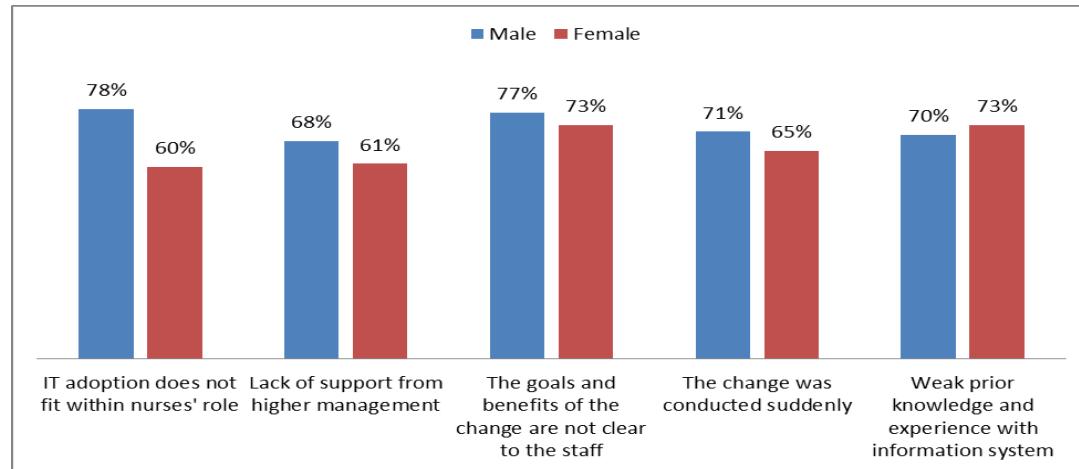


Figure (6): Causes of change resistance according to gender

In the private sector, results confirmed that the nurses' staff saw information technology adoption as "unfitting to their role and that it would add extra requirement and burden to their tasks", while in educational sector, this factor also scored very high. On

the other hand, the lack of support from top management for both sectors turned out to be a less important factor contributing to the resistance to information technology adoption see(Figure 7).

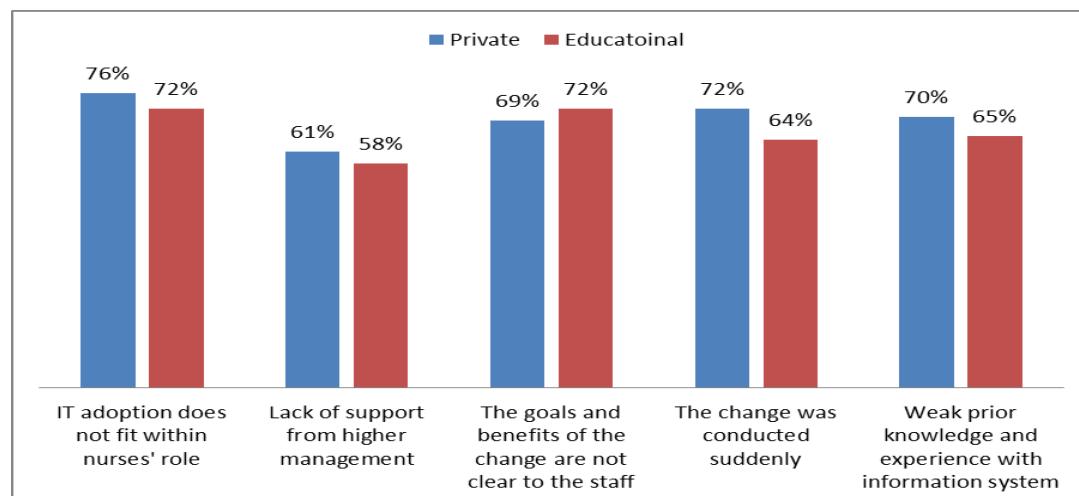


Figure (7): Change resistance according to health sector

9. DISCUSSION OF THE RESULTS:

According to the aforementioned analysis, medium resistance to change toward adopting information technology appeared due to the ambiguity of the goals and benefits of the change to the staff and due to the sudden and unsupported implementation.

Additionally, the foremost cause of change resistance toward IT adoption; was entailed in an increase in effort, burdens and job requirements along with changes in work routine that does not fit within nurses' role and job description. Furthermore, the result of the other two causes (Lack of seriousness and support from higher management and organizational

support in addition to lack of experience in dealing with Information Systems) showed low level of resistance. In general; all of the causes were supported by an age and gender breakdown.

This can be interpreted as: change resistance to information technology is mainly due to nurses feeling that information technology adoption will lead to an increased workload in addition to their existing load regardless of the outcome of quality that may result post information technology adoption. This appears clearly related to age and gender. Namely, males and the group in the 20-29 years age category showed stronger resistance to change than females and middle age category.

Throughout this study, groups that showed the most resistance toward information technology adoption are males between the ages of 20 and 29 working in private hospitals. Many factors may contribute to such findings. In Jordanian hospitals, especially private ones, nursing staff face more pressure from their directors, patients and their families; as they expect uninterrupted high quality care. From nursing staff perspective, adding more procedures to the overwhelming existing tasks, in an already stressful environment, will inevitably lead to resistance.

So, management should address this issue to ensure that the quality of care being provided to the patients will not be affected adversely, also, to find practical procedures and incentives for nursing staff to adapt to this change.

A strong relation was found between nursing staff resistance to adopting information technology and the type of health sector. An investigation has disclosed that employees who have been more assertive of resistance to these goals of change are working for educational hospitals and are mostly males.

10. RESEARCH LIMITATIONS:

This study focused on a specific set of personal and job-related variables. Many personal and job-related variables have been excluded that may have an effect on resistance to change and IT adoption. It is restricted to nursing in private and educational sectors comprised of three hospitals in Amman, Jordan.

11. CONCLUSION:

Nurses, the forefront of the care providers, and the main axis to medical services, face the challenge of using information technology. The issues raised by this study have implications for nursing practice and policy. So applying the Information technology in the medical field is a critical issue that might be a source of generating change resistance in medical teams. In this study, the perception to use and address information technology was evaluated. Change resistance toward

information technology adoption appeared in different groups; among age groups, the nurses aged above 51 years showed the highest rejection to using information technology.

On the other hand, the other age category that showed high resistance to change was the youngest group, aged between 21-29 years, and it reflected that this type of change does not fit with nursing role and add more work requirements. A surprising finding was the resistance to change from the male group, as they considered information technology adoption as a burden that doesn't fit with their role.

There is a wide negative perception and resistance toward using information technology, related to lack of support and lack of skills toward using this new system.

12. RECOMMENDATIONS

It is recommended that extensive training programs be conducted regarding the implications of using information technology in medical records.

In addition, involving the nurses in the process of building the information technology system from the beginning should be assured. Also, including IT performance and skills in annual appraisal, so the skillful nurses will get the higher appraisal results.

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ANNEX (1) RESEARCH FORM:

**Nurses' Resistance to the
Adoption of Information Technology in Jordanian Hospitals**

Dear Sir, Madam:

This questionnaire is part of a study investigating the views and attitudes of employees that cause a resistance in change towards IT adoption among the nursing sector in hospitals in Amman. The questions are divided into two sections, the first section represents socio-demographic information, and the second section included in the schedule are precisely constructed and designed. Please read them carefully and give your conscious opinions. The information you are about to give will solely be used for academic purposes. The questionnaire is anonymous—respondents' names are not requested and they will not be used in the study.

ANNEX (2) QUESTIONNAIRE:**SECTION I-SOCIO-DEMOGRAPHIC**

1- The hospital that you work in is:

- a. Private
- b. University hospital

2- How old are you (age)?

20-29 30-39 40-49 50-59 60 and above

Your gender (sex) is:

Male Female

3- Your work experience is:

Less than 1 year 1-3 years 4-6 years 7-10 years more than 10 years

4- Your level of education is:

- a. Diploma
- b. Bachelor
- c. Master's Degree
- d. Doctorate Degree

5- Do you have a computer at home?

- a) Yes
- b) No

6- Do you have Internet access at home?

- a) Yes
- b) No

7- Do you have a computer with Internet access at work?

- a) Yes
- b) No

8- Do you use the computer during work for work aids?

- a) Yes
- b) No

9- Do you use the Internet at work:

- a) Yes
 b) No

SECTION II-FACTORS RELATED TO CHANGE RESISTANCE:

The following suggested factors might impede efforts and programs of administrative and organizational change in your department.

No.	REASONS FOR RESISTING THE ADOPTION OF NEW IT	Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly Disagree (1)
1	Changing systems through new IT involves an increase in job requirements.					
2	Changing work routines by adopting new technology disrupts stable work traditions and standards, which makes it hard to support and implement this change.					
3	IT does not fit within nurses' roles as care providers.					
4	Lack of seriousness and support from higher management to change the system through adopting new IT decrease staff's willing to change.					
5	System changing and IT adoption within hospital system will no longer succeed because of lacking IT staff cooperation and supportive attitude.					
6	No motivation or incentives have been added by the organization as a result of adopting IT.					
7	The use of new IT instead of paperwork does not contribute to nursing staffs' prospects for growth and career advancement.					
8	IT adoption and system changing does not bring forth good results.					
9	The goals of change through IT use and limiting paperwork usage is not clear to nursing staff.					
10	Nursing staff received weak conviction in the objectives of change and IT adopting within hospital systems.					
11	Using information system will not enhance quality of work.					
12	System changing and using information system will be time consuming.					
13	Nursing staff are not fully aware of the benefit of change by using new technology.					
14	Staff has weak confidence in the expertise and skills of those responsible for the introduction of change regarding IT adoption.					
15	IT adoption and system changing was introduced in a confused manner.					
16	No training addressed system changing and IT adopting within hospital systems.					
17	Lack of previous skills related to using computer will impede effectiveness of change and using IT.					

2/13/2014