Polarity Management Educational Training Program and Its Effect on Head Nurses' Leveraging Health Care Polarities and Guiding Hospitals' Transformation

Samar Hussien Khalaf Alah[*],   Safaa Mohamed Abdelrahman [**], Ebtsam Ahmed Mohamed[***], and Amira Mostafa Fahmy[****]

1. * Assistant lecturer of Nursing Administration, Faculty of Nursing, Minia University
2. ** Professor of Nursing Administration, Faculty of Nursing, Minia University
3. *** Assistant Professor of Nursing Administration, Faculty of Nursing, Minia University
4. **** Assistant Professor of Nursing Administration, Faculty of Nursing, Minia University

Background: Hospitals are complex systems that provide an ideal environment for polarities to arise. If these polarities are treated as problems to be solved, they will continue to exist in the long run. However, if these polarities are properly harnessed, they can create a prosperous future and fulfill the larger goal of transforming hospitals. **Aim of the study:** Is to assess polarity management educational training program and its effect on head nurses' leveraging health care polarities and guiding hospitals' transformation. **Research design:** A quasi- experimental research design was utilized in this research. **Sample**: The study sample involved all head nurses worked in clinical areas. **Setting**: Minia University Hospitals. **Tools of data collection:** Included three tools; Tool (I): Self-administered questionnaire which has two parts; Part I: Personal data sheet, part II: Head nurses' knowledge about polarity management questionnaire; Tool (II): Leveraging of health care polarities scale and Tool (III): Polarity management: a way for hospitals transformation scale. **Results**: There were highly statistically significant relations between the mean score of head nurses' knowledge, leveraging of healthcare polarities, acceptance of polarity management throughout the study phases pre, and after 6 months of follow up implementation, There were statistically significant differences and positive correlation between head nurses' knowledge about polarity management and their leveraging of health care polarities in pre-educational training program while there was no statistically significant differences after 6 months of follow up implementation. **Conclusion:** Knowledge about polarity management leads to better leveraging of that polarities and guiding hospitals' transformation. **Recommendation:** Intensify workshops to nursing staff at all levels and hospitals managers about polarity management to achieve hospitals transformation.
Keywords: Educational Training Program, Head Nurses, Hospitals' Transformation, Leveraging Healthcare Polarities, Polarity Management.

Introduction

Higher level management has to deal with disagreement and change. Managers work in environments where conflicts are often sensed. They discover there are never any proper solutions since they are always need to make trade-offs. They are essentially partial truths that only reflect one realm of activity. This is significant because many times the decision is not between good and terrible, but rather between two good options or two unpleasant options, and many individuals are unable to effectively manage the tension that results**(Malhotra et al., 2021).**

Managers in health care systems face problems that are unparalleled in terms of their scope and complexity, problems that frequently appear unsolvable and unsurmountable**(Wynne et al., 2020).** Even with efforts to enhance the health care system's cost, quality, and safety, one-third of hospitals still have overall unfavorable occurrences. Thus, maintaining performance progress while addressing the issues with cost and quality in healthcare continues to be a significant institutional challenge. It has been unsuccessful to operationalize change initiatives as interventions to solve issues, and it is evident that the problem-solving viewpoint by itself seems flawed**(Wesorick & Shaha, 2015)**.

Because it has been demonstrated that these difficulties are paradoxes or polarities that need to be handled rather than problems that can be fixed because they never go away **(Johnson, 2020)**. Polarities are interdependent pairings with highly different values or points of view that, although first appearing to be antagonistic and competitive, eventually become necessary to achieve a greater goal or result that neither could achieve on their own **(Kise, 2023)**. Finding the correct solution in an attempt to resolve polarity only makes matters worse. Furthermore, healthcare organizations that effectively handle polarities tend to be more successful. While well-managed polarities assist businesses and individuals in creating a successful future, poorly managed polarities cause them to generate the future they dread **(Allah & Nassar, 2018)**.

By offering a diagnostic tool for identifying strengths and limitations impacting the desired outcomes, the Polarity Thinking Model (PTM) assists leaders in distinguishing between problems and polarities, as well as in assessing how well they are leveraging the polarities within their organizations. It also clarifies the necessary action steps to leverage and manage polarities **(Hovell, 2022).**

Furthermore, Polarities may be seen as a resource that we can use to our advantage **(Emerson & Lewis, 2019).** Additionally, in order for managers to succeed in their companies, they must be aware of these polarities, have the ability to find "win-win" solutions when necessary, and be able to recognize when one or more of the polarities has unintentionally caused stress in the work flow **(Klag & Langley, 2023).**

So that the advantages of two interdependent pairs of solutions may be maximized, polarity mapping, polarity identification, and seeing problems via a polarity management lens are all necessary. Consequently, Polarity Thinking (PT) offers a means for a group to express and document the many perspectives held by its constituents, and thereafter devise a plan to optimize the positive aspects and mitigate the drawbacks of both frameworks. Additionally, it enables addressing the entire polarity picture and bringing unseen

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tensions to light **(Peterson, 2017)**.

Furthermore, PT permits the use of polarity in conjunction with further thinking, not in substitute of it, for solving issues. And when people, groups, and organizations can tell the difference between a "polarity to leverage" and a "problem to solve," they can deal with both in an efficient manner, celebrate diversity, make the most of it, and turn opposition to change into a tool for a desired and sustainable future. Which effectively utilizes "both/and" PT and "either/or" thinking. Thus, when presented with a difficulty, leaders, teams, organizations, and nation-states must embrace this idea **(Taylor, 2019)**.

Moreover, conceptual and organizational change management frameworks helpful for considering difficulties, challenges, and change include paradox theory and polarity management, respectively. By using paradox theory to analyze problems and frame change, polarity management may help businesses become more responsive and flexible, reduce the frustration of adapting to change, and produce more effective and efficient activities**(Roy, 2016)**.

So, PT is a potent and effective strategy to assist in the successful transformation of one's identity. Understanding the fundamental differences between the two identities can help integrate the essential elements of the previous identity with the present expression, reducing the anxiety and suffering that frequently accompany such changes. As a result, when we ignore a real polarity, it will frequently repeat. In order to recognize change identities in organizations that are undergoing transition, it is usually helpful to leverage polarities. For this reason, polarity thinking is a potent strategy for effective organizational transformation **(Deaton, 2017)**.

Significance of the study

The Elsevier Clinical Practice Model Resource Center (CPMRC) has spent the last thirty years working with over 360 clinical settings to transform health care at the point of care and maintain the best places to provide and receive care. It was discovered that these settings shared many issues and problems, and that even after significant effort—including time, money, and resources—to solve these problems, the problems would eventually return, more difficult than before **(Wesorick & Shaha, 2015)**. Furthermore, it became clear that trying to conceptualize change attempts in terms of problem-solving interventions was ineffective. This resulted in the realization that these persistent problems were polarities that needed to be controlled rather than difficulties that could be resolved. The PT adds another perspective to our problem-solving mindset **(Wesorick, 2014)**

In spite of this, healthcare professionals still struggle to distinguish between problems and polarities, wasting time, money, and energy. Head nurses' capacity to recognize and handle polarities will therefore enable them to save these resources, as well as to foster trust, lessen resistance to change, and accelerate and sustain the achievement of the larger goal**(Taie, 2014)**. Internationally there was the study of **Wesorick & Shaha, (2015)** which called "Guiding health care transformation: A next-generation, diagnostic remediation tool for leveraging polarities", which claimed that using the PTM and tools can assess how well organizations are managing polarities and will improve the organization's capacity to self-diagnose and then succeed in achieving transformation toward sustainable desired outcomes. The study involved four hundred ninety-seven volunteers from two acute care organizations in the United States and two in Canada. Also, nationally there were the study of **Mohamed et al. (2021)** that have been conducted in Assiut University, which called "Effect of educational training program about polarity management on Nurse Managers' knowledge and Skills**"**, and concluded that there was a high significant difference between managers' knowledge and skills about polarity management before and after implementation of the training program and the training program was highly effective in improving nurse managers' knowledge and skills in polarity management.

Moreover, polarity management is still a new concept in Egypt and the health care polarities are still ambiguous for head nurses and most of head nurses still treat with health care issues as problems to be solved not polarities need to be managed which make the situation worse in spite of doing their best, the health care issues is still unsolvable. So that, head nurses should understand how to identify the polarities of health care and get the maximum benefits from these poles to achieve successful transformation in hospitals. Moreover it was felt necessary to provide an educational training program for head nurses about polarity management and assess its effect on head nurses' leveraging healthcare polarities and identify if it can be an accepted way for guiding hospitals' transformation.

Aim of the study

The aim of the study is to assess polarity management educational training program and its effect on head nurses' leveraging health care polarities and guiding hospitals' transformation.

Research questions:

H1: Head nurses' knowledge about polarity management will be higher after implementation of the educational training program.

H2: Head nurses' leveraging of health care polarities will be higher after implementation of the educational training program.

H3: After implementation of the educational training program, head nurses will acknowledge that polarity management is an accepted way to guide Hospitals transformation.

Subjects and Methods
Research design:

A quasi- experimental research design was utilized in this research.

Setting:

The study was conducted at Minia University Hospitals (Minia Emergency University Hospital; Renal and Urology University Hospital; Liver University Hospital; Cardio Thoracic University Hospital; and Pediatric and Gynecology University Hospital).

- **Emergency University Hospital**: it has two buildings, the first build has one floor building, and the second building is an annex building that consisting of three floors. The first building is contained 7 units with capacity of (41) bed.
- **Renal and Urology University Hospital:** it consisted of one building that has five floors with bed capacity (132) bed.
- **Liver University Hospital:** it consisted of

one building that has four floors with bed capacity (218) bed.

- **Cardio Thoracic University Hospital:** it consisted of one building that has two floors with bed capacity (175) bed.
- **Pediatric and Gynecology University Hospital:** it consisted of one building that has four floors with bed capacity (253) bed

Subjects:

The study sample involved all head nurses worked in clinical areas (total no 80 head nurses)

Tools of Data collection:

Data was collected through the utilization of three tools as follows:

Tool (I): Self-Administered Questionnaire; it included two parts:
Part I: Personal data sheet:

It has been designed by the researcher; this part used to collect data related to personnel characteristics data such as (age, gender, marital status, residence, total years of experience, years of experience in head nurse position, educational qualification, name of the hospital, department of head nurses and attendance of training program about polarity management and attendance of training program about problem solving).

Part II: Head Nurses' Knowledge about Polarity Management Questionnaire:

This questionnaire developed by the researcher's .It used to assess the head nurses' knowledge about polarity management dimensions. This questionnaire included total (30) questions in the form of multiple choices. It is divided into 6 dimension; polarity definition and characteristics (4 questions), differences between polarity management and problem solving (10 questions), polarity management and its benefits (7 questions), polarities in health care (2 question) polarity principles (4 questions), and polarity map (3 questions).

Scoring system

Responses reflected three levels of responses ranged as (1= correct answer, 0= incorrect answer and 0= don't know). The responses were divided into two levels as follows; satisfactory that was ≥ 61 % and unsatisfactory that was ≤ 60 %

Tool (II): Leveraging of Health Care Polarities Scale:

The questionnaire has been developed by the researcher to assess head nurses' leveraging of health care polarities based on the literatures of **Mohamed, Abo Elmagd & Yussief, (2021), Ahmed, et al (2022), Allah & Nassar (2018), Deaton (2017), Manderscheid & Harrower (2016), Roy (2016), Wesorick (2016), Wesorick & Shaha (2015), Wesorick (2014), and Elsevier/CPM Resource Center (2011).**

The questionnaire consisted of (156 items) that reflect 13 dimensions that represent common polarities of health care as prioritized by **Elsevier Clinical Practice Model Resource Center (CPMRC) 2011**, each dimension have 12 statements that indicate how well head nurses leverage each polarity, the 12 statements reflect 6 positive and 6 negative

outcomes of the two poles that indicate the values and fears of each polarity. These polarities are:

Polarities	No. items
• **Patient and staff safety**	(12 items)
• **Routine task care and scope of practice care**	(12 items)
• **Individual competency and team competency**	(12 items)
• **Standardized care and autonomous care**	(12 items)
• **Conditional respect and unconditional respect**	(12 items)
• **Vertical and horizontal relationships**	(12 items)
• **Medical care and whole person care**	(12 items)
• **Technology platform and practice platform innovation**	(12 items)
• **Patient satisfaction and staff satisfaction**	(12 items)
• **Candor and diplomacy**	(12 items)
• **Change and stability**	(12 items)
• **Project/initiative driven change and framework driven change**	(12 items)
• **Margin and mission**	(12 items)

Scoring system

Responses rated on 5 point Likert scale ranging from (0 – 100) point Likert scale to reflect five levels of responses: (almost never, 0 points), (seldom, 25 points), (sometimes, 50 points), (often, 75 points), and (almost always, 100 points). The final score for each dimension is then determined as an average (mean) of answers from all respondents for that specific dimension, Then, the average (mean) is computed for the three items collectively within each single quadrant and then across each of the poles within each polarity. Thus, the average score represents how well that polarity is being leveraged according to respondent perspectives collectively on scales with 100 as the maximum. In the positive quadrants "almost always equals 100 points each, while the negative items are inversely scored in which almost never equals 100 points). The scoring of the tool ranged from 0% to 100% and was distributed as follows:

• **Poor leveraging of polarities**	**≤50%**
• **Medium leveraging of polarities**	**51% - <75%**
• **Excellent leveraging of polarities**	**≥ 75%**

Tool III: polarity management: a way for hospitals transformation scale:

This tool has been developed by the researcher based on the literature of **Wood & Lomas (2021), Jones, et al (2021), Wallis (2020), Stanback (2019), Yusefi, et al (2018), Piroozi, et al (2017), and Stuart & Moore (2018).**It included 10 statements to assess head nurses' level of acceptance for polarity management as a way to guide hospitals' transformation.

Scoring system: Responses rated on 3 point Likert scale reflect three levels of responses ranged as (1= Disagree, 2=Neutral and 3=Agree). And it divided into two levels; Accepted that was ≥ 61 % and refused that was ≤ 60 %.

Pilot study:

A pilot study was done on 10% (8 head nurses) of participants, They were chosen randomly from the research setting to assess and ensure feasibility, objectivity, applicability, clarity, and adequacy of the study tools and to estimate the time needed for filling the study tools, as well as to identify potential hurdles and problems during data collection. The tools that were put in their final form were not

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modified in light of the findings of the pilot study; so that the pilot study was incorporated in the actual study.

Tools Validity and reliability

The tools were submitted to a panel of five experts in the field of nursing administration at Minia and Assuit University confirmed its validity. Modifications on the tools were done according to the panel judgment in relation to appropriateness of the content and accuracy of items.

Reliability of the tools (tool I, II & III) was performed to confirm consistency of tool. The internal consistency measured to identify the extent to which the items of the tool measure the same concept and correlate with each other by Cronbach's alpha test. (Tool I $\alpha=0.845$, tool II $\alpha=0.872$ & tool III $\alpha=0.825$).

Data collection procedure:

Data collection procedure:

The study was conducted in six phases: preparation, assessment, planning, implementation, evaluation and follow up phase. It was lasted from the 10th of January (2022) to the 30th of October (2023).

Phase 1: Preparation Phase:

In this phase a written Approval was taken from Ethical Committee in the Faculty of Nursing, Minia University Also, approval to conduct the study was obtained from Dean of the Faculty of Nursing, Minia University. Then the three tools of the study were developed by the researcher, and translated in to Arabic, tools were tested for its validity from the jury; and necessary modification was done, also tools were tested for its reliability and internal consistency. This phase lasted from 10th of January (2022) to 6th of July.

Phase 2: Assessment Phase:

Permissions were obtained from directors of the five hospitals (Minia university Hospitals). Oral permissions were obtained from the head nurses (Minia university Hospitals). The pre-test was conducted on head nurses at Minia University Hospitals, by using both tools of the study before implementation of the training program to use it as a base line data. This phase lasted from 10th of July (2022) to 10th of August (2022).

Phase 3: Planning phase:

In this phase: the program booklet about polarity management and health care polarities were developed based on the extensive reviewing of the literature. The booklet included knowledge about definition, differences between polarities and problems, benefits, polarities in healthcare, principles, polarity map, steps of developing a polarity map, and the thirteen health care polarities. Then the program guidance were developed that contained action steps and early warnings for leveraging the thirteen health care polarities then the guidance were tested for its validity from the jury then distributed to head nurses after completion of the program (in the conclusion session). This phase lasted from 17th of August (2022) to 4th of December (2022).

Phase 4: Implementing phase:

The program was implemented on the study sample who were all head nurses (n=80) at Minia University Hospitals and the program holded at the continuous training units at Minia University Hospitals, The program was implemented by divided the study subjects into categories based on their hospital, head nurses were divided into 5 major groups for the 5 hospitals included in the study; each group included 2 sub group in the same hospital, This was done to avoid shortage of nurse managers which might happen if all of them leave the hospitals at the same time. There were (2) sub groups trained in each day during morning shifts and break time. The head nurses were trained in (3) selected days of each week as (Saturday, Wednesday and Thursday). Each group had attended (10) sessions each session was 2 hours bringing the total hours of the program to 20 hours Which was implemented over (17) weeks. The researcher described the objectives of the program to the participants, distributed the handout about polarity management in the beginning of the program and finally distributed the guidance about leveraging of health care polarities in the final session. In the implementation of polarity management program; there were different teaching methods used by the researcher in small groups with the head nurses. This phase lasted from 10th of December (2022) to 5th of April (2023).

Phase 5: Evaluation Phase:

In this phase; the head nurses assessed immediately after completion of the training program by using (tool I). It was completed at 26th of April (2023)

Phase 6: Follow up Phase

This phase was implemented after six months from the implementing of the program. In this phase; researcher assessed head nurses' by using the study tools (tool I, II &III) it was completed at the 30th of October (2023)

Administrative design:

An official approval was granted from the Dean of Faculty of Nursing at Minia University and directors of Minia university hospitals to carry out the study. This approval was included a brief explanation of the objectives of the study. The research idea was approved by the Nursing Faculty's Ethics Committee.

Ethical Consideration:

The researchers obtained consent from the head nurses at Minia University Hospitals. Before conducting both the pilot study and the main study, Participants provided a written consent prior to their involvement and expressed willingness to participate. The participants were provided with an explanation of the study's nature and objectives. Participants in research studies possess the prerogative to decline participation or discontinue their involvement without providing any justification. The preservation of subject privacy was considered during the data collection process. The participants were guaranteed that their data would be treated with utmost confidentiality. To ensure anonymity and privacy, each nurse was assigned a numerical identifier instead of using their names.

Statistical design:

The collected data were tabulated & statistically analyzed using software program and statistical package for social science (IBM 28.0). The statistically analysis included percentage (%), mean, stander deviation (SD), Kruskal Wallis test was used to test statistically significance between pre, immediately and after 6 months of follow up of head nurses' knowledge about polarity management, Friedman test

investigated mean differences between pre, immediately and after 6 months of follow up of total head nurses' knowledge of polarity management dimensions. independent sample t-test investigated mean differences between total head nurses' leveraging of health care polarities dimensions pre and after 6 months of follow up implementation of educational program. Chi-square test used between more than two variables and proportion more than 5, it was used to test statistically significance between pre and after 6 months of follow up of head nurses' leveraging of health care polarities dimensions. Fisher test used to detect differences between two or more proportions and the sample size is small. In additional spearman correlation test used between the total knowledge regarding polarity management, leveraging of health care polarities dimensions, and acceptance for polarity management pre and after 6 months of follow up implementation of educational program. Graphs were done for data visualization using Microsoft Excel. The P - value of ≤ 0.05 indicates a significant result and P - value of ≤ 0.001 indicates high significant while, P value of > 0.05 indicates a non-significant result.

Results

Table (1): Distribution of Studied Head Nurses According to Their Personal Data in Minia University Hospitals (n=80).

Personal Data	No.	%
Age / years		
$22 \leq 27$ years old	32	**40.0**
28 - 33 years old	16	20.0
34 - 39 years old	17	21.3
40 - 45 years old	10	12.5
≥ 46 years old and more	5	6.2
Mean ± SD	**32.0 ± 7.6**	
Gender		
Male	22	27.5
Female	58	**72.5**
Marital status		
Married	63	**78.8**
Single	17	21.2
Residence:		
Rural	32	40.0
Urban	48	**60.0**
Total years of experience		
1-5 years	34	**42.4**
6-10 years	12	15.0
11-15 years	7	8.8
16-20 years	19	23.8
21 years and more	8	10.0
Years of experience as head nurse		
1-5 years	48	**60.0**
6-10 years	20	25.0
11-15 years	3	3.8
16-20 years	6	7.4
21 years and more	3	3.8
Educational qualification in nursing		
Bachelor degree	74	**92.4**
Master degree	3	3.8
Doctoral degree	3	3.8
Name of the hospital:		
Minia Emergency University Hospital	15	18.8
Renal and Urology University Hospital	11	13.7
Liver University Hospital	7	8.8
Cardio Thoracic University Hospital	12	15.0
Pediatric and Gynecology University Hospital	35	**43.7**
Head nurse department:		
General care unit	33	41.2
Critical care unit	47	**58.8**
Have you attended a training program on polarity management?		
yes	6	7.5
no	74	**92.5**
Have you attended a training program on problem solving?		
yes	20	25.0
no	60	**75.0**

Table (1) Shows that (40%) of head nurses are between age group ($22 \leq 27$) years old; with mean age (32.0 ± 7.6 years). In relation to gender, (72.5%) of head nurses are females. Regarding marital status, there are (78.8%) of the head nurses are married. Concerning the residence, (60%) of them is live in urban area. Regarding total years of experience (42.4%) of head nurses has 1-5 years of experiences. Speaking about years of experience as a head nurse, there are (60%) of them has (1-5) years of experiences. Also, this table displays that (92.4%) of head nurses have Bachelor degree. For the hospital name (43.7%) of them work in Pediatric and Gynecology University Hospital. Regarding head nurse department there are (58.8%) of head nurses are working in critical care units while (41.2%) of them are working in general care units. Also this table shows that (92.5%) of head nurses didn't attend a training program on polarity management, while (75%) of them didn't attend a training program on problem solving.
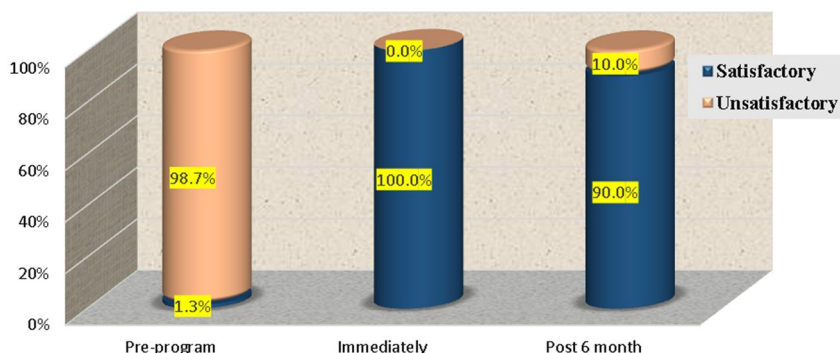
Figure (1): Total score of head nurses' levels of knowledge about polarity management pre, immediate and after 6 months of follow up implementation at Minia University Hospitals (n = 80).

Figure (1) illustrates that (98.7%) of head nurses have unsatisfactory level of knowledge about polarity management in pre-implementation which improved to (100%) satisfactory level of head nurses' knowledge about polarity management immediately after implementation, and slightly decreased to (90%) after 6 months of follow up implementation.

Table (2): Differences between head nurse mean score regarding knowledge about polarity management dimensions pre, immediate & after 6 months of follow up implementation at Minia University Hospitals (N=80).

Polarity management dimensions	Pre - test	Immediate- test	Post- test	F	P value
• Polarity definition and characteristics (4 questions).	1.0 ± 1.0	3.8 ± 0.4	3.3 ± 0.8	270.114	0.0001**
• Differences between polarity management and problem solving (10 questions).	2.6 ± 2.4	9.5 ± 0.8	8.3 ± 1.7	365.467	0.0001**
• Polarity management and its benefits (7 questions).	1.7 ± 1.7	6.6 ± 0.7	5.7 ± 1.5	281.182	0.0001**
• Polarities in health care (2 questions).	**0.3 ± 0.5**	**1.9 ± 0.4**	**1.7 ± 0.5**	**269.492**	**0.0001******
• Polarity principles (4 questions).	0.8 ± 0.9	3.7 ± 0.7	3.3 ± 0.9	270.489	0.0001**
• Polarity map (3 questions).	0.4 ± 0.6	2.8 ± 0.4	2.6 ± 0.6	430.012	0.0001**
Total knowledge about Polarity management	**6.8 ± 5.8**	**28.2 ± 2.1**	**25.0 ± 4.6**	**538.813**	**0.0001******

**statistically significance at 0.01   F: repeated measures Friedman test

Table (2) presents that the head nurses have low mean scores regarding polarity management for all dimensions in pre-program which improved in all dimensions of polarity management (knowledge about polarity definition and characteristics, differences between polarity management and problem solving, polarity management and its benefits, polarities in health care, polarity principles and polarity map) immediately and after 6 months of follow up implementation with highly statistically significance differences (p=0.0001**).

Regarding the total mean scores of head nurses knowledge about polarity management dimensions; it was noted that the mean score in pre-program is 6.8 ± 5.8 in pre- program, which increases to 28.2 ± 2.1 immediately after implementation and slightly decreases to 25.0 ± 4.6 after 6 months of follow up implementation with highly statistically significance differences (p=0.0001**)
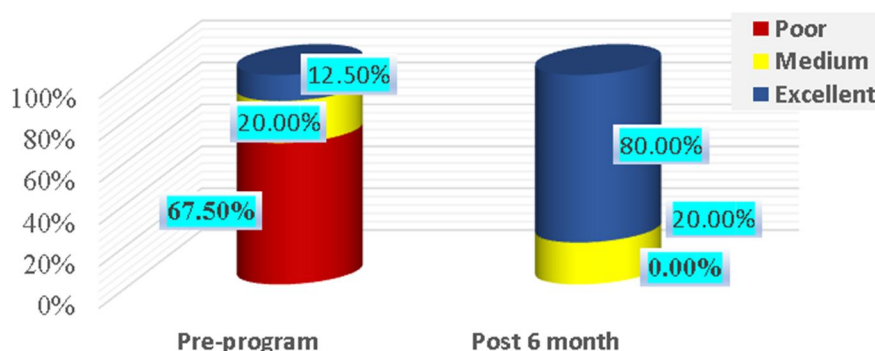

Figure (2): Total score of head nurses' levels of leveraging of health care polarities pre, and after 6 months of follow up implementation at Minia University Hospitals (n = 80).

Figure (2) illustrates that (67.5%) of head nurses have poor level of leveraging of health care polarities in pre-implementation, while (20%) of them have medium level of leveraging while (12.5%) of head nurses have excellent leveraging of health care polarities, which improved after 6 months of follow up implementation to be (80%) of them have excellent level of leveraging of health care polarities, while (20%) of head nurses have medium level of leveraging while (0%) have poor level of leveraging of health care polarities.

Table (3): Differences between head nurses' mean scores regarding leveraging of health care polarities dimensions pre & after 6 months of follow up implementation at Minia University Hospitals (N=80)

leveraging of health care polarities	Total mean Pre-program	Total mean Post 6 months	T-test	*P* value
• Patient and staff safety	54.7 ± 19.5	79.2 ± 7.5	10.415	0.0001**
• Routine task care and scope of practice care	53.8 ± 18.2	81.9 ± 6.0	13.106	0.0001**
• Individual competency and team competency	53.6 ± 19.7	77.7 ± 7.7	10.214	0.0001**
• Standardized care and autonomous care	55.6 ± 19.7	**85.3 ± 5.3**	13.099	0.0001**
• Conditional respect and unconditional respect	58.8 ± 19.9	79.0± 6.4	8.731	0.0001**
• Vertical and horizontal relationships	56.2 ± 19.1	**75.8 ± 6.2**	8.667	0.0001**
• Medical care and whole person care	57.1 ± 18.4	77.3 ± 8.5	8.868	0.0001**
• Technology platform and practice platform innovation	**60.4 ± 18.5**	76.9 ± 8.3	7.189	0.0001**
• Patient satisfaction and staff satisfaction	53.8 ± 19.7	76.0 ± 6.9	9.565	0.0001**
• Candor and diplomacy	54.0 ± 19.2	76.0 ± 7.2	9.573	0.0001**
• Change and stability	**53.5 ± 19.1**	76.5 ± 7.0	10.097	0.0001**
• Project/initiative driven change and framework driven change	56.9 ± 19.3	77.0 ± 8.04	8.596	0.0001**
• Margin and mission	55.5 ± 20.9	76.0 ± 9.3	7.645	0.0001**
Total leveraging of health care polarities	**55.6 ± 17.3**	**78.0 ± 3.7**	**11.262**	**0.0001****

**statistically significance at 0.01   P – Value based on   independent sample t-test

Table (3) shows that head nurses have medium mean scores in pre-implementation which increases after 6 months of follow up implementation for all dimensions of leveraging of health care polarities with highly statistically significance differences (p=0.0001**). Regarding total mean score of head nurses' leveraging of health care polarities dimensions, it was noted that the total mean score in pre-program was medium (55.6 ± 17.3), increases to excellent (78.0 ± 3.7) after 6 months of follow up implementation with highly statistically significance differences (p=0.0001**). Also this table shows that in pre- program implementation the highest mean score regarding leveraging of health care polarities was for technology platform and practice platform innovation polarity with medium leveraging (60.4 ± 18.5) while the lowest mean score was for change and stability polarity with poor leveraging (53.5 ± 19.1). While after 6 months of follow up implementation, it was noted that the highest mean score regarding leveraging of health care was for standardized care and autonomous care poles with excellent leveraging (85.3 ± 5.3); however the lowest score was for vertical and horizontal relations with excellent leveraging (75.8 ± 6.2).
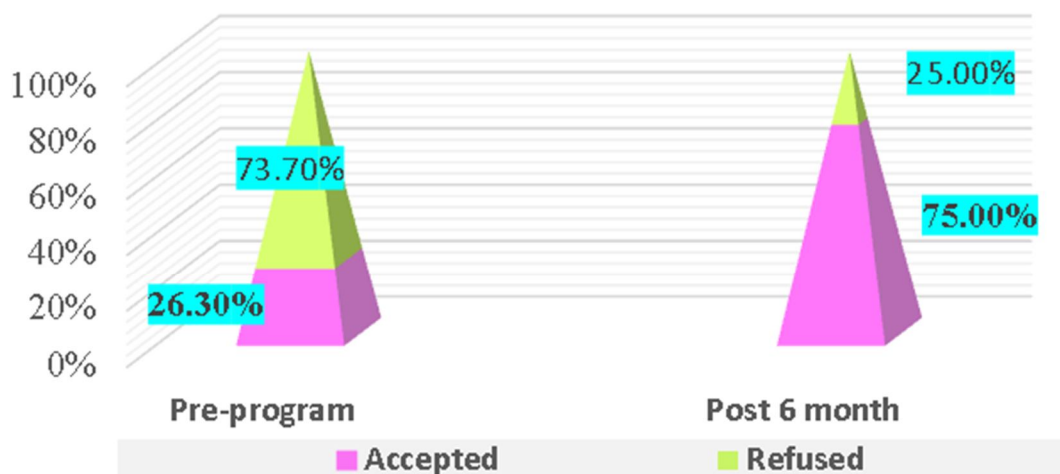

Figure (3): Total score of head nurses' levels of acceptance for polarity management as a way to guide hospitals' transformation pre, and after 6 months of follow up implementation at Minia University Hospitals (n = 80).

Figure (3) illustrates that (73.7%) of head nurses refused polarity management as a way to guide hospitals' transformation in pre-implementation, while (26.3%) of head nurses accepted for polarity management as a way to guide hospitals' transformation in pre-implementation which improved after 6 months of follow up implementation to be; (75%) of head nurses accepted for polarity management as a way to guide hospitals' transformation, while (25%) of head nurses refused polarity management as a way to guide hospitals' transformation.

Table (4): Correlation between knowledge about polarity management, leveraging of health care polarities, and acceptance for polarity management among head nurses pre and after 6 months of follow up implementation at Minia University Hospitals (n = 80).

Items		Pre-Educational Training program			Post 6 months of Educational Training program		
		knowledge about polarity management	leveraging of health care polarities	acceptance for polarity management	knowledge about polarity management	leveraging of health care polarities	acceptance for polarity management
Knowledge	r	1			1		
	P - Value						
Leveraging	r	0.425	1		0.167	1	
	P - Value	0.0001**			0.140		
Acceptance	r	0.399	0.323	1	0.086	0.074	1
	P - Value	0.047*	0.003**		0.450	0.515	

Table (4) explains that there are highly statistically significant differences and positive correlation between head nurses' knowledge about polarity management and their leveraging of health care polarities in pre-educational training program (p= 0.0001**). Also, there are statistically significant differences and positive correlation between head nurses' leveraging of health care polarities and their acceptance for polarity management as a way to guide hospitals' transformation in pre-educational training program (p= 0.003**) While, there are highly statistically significant differences and positive correlation between head nurses' knowledge about polarity management and their acceptance for polarity management as a way to guide hospitals' transformation in pre-educational training program (p= 0.047*). However there were no statistically significant differences and no correlation between all three variables after 6 months of follow up implementation.

Discussion

Organizational paradoxes are inherently tense situations that result from opposing forces, conflicting aims, or conflicting expectations. They resist easy fixes and call for sophisticated strategies. Because hospitals are intricate systems, paradoxes frequently arise there (**Tuckermann, 2018**). Thus, as the healthcare business develops at an accelerated rate, health care practitioners must treat more patients with fewer staff members and resources, employ standardized evidence-based procedures, integrate new technology, and preserve the human touch, which is equally important to patient care. Additionally, they are embracing the change needed to develop while trying to maintain the stability of their businesses (**Wick et al., 2023**). These mutually reinforcing opposites are sometimes referred to as polarities, paradoxes, or dilemmas (**Pina e Cunha et al., 2024**).

When these paradoxes are approached as issues that need to be resolved, they become "impervious to solution" and continue to exist throughout time (**Schnelli et al., 2023**). But these opposites may create a successful future if they are properly controlled (**Saleh & Ali, 2023**). Therefore, the more we comprehend about the components of polarity management and the dynamics that underpin it, the more adept we will be at harnessing its energy (**Inesia-Forde, 2023**). In a similar vein, the polarity thinking approach could help us confront and handle the ever more complicated circumstances surrounding the assessment reform that is required to satisfy the quickly evolving needs of students, businesses, and the general public(**Govaerts et al., 2019**). Therefore, this study aimed to assess polarity management educational training program and its effect on head nurses' leveraging health care polarities and guiding hospitals' transformation.

In the current research, regarding the personal data of the head nurses it was noted that the highest percent of head nurses was between age group $22 \le 27$ years old. In relation to gender it was observed that the majority of head nurses were females. Regarding marital status, it was noted that the majority of head nurses were married. Speaking about total years of experience the highest percent of nurses had 1-5 years of experiences. Also, the current research displayed that the majority of head nurses had bachelor degree regarding to their educational qualification in nursing, the current research also revealed that more than half of head nurses were working in critical care units and the rest were working in general care units. Regarding attendance a training program on polarity management, it was noted that the majority of head nurses didn't attend such training which explained the poor knowledge about polarity management. While concerning attendance a training program on problem solving, it was observed that about three quarters of head nurse didn't attend such program in which most of head nurses gained theoretical information regarding problem solving in administration curriculum without attending clinical training about it.

Regarding head nurses' knowledge about polarity management; the current study hypnotized that head nurses' knowledge about polarity management will be higher after implementation of the educational training program. This hypothesis was correct regarding to the research results as the findings of the current research demonstrated that there was a highly statistically significant difference between total mean score of head nurses' knowledge about polarity management dimensions throughout the study phase's pre, immediate and after 6 months of follow up implementation. In which, it was noted that there were a significant improvement in all dimensions and total mean scores regarding head nurses' knowledge about polarity management dimensions after 6 months of follow up implementation compared with pre-program implementation.

Also, the current study found that the majority of head nurses had unsatisfactory knowledge level about polarity management in pre-program implementation while all head nurses had satisfactory knowledge level about polarity management immediately after program implementation and also found that the majority of head nurses had satisfactory knowledge level about polarity management after 6 months of follow up implementation. The poor head nurses knowledge about polarity management in before-program implementation could be due to the novelty of the concept while the

continuous training units in university hospitals give attention to develop head nurses basic skills for patient care and management while marginalize the new trends, moreover the comprehensiveness of the introduced educational training program help head nurses to understand all dimensions of polarity management which obviously improve their knowledge after program implementation.

This supported by the study of **Taie, (2014)** who demonstrated that managers' understanding of polarity management differed significantly before and after awareness training, with none of the tested sample having knowledge of all polarity-related issues. Also compatible with the study of **De Haan & Nilsson, (2017)** who affirmed the need for substantial talents like self-government, elastic integrity, self-confident modesty, watchful risk-taking, bifocal visualization, wobbling stability, uncertain profits, and compassion to be advanced in order to achieve balance between paradoxes.

And this in the same line with **Gab Allah & Nassar, (2018)** who asserted found the mean knowledge score of nurse managers varied significantly throughout the research phases (pre- and post-training), with a highly statistically significant difference. Additionally, following awareness workshops, nurse managers' knowledge of polarity management significantly improved across the board and as a whole. Also, this findings consistent with **Mohamed et al., (2021)** who discovered that there was a significant improvement in all items and the overall score of nurse managers' knowledge and skills regarding polarity management following the training program, and that there was a highly statistically significant difference between the mean score of nurse managers' knowledge and skills throughout the study phases (pre- and post-training).

Additionally, in harmony with the research of **Sorour et al., (2023)** who found that a high percentage of head nurses had a low knowledge level about polarity management concepts and polarity mapping pre-educational intervention compared with immediately after intervention. And asserted that majority of head nurses in critical care units were not able to distinguish between problem solving and polarity management process correctly, and they have lack the awareness about polarity management principles, techniques, and their role in managing polarity and set polarity maps. And, revealed that most university hospitals focus only on providing workshops and training programs to improve only the clinical practices of nursing staff. Also consistent with the study of **Saleh & Ali, (2023)** who disclosed that there was a significant advancement of study participants` level of polarity thinking from before to after the training program.

Regarding head nurses' leveraging of health care polarities dimensions; the current study hypnotized that head nurses' leveraging of health care polarities dimensions will be higher after implementation of the educational training program. This hypothesis was correct regarding to the study results in which the findings of the current research demonstrated that there was a highly statistically significant difference between total mean score of head nurses' leveraging of health care polarities dimensions after 6 months of follow up implementation comparing with pre-program. In which, it was noted that there were a significant advancement in all dimensions and total mean scores regarding head nurses' leveraging of health care polarities dimensions after 6 months of follow up implementation compared with pre-program implementation. Also, the current study found that the majority of head nurses had poor level of leveraging of health care polarities in pre- program. While the majority of head nurses had excellent level of leveraging of health care polarities after 6 months of follow up implementation compared with pre- implementation of the program.

This might be due to poor knowledge of head nurses about polarity management in pre- program implementation which lead to poor skills in mapping and leveraging of these health care polarities. While introducing of the study educational training program that contained adequate knowledge about healthcare polarities and training on how to apply these polarity maps, develop the proper action steps and measure the early warnings which help nurses to achieve the maximum level of leveraging of health care polarities after 6 months of follow up implementation. This compatible with the study of the research of **Adams et al., (2020)** who disclosed that by utilizing the polarity map as a guide, Summit attendees produced early warning indicators and action actions to promote values, which improved the use of poles to create effective, efficient, and integrated healthcare.

And, also in the same line with this study **Mallek & El-Hosany, (2020)** who assess the effect of training program for advancement competence and polarity of clinical instructors and discovered that the clinical instructor's mean ratings for their overall clinical teaching practice expertise in the pre- and post-intervention programs differed statistically significantly. This also in harmony with the study of **Lewis & Smith, (2022)** who developed the polarity assessment tool, which focuses on "both/and" and facilitates the development of leverage for the complex and crucial problems that all leaders, teams, and organizational systems encounter. The tool is an accurate way to measure the dynamics of complex and interdependent systems..

Also this in the same line with **Ahmed et al., (2022)** who showed how polarity mapping utilizing the (PACT) [TM] model provides a fresh perspective on crisis decision-making. It is necessary to regard managing educational crises as polarity rather than as an either/or procedure for making decisions. To do this, it is advised that you participate in a mapping process and be aware of warning indicators that might result from concentrating too much on one of the poles. Additionally, this is compatible with the study of **Elsayed et al., (2023)** who found that highly statistical significant difference relation between mean and standard deviation scores of polarities practice between pre and post program and between pre-program and follow up phases of the program. And asserted that polarity management practice are essential for leaders to quickly achieve goals while building sustainable processes and structures and help eliminate insecurity.

Also, this supported by **Sorour et al., (2023)** who found that, as a result of head nurses' ignorance of polarity management and mapping, all head nurses had poor practice levels when it came to using polarity management. Researchers discovered that, in terms of polarity mapping skills, half of head nurses had moderate practice levels immediately following the educational intervention, and 25% had high practice levels. However, three months into the intervention, more than two-fifths of the head nurses still had moderate practice levels.

Additionally the current study reported that in pre-program all thirteen health care polarities dimensions included in the study had medium leveraging, which improved to be excellent for all thirteen health care polarities after 6 months of follow up implementation. This might be due to poor head nurses' practice in polarity diagnosing, mapping and

leveraging which lead improper leveraging of all thirteen polarities in pre-program implementation, which improved to be excellent leveraging for all thirteen polarities after 6 months of follow up implementation. This supported by the results of **Wesorick, (2015)** who found that the survey which conducted in the four participating organizations for all thirteen polarities assessed in the study provided numeric results which reflect that these typical polarities aren't managed well.

Also this in harmony with the study of **Govaerts et al., (2019)** who pointed out that the polarity thinking TM paradigm may be a helpful viewpoint for analyzing and resolving conflicts in intricate evaluation systems. By using this concept, people are encouraged to accept and make use of other points of view instead of wasting time debating who or what is correct. And consistent with the study of **Cunha & Putnam, (2019)** who explained that through applying paradox theory by navigating the paradox with current maps, we may benefit from the trade-offs and the synergy that arise.

Moreover, the current study found that regarding the highest score of head nurses' leveraging of health care polarities dimensions in pre-program implementation was for technology platform and practice platform innovation polarity dimension. This might be due to the new direction of Minia University hospitals to replace manual records and reports of the hospital to be electronic health record (EHR). Which begin to be implemented in the last two years in most units of the hospitals in which focusing of everyone's attention in preparation for obtaining accreditation by General Authority for Healthcare Accreditation and Regulation (GAHAR) Which includes information management and technology as a basic standard for accrediting hospital, GAHAR included in preparations for the introduction of a comprehensive health insurance system into hospitals to establish an integrated health system that includes one hundred million Egyptians, in accordance with presidential initiatives in the field of health. So that the hospitals continuous training units organized a lot of training sessions for all nursing staff to apply EHR and readiness of head nurses to use EHR, also the researcher noticed this by herself, which lead to over focusing technology platform over practice platform innovation which lead to poor leveraging of that polarity.

This was agreed with the study of **Habibi-Koolaee et al., (2015)** who asserted that more than half of nurses have readiness toward using EHR. Additionally compatible with **Salameh et al., (2019)** who noted that nurses' attitudes toward the implementation of electronic medical records (EMR) systems were positive and who clarified that this was due to the challenges of using a paper-based documentation system, which has contributed to the successful adoption of EMRs in other studies.

Also in the same line with the study of **Nyandekwe et al., (2020)** who cited that the Egyptian law number two 2018 acknowledge that the (GAHAR) is an Egyptian government body affiliated with the President of the republic that was established pursuant to and its executive regulations as one of the three main pillars (the Insurance Authority, the Welfare Authority, and the Oversight Authority) for implementing the comprehensive health insurance system.

And also, agree with **Mohamed et al., (2021)** who found that the majority of nurses disagreed that the main difficult with hospital information system (HIS) was data retrieval, data entry, and the user interface language was difficult or unclear. Also; high percentage of them disagreed

that HIS were old, difficult to use, difficult to train users or have no maintenance/technical support for hardware/software. Also in harmony with **Alrasheeday et al., (2023)** who found that the highest percentage of nurses had positive overall attitudes toward using EHRs. And consistent with the study of **Mahfouz & Mohamed, (2023)** who discovered that there were significant statistical positive correlations between the study participants' total knowledge as well as total technological skills toward EHRs and career success throughout program phases. While In contrast with the study of **McCrorie, (2019)** who noted differences in the degree of participation in EHR implementation and recommended that other healthcare facilities and hospitals take steps before implementing EHRs to allay worries about the standard and safety of patient care and increase the likelihood of a successful rollout. Also opposite to the study of **Cho et al., (2021)** who found that all studied nurses were found to be significantly associated with resistance user to use HER systems, either directly or indirectly.

However the current noted that the lowest mean score regarding head nurses' leveraging of health care polarities in pre-program implementation was for change and stability polarity, this might be due to decrease of nurses' knowledge as well as skills required for practicing hospitals' change while maintaining the stability of the hospital. This supported by the research of **Wang and Kebede, (2022)** who discovered that nurses' perceptions of organizational change were poor. Also **Emam, (2022)** who stated that nurses' perceptions of organizational transformation were poor. This is in contrast with the study of **Milovanovic et al., (2022)** that showed nurses' perceptions of organizational change were mostly favorable.

However after 6 months of follow up implementation, the present research discovered the highest mean score regarding head nurses' leveraging of health care was for standardized care and autonomous care polarity. This might be due to considering them as the cores of nurses' work which attract their attention for continuous improvement of their practical skills, while nurses starved to get autonomy in care with their patients and making autonomous decisions. So that the educational training program reinforce nurses' knowledge and practices toward leveraging of standardized care and autonomous care which lead to achieve a greater purpose especially with the readiness of head nurses to use EHR that facilitate the application of standardized care as it became evident that the standardized care practices should be included in the electronic health record in order to be easy to use. This agreed with the study of **Østensen et al., (2022)** who stated that additional development of standardized care practices and other standardized documentation structures is necessary and who claimed that system level facilitation of a stable technology infrastructure and the provision of functionality that supports nurses' workflow may be necessary for the successful implementation of standardized care practices.

Also, after 6 months of follow up implementation, the current study reported that the lowest mean score regarding head nurses' leveraging of health care polarities was for vertical and horizontal relations, this might be due to poor head nurses knowledge about vertical and horizontal relations in health care systems, in which during the educational training program most of head nurses wonder about this concept and ask a lot of questions to clarify it and connect it to their actual practice and so it needed more effort from

researcher to clarify this concept and it's applications. Also vertical and horizontal relations need justifying of hospitals policies and procedures to be able to implement it ideally which is difficult to be achieved as head nurses don't have enough authority to modify hospital policies. This parallel with **Heeringa et al., (2020)** who stated that American lawmakers are pushing for provider vertical and horizontal integration more and more, and who suggested that future studies look at the relationship between vertical and horizontal structure and results related to quality and cost in a methodical manner.

Regarding head nurses' acceptance for polarity management as a way to guide hospitals' transformation; the current study hypnotized that after implementation of the educational training program, head nurses will acknowledge that polarity management is an accepted way to guide hospitals transformation. This hypothesis was true according to the findings of the current study which demonstrated that the highest percentage of head nurses refused polarity management as a way to guide hospitals' transformation in pre pre-program implementation, while after 6 months of follow up implementation the highest percentage of head nurses accepted polarity management as a way to guide hospitals' transformation. Also this study found that there were highly statistically significant differences between the mean scores of all items of head nurses acceptance of polarity management throughout the study phase's pre, and after 6 months of follow up implementation.

This might be due to decrease of knowledge about polarity management as well as its importance in guiding hospitals transformation in pre-program implementation. While the educational training program of the study improve head nurses' knowledge about role of polarity management in achieving hospitals transformation that made them acknowledge that polarity management was an effective tool for diagnosing of the most important healthcare polarities and assisted them for better leveraging of that polarities and to achieve the greater purpose of hospitals transformation. This was compatible with the study of **Wesorick, (2014)** who mentioned that polarity offers leaders the chance to see the possibility for change, grasp reality more deeply, and act to fulfill a greater purpose.

And supported by the study of **Wesorick & Shaha, (2015)** who explained that utilizing the polarity thinking model and related tools to assess an organization's polarity management practices, it will become more adept at self-diagnosing and successfully transforming toward desired, long-term results. Additionally supported by **Govaerts et al., (2019)** who acknowledge that adopting Polarity Thinking [TM] and rephrasing assessment issues from a "either-or" to a "both-and" viewpoint might assist our efforts to modify assessment systems to better serve the requirements of students, educational institutions, and the general public.

And it agreed with the study of **Donnelly, (2020)** who noted that attempting to support individuals and groups who are willing to engage the tensions surrounding the perceived oppositions permeating modern life and are essential to the creation of generative futures for all, integrative polarity work is presented as a guiding approach. By engaging perceived polarities, individuals and groups can transform their own lives and the lives of others. Also, in the same line with **Maryboy et al., (2020)** who conceived that the paradox thinking of balancing opposites, can be a useful tool for transformation.

Regarding correlation between head nurses' knowledge about polarity management, head nurses' leveraging of health care polarities, and head nurses' acceptance for polarity management; the present research found that there were statistically significant differences as well as positive correlation between head nurses' knowledge about polarity management, their leveraging of health care polarities and head nurses' acceptance for polarity management in pre-educational training program. This explained that the more nurses' knowledge about polarity management before program, the higher level of leveraging polarities and the more acceptance for polarity management as a way for hospitals' transformation and vice versa. However there were no statistically significant differences and no correlation between all three variables in post 6 month's educational training program. Because the educational program was effective enough to remove statistical differences from all three variables, in which all nurses became knowledgeable about polarity management and became skilled in leveraging of healthcare polarities and moreover acknowledge that polarity management was an accepted way to guide hospitals' transformation, which mean the credibility of all study hypothesis.

This parallel with **Sorour et al., (2023)** who discovered that following three months of educational instruction, head nurses' levels of polarity management practice and general knowledge did not significantly correlate with each other compared to before the educational intervention. While, conversely with **Elsayed et al., (2023)** who discovered that there were positive correlation between studied sample total knowledge as well as their practice and their performance and there were positive correlation between studied sample practice also their performance in post-program phase. While there were no correlation among them in pre-program.

Conclusion

Based on the present research, it can be concluded that there is a significant improvement in all dimensions and total mean scores regarding head nurses' knowledge about polarity management dimensions. Additionally, there is a significant improvement in all dimensions and total mean scores regarding head nurses' leveraging of health care polarities dimensions. And also, the highest percentage of head nurses accepted polarity management as a way to guide hospitals' transformation, after 6 months of follow up implementation compared with preprogram implementation.

Moreover, improving of nursing staff knowledge about polarity management and practicing on polarity thinking models can work as an effective tool for diagnosing of healthcare polarities and dealing with ongoing, never end healthcare issues, which lead to better leveraging of healthcare polarities and consequently achieving of the greater purpose of hospitals transformation.

Recommendations:

Based on the findings of the current study, the following recommendations are suggested.

- Involving polarity thinking model in nursing administration curriculum.
- Including polarity thinking model in internship students' training to practice them on diagnosing and managing of healthcare polarities at their units.

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- Intensifying trainings to managers about polarity management to achieve hospitals transformation.
- Establishing a partnership with hospital executives to take the results of the study into consideration, take their results seriously, and applying it in accordance with regulations, laws, and available capabilities.
- Adopting polarity management in hospitals as a means for evaluating the quality of health care services through collaboration with quality management units in hospitals.

Recommendations for further research:

- A comparative study for diagnosing levels of leveraging health care polarities in private and educational hospitals.
- Using of polarity thinking for handling health teams' dysfunctions.
- Paradoxical leadership and its effect on healthcare transformation.

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