# Relation between Leadership Competencies, and Sustainable Development Behaviors of Nurses

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## ABSTRACT

**Background:** Nurses are the largest human resource group and backbone of every health care system. Head nurses are the key to professional communication between the top management and staff nurses, their role is highly important in the success of healthcare organizations so this require certain skills and practices are very important to increase nurses innovation and Sustainable development behaviors. **Aim: to** assess the relation between leadership competencies and sustainable development behaviors of nurses. **Subjects and Method:** A descriptive correlation design was used to achieve the aim of this study. **Setting:** The study was conducted El- Sinbelawin General Hospital, Dakhlia, Egypt. **Subjects:** Simple random sample from nurses (n= 240). **Tools**: leadership competency scale and sustainable development behaviors scale, **Results:** near half of the studied nurses reported that head nurses had a high level of leadership competencies. While, more than half of the studied nurses had a high level of sustainable development behavior. **Conclusion:** there was statistically significant positive correlation between leadership competencies, sustainable development behavior. **Recommendations:** Conduct workshops on innovative thinking and develop strategies to enhance nurses' level of sustainable development behavior, As well administer continuous learning about modern and innovative ways of leadership to update and promote leadership competencies of head nurses.

**Keywords: Leadership competencies,** Nurses' **sustainable development behavior.**

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## Introduction

Now, more than ever, we need knowledge, expertise and the capacity of nurses to bring solutions to our health-care challenges and future directions, These challenges and changes require nurses to exercise leadership in all domains including; clinical care, management, education, researcher and policymakers, This requirement also needs a competent nursing leaders at all levels Team, patient and system outcomes all benefit when nurses in all areas and levels maximize their leadership potential *(Kohlström, 2022).*

A leader is anyone who uses interpersonal skills to influence others to accomplish a goal. The leader is important for promoting high levels of performance and achieving quality outcomes. A manager in contrast, is an individual employed by an organization who is responsible and accountable for efficiency achieving the goals of the organization. As with leaders, managers require a set of interpersonal skills to achieve their goals, however a manager has authority, responsibility and power defined by the organization. All good managers are also good leaders

Nursing leadership plays a vital role in shaping outcomes for healthcare organizations, personnel and patients. With much of the leadership workforce set to retire in the near future, identifying factors that positively contribute to the development of leadership in nurses is of utmost importance (*Lee et al., 2022).*

Nurse leader need the combination of knowledge, skills, personal characteristics, and individual and social behaviors to perform their job which are leadership competencies. *(Persaud, 2021).*Also competencies are the measurable or observable knowledge, skills, abilities, and behaviors critical to successful job performance. Choosing the right competencies allows employers to:Plan how will organize and develop workforce, Determine which job classes' best fit business needs, Recruit and select the best employees, Manage and train employees effectively and Develop staff to fill future vacancies*(Tien et al., 2021)*

Leadership competencies help nurse leader to lead self, lead their staff and lead their organization (*White, 2023).*Competencies provide the foundation for assessment and selection techniques, including exams, interviews, and reference checks. It descriptions show employees what level of knowledge and skill mastery is required to successfully perform job duties, and what behavioral standards must be consistently demonstrated *(Kohlström, 2022).* Also competencies allow leaders to choose and prioritize training courses and other learning opportunities for employees. *(Dirani et al., 2020).*

Competencies usually fall into three categories: behavioral competencies, technical competencies and functional competencies. Behavioral Competencies an expression of the softer skills involved in an employee's performance. Technical Competencies usually concerned with the

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effective use of IT systems and computers, or any hard skills necessary for a job role. Functional competencies refer to the skills that leaders use when solve a problem or perform an activity

Nowadays, markets present a place characterized by strong competition where innovation represents an important tool allowing companies to achieve a competitive advantage. On the other hand, it is not sufficient just to innovate, but more importance is placed on the creation of innovations implemented on the principle of sustainable development (eco innovation).

Eco-innovation can be understood as a choice of suitable materials, processes, and distribution methods that are used with lower consumption of energy and natural resources (*Leppänen et al., 2022*

Moreover, many environmental problems, as well as competitiveness challenges within the global economy, have caused an increasing need to change and renew existing technological production and social behavioral patterns. Therefore, it is significant to redirect companies and their focus on the real implementation of activities that have a direct positive impact on sustainable development. This is important for influencing the level of care for the environment and loyalty for the organization (*Kushwaha et al., 2022*).

It is cleared that competent nurse leader has an important role in supporting frontline nursing personnel to innovate and adapt, so we can deduce that competent nurse leader can help in promoting innovative and sustainable work behavior of staff nurses (*Aronsson et al., 2022*).Sustainable development is "development that meets the needs of the present generation without compromising the ability of future generations to meet own needs ".It is an organizing principle that aims to meet human development goals while also enabling natural systems to provide necessary natural resources and ecosystem services to humans (*Sorour, &Elkholy, 2021*).

Sustainable development is observed through four dimensions which are Economic dimension, Societal dimension, Cultural dimension and Ecological dimension (*Rosa &Iro, 2019*).

A sustainable development lens can also influence the Finnish health system. Ecological and social well-being can be increased by applying economic values to the choices that are made for long-term and stable economic growth. Societies that have high standards of equality and justice are socially sustainable. Inequality between genders is a global challenge regarding social sustainability and influences health outcomes (*Rosa & Iro, 2019*).

Sustainability in nursing involves six defining attributes: ecology, environment, future, globalism, holism and maintenance. Antecedents of sustainability require climate change, environmental impact and awareness, confidence in the future, responsibility and a willingness to change. Sustainable development involves

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interpersonal social and cultural relations and long-term economic and ecological thinking in societal decision-making. Dimensions are well-suited for a foundation of decision-making in acute health care *(Ritchie, 2022).*There are barriers that small and medium enterprises face when implementing sustainable development such as lack of expertise, lack of resources, and high initial capital cost of implementing sustainability measures. Globally, the scale of collective action and lack of political will are barriers to achieving sustainable development. To overcome challenges; governments must jointly form an agreement of social and political strength. Efforts to enact reforms or design and implement programs to decrease the harmful effects of human behaviors allow for progress toward present and future environmental sustainability goals (*Álvarez Jaramillo et al., 2019).*

### Significance of the study:

Globalization, rapid technological changes in the 21st century, and new competitors have shaped a highly today's competitive and distribution market. Thus, sustainable development behaviors among nurses is becoming increasingly necessary due to the changing environmental and economic dynamics, customer needs, and increasing competition for organizations, this can be achieved through presence of leadership competencies (**Masa'deh, 2020).**

Numerous countries have identified leadership competencies a priority for most healthcare organizations, as staff nurses require flexible and inclusive workplaces where their interests and needs are considered .So that organizations that have an intense culture of recognizing employees through competent leaders have a 31% lower turnover rate than organizations that have in competent leader (**Bersin, 2015) .**

While there is an increasing awareness that sustainable change is essentially based on the innovative process and it also has great influence on social and economical well being. So that the researcher carried out this study to assess the relationship between leadership competencies, and sustainable development behaviors of nurses.

### The aim of the study was:

This study aims to assess the relation between leadership competencies and sustainable development behaviors of nurses**.**

### Research questions:

- What is the level of leadership competencies of head nurses?

- What is the level of Nurses 'sustainable development behaviors?

- Is there a relation between leadership competencies and sustainable development behaviors of nurses**?**

## Subjects and Methods:

### Research design:

A descriptive corelational design was used to conduct this study.

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## Study Subjects:

Simple random sample was selected from nurses (n=240) who agreed to participate in the study. Sample size was calculated according to following equation provided [n= N/ 1+N (e)$^2$].

## Study Setting:

The study was conducted at El-Sinbelawin General Hospital, Dakhlia, Egypt

## Tools for data collection:

**Tool I: Leadership competency scale: it consists of two parts:**

**Part I:** Socio demographic and work-related characteristics of nurses, to collect data about; age, gender, years of experience, marital status, level of education and department type**.**

**Part II:** It was adapted from **(Charles, 2000; Hyung & JiHoon, Wesley & Katharyn, 2010)** to assess frequency and intensity of leadership competencies of head nurses as perceived by nurses. It consists of(53) items grouped under11 domains as: influencing and motivating (5 items), learning, managing (5 items), envisioning (4items), teaming (5 items), initiating (5 items), ethical behavior (5 items) , developing human capital (5 items), communicating (4 items), decision making (5 items)  and changing (5 items).

The responses of nurses to the scale related to frequency of leadership competencies were measured on a five-point Likert scale ranging from (0 – 4). Where: 0= never performs this task, 1=

Performs this task yearly, 2= Performs this task monthly, 3= Performs this task weekly and 4= Performs this task daily**.**

Similarly, the Intensity of leadership competencies were measured on a five-point Likert scale ranging from (0 – 4 )where: 0=not Intense, 1=somewhat Intense, 2=moderately Intense, 3=highly Intense and 4=extremely Intense. The total level of leadership competencies among head nurses considered: Low leadership competencies if the score less than 50%, Moderate leadership competencies if the score range from 50% to 75%and High leadership competencies if the score more than 75% **(Charles, 2000; Hyung, et al., 2010).**

Tool II: sustainable development behavior Scale: It was adapted from (Dumitru et al., 2015).It consists of 21 items to assess sustainable development behavior levels of nurses at their workplace. Nurses' responses were measured on 5- point likert scale that ranging from (1- 5). Were 1= never, 2 = rarely, 3= sometimes, 4= often, and 5= always.The total level of sustainable development behavior among nurses considered: Low sustainable development behavior if the score range from 20% to less than 40%.Moderate sustainable development behavior if the score range from 40% to less than 60%. High sustainable development behavior if the score range from 60% to100% (**Dumitru et al., 2015).**

## Content Validity and Reliability:

The study tools were translated into

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Arabic language. Face and content validity were conducted by five experts from faculty of nursing at Zagazig University and two experts from El sinbelawin general hospital. Content and face validity sheet involved two parts: the first part included the opinions of the experts for each item that were recorded on a two-point scale: relevant, and not relevant; the second part covered general or overall opinion about the form which express their opinions and comments on the tools for clarity, applicability, comprehensiveness, understanding, any suggestions for any additional or omissions of items and ease for implementation. According to their opinions, all recommended modifications were performed by the researcher.

### Fieldwork:

The preparatory phase was done by printing questionnaire forms more than the required sample size in order to maintain the complete sample size and also to compensate for the forms with missing data. Then the data collection phase of this study was executed during the morning, afternoon and night shifts in three days per weeks. It was lasting two months from mid-November 2022 to mid-january2023. Also, explaining orally the purpose of the study and ways to fill in the questionnaire sheets briefly to the nurses before the beginning of their answer. The filled forms were collected in time and revised to check their completeness to avoid any missing data.

### Pilot study:

The pilot study was conducted to assess the tool's clarity and feasibility and to identify the obstacles of applicability, the pilot sample included 24 staff nurses and three head nurses (10% of the study sample) selected from the study setting. No modifications were done and the pilot sample was included in the main study sample. The pilot study also served in estimating the time needed for filling out the forms that took from 15-20 minutes.

### Administrative and Ethical consideration:

An official letters obtained from the dean of faculty of nursing at Zagazig University to El- Sinbelawin General Hospital manager and nursing director to request permission and cooperation for conducting this study, then oral official permission from the nursing director and from the head nurse of each unit to their nursing staff after explaining the nature and the aim of the work.

### Ethical Considerations

**The study was approved by Research** Ethics committee (REC) of the faculty of nursing, Zagazig University, approval to conduct the study will be obtained from the medical and nursing directors of El- Sinbelawin General Hospital .and the head nurses of the units after explaining the aim of the study. The agreement for participation of the study will be taken after fully explanation of the aim of the study. Participants will be given the opportunity to refuse the participation, and they will be notified that they could withdraw at any time. Also, they will be

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assured that the information would be confidential and used for the research purpose only. The researcher will assure maintaining anonymity and confidentiality of subjects 'data.

## Statistical Analysis:

Data were organized, categorized, tabulated and statistically analyzed by using the Statistical Package for the Social Sciences (SPSS), version 23.0 IBM Corp., Armonk, NY: USA.. Data were present using descriptive statistics in the form of the mean ± SD and qualitative data were expressed as absolute frequencies (number) & relative frequencies (percentage). Percent of categorical variables were compared using Chisquare test. Pearson correlation coefficient was calculated to assess relationship between various study variables, (+) sign indicate direct correlation & (-) sign indicate inverse correlation, also values near to 1 indicate strong correlation & values near 0 indicate weak correlation. All tests were two sided. P-value < 0.05 was considered statistically significant, p and p-value ≥ 0.05 was considered statistically insignificant. β(regression coefficients) & R square test for Multiple linear regression that is a predictive analysis. Multiple linear regressions was used to describe data and to explain the relationship between one dependent continues variable and one or more continues independent variable

## Result

Near from half of studied nurses (47.9%) reported that the head nurses had a good level of leadership competencies, while (27.9%) of nurses reported that the head nurses had a bad level of Leadership competencies,

**Table (1):** This table shows that the highest percentage of nurses were females, married, had nursing diploma and were in the age group range between 20 – 30 years old (95.8%,91.7%, 45.8%, &62.5%, respectively). Half of nurses had less than five years of experience in nursing (50%).

**Table (2):** this table clarify that the highest mean score of Leadership competencies domains was related to Ethical behaviors, Influencing and motivating and Teaming(21.106±2.489, 19.787±3.045, 16.963±3.279, respectively), while the lowest mean score was related to developing human capital and communicating (10.302±2.041, 11.542±4.312, respectively).

**Figure (1):** This figure shows that near half of nurses (47.9 %) clarified that head nurses had a good level of Leadership competencies ,while (27.9%) of nurses revealed that head nurses had a bad level of Leadership competencies**.**

**Figure (2):** This figure show that approximately above half of nurses had high level of sustainable development behavior (55%) while (22%) of them had low level of sustainable development

**Table (3):** Clarifies that there are a positive statistically significant correlation between head nurses leadership competencies and nurses sustainable development behaviors scores (r=0.398&at

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p value 0.001)

**Table (4):** Shows there were a statistically significance difference between personal characteristics of nurses regarding age, years of experience and educational qualifications and their perception of leadership competencies at p value< 0.05, it is cleared that nurses who aged from20-30 years old perceived that head nurses had low leadership competencies, on the other hand nurses who had more than ten years experience revealed that head nurses had low level of leadership competencies**.**

**Table (5):**Shows there were a statistically significance difference between personal characteristics of nurses and Sustainable development behavior regarding age ,years of experience, educational qualifications and department of work at p value<0.05, it is cleared from the table that 90% of nurses with nursing diploma had low level of sustainable development behavior.

## Discussion:

Leadership competencies have often been seen as a vital element and feature of management that influence the level of commitment of employees within the organization and have the possibility to boost organization effectiveness, innovative work behaviors among staff nurses, job satisfaction, as well as a sense of confidence about problem solving in order to achieve the organizational objectives **(Abasilimet al., 2019).**Professional development can help

achieving sustainable development and enhances the quality of professionals or skilled labor force in an organization or a country through access to education and training. It enhances professional knowledge, skills, competence, and effectiveness. Professional development leads to increased efficiency and productivity of workforce in an economy and in turn helps building human resource development in a country **(Havea&Mohanty, 2020)**

Therefore, the aim of this study was to assess the relation between head nurse's leadership competencies and sustainable development behavior.

Regarding personal characteristics of nurses, the current study reflected that the highest percentage of nurses were female and married**.** This result was similar to **Mobasher et al., (2019)**who conducted A cross sectional study in Iran about nurses' competence and job related factors among nurses in university hospitals, and found that most of nurses had were females and married.

Moreover, the present study showed that that the highest percentage of nurses had nursing diploma and were in the age group range between 20 – 30 years old. Half of nurses had less than five years of experience in nursing. In the same line, a study carried out by **Adib&Eshraghi, (2018)** in Iran about assessing nurses' clinical competence from their own viewpoint and the viewpoint of head nurses, found that most of the studied nurses had diploma and had less than 5

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years of work experience. Similarly, **Osman et al., (2019)** who studied relationship between nurses' competencies and quality of patient care at intensive care units and reported that the study sample were at age ranges from 20 to less than 30 years with mean ± SD (26.98±4.05).

The current study revealed that near from half of nurses reported that the head nurses had a high level of Leadership competencies, while more than one quarter of nurses reported that the head nurses had a low level of Leadership competencies. From the research investigator point of view, this might be attributed to factors that affected the development of nurse leader competence as work experience, type of nursing environment, educational level achieved, adherence to professionalism, critical thinking, and personal factors. Work experience and education were shown to significantly influence the development of competency of nurses **(Rizany et al., 2018).**

This result was similar to **Mahdi&Faraj, (2022)**who conducted a descriptive analytical study in Iraq to evaluate leadership competencies among nurse managers, and found that the highest proportion of studied nurse managers had good level of leadership competencies. Likewise, a study carried out by **Lehtonen et al., (2018)** in Island to assess nurse managers' leadership and management competencies assessed by nursing personnel in a Finnish hospital, found that leadership and management competencies were assessed as being quite good by the nursing personnel.

Also, a study conducted by **El-Sayed, (2021)** in Egypt about core competencies elements among first line nurse managers at Port-Said Governmental Hospitals and reported that nurses assessed the competence level of nurse managers as good. As well, a study conducted by **Warshawsky& Cramer, (2019)** in Florida about describing nurse manager role preparation and competency and found that nurse managers were rated competent.

On the other hand, these results were against a study performed by **Abd-Elmoghith&Abd-Elhady, (2021)** in Egypt to assess nurse managers' competencies and its relation to their leadership styles and stated that slightly less than half of nursing managers had a low level of competency. This difference may be related to the frequency of performing managers' activities were low and this because of they were having a higher responsibility and loaded during the morning shift. However, it might be lack of confidence in their ability and lack self-belief.

In addition, the study result was contradicted with **Ma et al., (2021)**who studied competencies of military nurses in general hospitals in China and reported that competencies of military nurse managers in general hospitals is limited. Also, a quantitative study performed by **Paarima et al., (2022)** in Ghana about leadership competencies of first-line nurse managers and stated that nurse managers exhibited a moderate level of leadership competencies.

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Moreover, **Gunawan et al., (2020)** who conducted a study in Indonesia entitled" Comparison of managerial competence of Indonesian first-line nurse managers and reported that the managerial competence of the studied nurse managers was at a moderate level. In the same context, a cross sectional study performed by **MB& GM, (2021)** in Egypt to evaluate managerial competencies of primary health care managers and stated that more than half of the studied sample had low managerial competency.

Concerning total mean score and levels of leadership competence domains of head nurses as perceived by nurses, the present study clarified that the highest mean score was related to ethical behaviors domains, influencing and motivating and teaming domains, while the lowest mean score was related to developing human capital and communicating domains .This result might be due to the nurse managers received training to help in successfully get experience and knowledge in using management skills and practiced tools during work environment the long term. Ethical competence is a major part of competence that is formed based on an individual development process in society and the structures of personal, educational, and functional values.

The importance of ethics is related to which idea that believes nursing profession was founded on ethics. Moreover, due to the presence of violence, anxiety, job dissatisfaction, distress, and ethical contradictions in the nursing practice,

nurses needs high ethical competency. The high ethical competence can help nurses in providing health care with ethical aspects in a stressful hospital environment **(Gunawan et al., 2018).**

Different tools have been used to assess the competence in previous studies. Similarly, in more studies the highest competence has been reported in this domains, a cross sectional descriptive study in Iran carried out by **Mobasheret al., (2019)** to investigated head nurses' competence and job related factors among head nurses in university hospitals and reported that the highest mean score of competence were in domains of 'ethical-legal performance. Consistently, **Gunawanet al., (2020)** who conducted a study about managerial competence of first-line nurse managers in public hospitals in Indonesia and reported that all nurses were most competent in maintenance of teaming and in ethical behaviors.

In contrast, **Ochonmaet al., (2018)** who studied managerial competency among hospital managers in Spain showed that the highest scores of nurses' competence was in "managing situations". In the opposite line, a descriptive cross sectional study by **Okonkwo et al., (2020)** in Nigeria entitled "Managerial Competencies ‑A Survey of Healthcare Managers in A Tertiary Hospital in Calabar, South‑South Nigeria "reported that the highest competence was reported in learning dimension. Also, this result was congruent with **Dikicet al., (2019)** who

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carried out a study in Serbia about alignment of perceived competencies and perceived job tasks among primary care managers, and found that the highest mean score of leadership competencies was reported in communication domains and mentioned that the achievement of any organization depends on the effectiveness of its communication systems and the interaction between employees members, and the primary reason for job discontent is bad communication between managers and employees. From the research investigator point of view, differences in these findings may be due to different conditions and skills of the head nurses studied.

Related to total levels of sustainable development behavior among nurses, the current study declared that more than half of the studied nurses had high level of sustainable development, while more than two fifth of them had low level of sustainable development. This may be due to nurses' level of education and years of work experience that can impact continuous creative or innovative ideas for sustainable behaviors. Plus, different work specialty departments and work environment may create different nurses' levels to maintain sustainability **(Al-Atwiet al., 2019).**In addition, the nurse managers believe that their behaviors are crucial for working sustainably because everyone has a shared responsibility and commitment to protect the environment and their patients.

Along with the present study findings, a study performed by **Algabar et al., (2023)** in Egypt about role of nurse

managers' sustainable management behaviors in building sustainability consciousness among nurses and stated that more than half of nurse managers had a high-level of sustainable management behaviors. On the same scene, **Abd-Elmonem et al. (2022)** who carried out a study in Egypt to investigate the relation between green human resource management strategies and organizational innovativeness among head nurses indicated that about more than half of nurse managers had a high perception level towards green human resource management to support the sustainable use of resources and preserve the natural environment in which the hospital provided training programs to develop green leadership approaches for leaders to implement green sustainable management strategies.

On the other hand, **Sorour&Elkholy, (2021)** who conducted a study in Egypt to investigate the relationship between servant leadership and its' role on staff nurses' creativity and sustainable development behavior, and assured that the highest percentage of the participants had a moderate level of sustainable development behaviors in different categories among nursing staff. On the other side, the present study finding was incongruent with a study done in Finland by **Leppanen et al., (2022)** entitled "Nurses´ and nurse managers´ perceptions of sustainable development in preoperative work "and revealed a poor level of sustainable development principles among nurse managers.

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In addition, the study result was contradicted with **Mamdouh& Samir, (2022)** who studied human resource management practices in relation to nurses' innovative work behavior, in Egypt and found in their study that more than two thirds of the participant had a moderate perception level regarding sustainable behaviors. Moreover, this result was different from **Swanson, (2022)** who performed a study in USA, entitled "Foundations of human resource development "and reported that the nursing staff had low perceptions level of sustainable development behaviors.

Pertaining to correlation between leadership competencies of head nurses and sustainable development behavior scores of nurses, the current study highlighted that there was a positive correlation between leadership competencies score and sustainable development behaviors scores. From the research investigator point of view, the previous study results might be due to that leadership competencies is considered as the important aspect that contributes tothe staff nurses' continuous sustainability behavior.

Additionally, competent leaders able to motivate staff to perform beyond their expectations by mean of purposeful tasks inspire hard work, share vision and simply express objectives and priorities. As well, encourages the adoption and implementation of new ideas with decentralization. Moreover, they enhance and provide staff with more decision-making autonomy in all actions related to tasks they perform and support new activities that could positively affected staff nurses' innovative work behaviors **(KO & Kang, 2019).**

This result was in agreement with a study done by **Cummings et al., (2020)** in Canada, about the essentials of nursing leadership which supported the study findings and confirmed that effective strong leadership is fundamental to facilitate the sustainable development behavior strength. Competent leadership positively correlates with values to develop nurses and offers a collaborative framework team for increasing creativity and productive sustainable behavior in nursing communities. Similarly, **Sorour&Elkholy, (2021)** who reported that there was a highly statistically significant positive correlation between competent leadership and its role on staff nurses' creativity and sustainable development behavior.

According to relation between personal characteristics of nurses and their perception regarding leadership competence levels of head nurses, the present study represented that there was statistically significance difference between personal characteristics of nurses and leadership competence levels regarding age, years of experience and educational qualifications. This can be interpreted as older nurses; nurses who have more years of work experience and have higher level of education are more likely to have higher leadership

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competence scores.

This result coincided with a study conducted by **Warshawsky& Cramer, (2019)** reported that experience had the strongest association with nurse manager competence, followed by graduate leadership education. Likewise, **Lehtonen et al., (2018)** found that nurse manger's competencies were associated with their education level, working experience, and with their education.Conversely, this result disagreed with a study carried out by **Mahdi&Faraj, (2022)** stated that there were no significant differences have been reported in leadership competencies with regard to nurse managers' age, gender, qualification, As regard relation between personal characteristics of nurses and sustainable development behaviour levels, the current study showed that there were statistically significance differences between personal characteristics of nurses and sustainable development behaviour levels regarding age, years of experience, educational qualifications and department of work. This can be explained as older nurses; nurses who have more years of work experience, have higher level of education and work at ICU are more likely to have higher sustainable development behaviour scores, and years of experience.

These findings of the current study are supported by **Leppänen et al., (2022)**who also confirmed that as head nurses got older, they interacted with the environment more sustainably, which results in more effective management behaviors and improves their capacity to sustainably lead their staff.On the other hand, the results of the current study partially agreed with a study carried out by **Algabar, (2023)** stated

that there were statistically significant relations between overall sustainable development behaviours and nurse managers' age and years of experience, while no significant relation was found with their work department.

**<span style="color:red">Recommendation</span>**:

**Based on the findings of this study, the following recommendations can be included:**

**The nurse manger and authorities should:**

- Provide training programs to improve leadership competencies of head nurses.
- Identify strengths and weaknesses of head nurses to promote their leadership competencies
- Improve communication skills of head nurses through training courses about importance and different ways of effective communication channels
- Administer continuous learning about modern and innovative ways of leadership to update and promote leadership competencies of head nurses.
- Identify the facilitators and barriers of leadership competencies of head nurses across positions and unit types.
- Identify the facilitators and barriers of sustainable development behavior among nurses across positions and unit types.
- Integrate the concepts of leadership competencies, sustainable development behavior into the main values and improve them through strategic management.

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**The nurse leader should:**

- Provide various opportunities and time for education, training programs to promote sustainable development behavior among nurses.
- Encourage and provide support to staff nurses through open communication, problem-solving, and shared decision making.
- Reduce nurses' resistance to change through communicating the objectives, methods and process of introducing new changes, nursing trends, media and technologies.
- Create a perception of equality among nurses which helps them to engage in
- Sharing their valuable knowledge with their team members and other staff in the organization.
- Conduct workshops on sustainable thinking and develop strategies to enhance nurses' level of sustainable development behavior.
- Nursing leaders should focus on the social approach, not just technical aspects
- Setting visions, polices, rules and plans to improve their staff nurses sustainable development behavior,
- Adhering to laws and standards that promote sustainable development behavior.
- Inspecting sustainable practices, and setting strategic performance objectives.
- Focus on proposing various sustainability initiatives, promoting sustainability programmes.
- Guiding project management activities.
- Managing teams, and effectively evaluating sustainable performance, as well as communicating effectively with various departments.

**The staff nurses should:**

- Develop their capabilities
- Develop themselves professionally
- Use new technologies, media, information and communication technologies and methods in nursing
- Learn new things at work.
- Attend workshops and apply strategies to elevate their levels of sustainable development behavior .
- Foster culture of sustainable development behavior through social media groups as what's app, mails, instagram…etc.
- Act pro-environmentally at work and encourage others to do that
- Make nursing procedures in a friendly environmental way
- Give due care to saving energy at work
- Following rules and policies to achieve organizational environmental goals.

**Further research**

- The effect of training program about sustainable development behavior in nursing on staff nurses' organizational climate, self-efficacy and job productivity of nurses.
- Future longitudinal, experimental and multi-site studies to conduct more research on leadership competencies, nurse's sustainable development behavior.
- Develop objective tools for leadership competencies and sustainable development behavior.
- Develop standards for head nurse's leadership competencies.

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**Table (1): Personal characteristics of nurses in the study sample (n=240)**

| Personal Characteristics | (N=240) | |
|---|---|---|
| | No | % |
| **Age in year** | | |
| 20-30 | 150 | 62.5% |
| 31-<40 | 70 | 29.2% |
| 40+ | 20 | 8.3% |
| **Mean +SD** | **28.4±6.2** | |
| **Marital status** | | |
| Single | 20 | 8.3% |
| Married | 220 | 91.7% |
| **Gender** | | |
| Female | 230 | 95.8% |
| Male | 10 | 4.2% |
| **Experience ( years)** | | |
| <5 years | 120 | 50% |
| 5-10 | 100 | 41.7% |
| More than 10 | 20 | 8.3% |
| **Mean +SD** | **4.3±8.7** | |
| **Educational qualification** | | |
| Nursing diploma | 110 | 45.8% |
| Technical institute of nursing diploma | 50 | 20.8.% |
| Technical institute of health diploma | 20 | 8.4% |
| Bachelor in nursing | 60 | 25% |

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**Table (2): Total levels of leadership competencies domains as perceived by nurses**:

| Leadership competencies domains | High | | Moderate | | Low | | Mean±SD |
|---|---|---|---|---|---|---|---|
| | No | % | No | % | No | % | |
| Influencing and motivating | 146 | 60.7% | 55 | 22.8% | 39 | 16.5% | 19.787±3.045 |
| Learning | 113 | 47.1% | 63 | 26.3% | 64 | 26.6% | 15.338±4.046 |
| Managing | 136 | 56.6% | 53 | 22% | 51 | 21.4% | 15.906±3.210 |
| Envisioning | 95 | 39.6% | 59 | 24.6% | 86 | 35.8% | 14.268±4.100 |
| Teaming | 145 | 60.4% | 45 | 18.8% | 50 | 20.8% | 16.963±3.279 |
| Initiating | 93 | 38.7% | 65 | 27.1% | 82 | 34.2% | 12.513±3.915 |
| Ethical behaviors | 165 | 68.8% | 55 | 22.9% | 20 | 8.3% | 21.106±2.489 |
| Developing human capital | 82 | 34.2% | 51 | 21.2% | 107 | 44.6% | 10.302±2.041 |
| Communicating | 88 | 36.7% | 63 | 26.2% | 89 | 37.1% | 11.542±4.312 |
| Decision making | 94 | 39.2% | 66 | 27.5% | 80 | 33.3% | 12.723±3.024 |
| Changing | 111 | 46.2% | 57 | 23.8% | 72 | 30% | 14.931±4.221 |
| Total | 115 | 47.9% | 58 | 24.2% | 67 | 27.9% | 16.723±2.622 |

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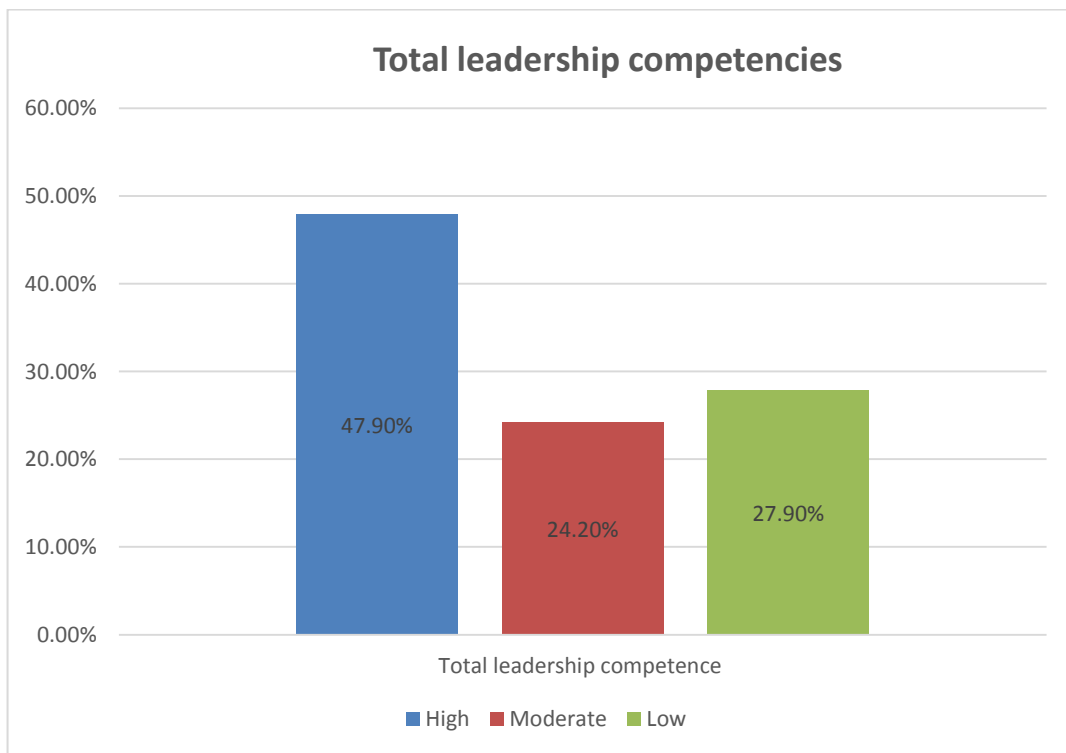Eur. Chem. Bull. 2023, 12(Regular Issue 10), 14710 – 14733

**Figure (1) Total levels of leadership competencies as perceived by nurses.**
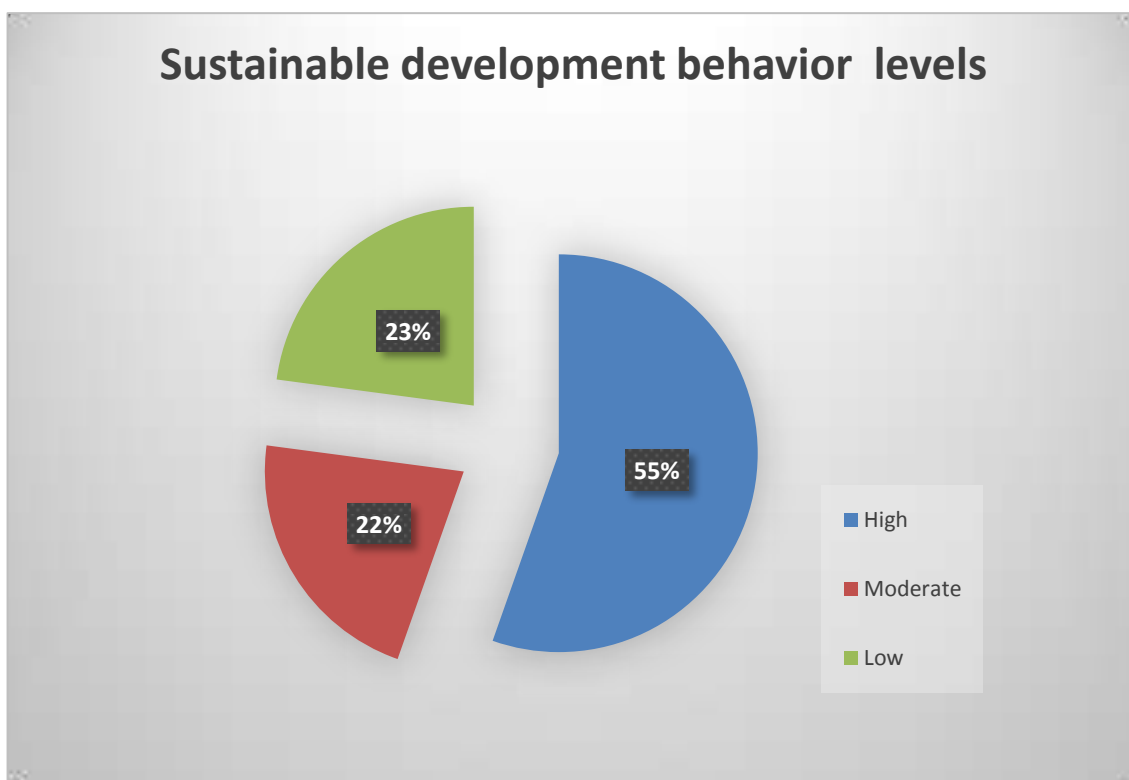


**Figure (2) Sustainable development behavior levels among nurses (n=240).**

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**Table (3): Relation between head nurses leadership competencies and nurses' sustainable development behaviors** (240).

| Items | leadership competencies | | Sustainable development behavior | |
|---|---|---|---|---|
| | **r** | **P** | **R** | **P** |
| **leadership competencies** | --------- | ----- | 0.398* | (0 .001) |
| **sustainable development behaviors** | 0.398* | (0.001) | ---- | ----- |

* Statistically significant P value <0.05      *non statistically significant P value >0.05

**Table (4):** Relation between personal characteristics of nurses and their perception regarding leadership competencies levels of head nurses (n=240)

| Personal characteristics | leadership competence levels | | | | | | number | P |
|---|---|---|---|---|---|---|---|---|
| | High | | Moderate | | Low | | | |
| | **n.** | **%** | **n.** | **%** | **n.** | **%** | | |
| **Age per years** | | | | | | | | |
| 20-30 | 5 | 3.3 | 15 | 10 | 130 | 86.7 | 150 | 0.032 |
| 31-<40 | 6 | 8.6 | 14 | 20 | 50 | 71.4 | 70 | |
| 40+ | - | - | 10 | 50 | 10 | 50 | 20 | |
| **Marital  status** | | | | | | | | |
| Single | - | - | 2 | 10 | 18 | 90 | 20 | 0.212 |
| Married | 10 | 4.5 | 30 | 13.6 | 180 | 81.8 | 220 | |
| **Gender** | . | . | . | . | . | . | . | |
| Males | 2 | 20 | | | 8 | 80 | 10 | 0.34 |
| Females | 20 | 8.7 | | | 210 | 91.3 | 230 | |
| **Years of experience** | | | | | | | | |
| 1_<5 years | 30 | 25 | 5 | 4.2 | 85 | 70.8 | 120 | 0.023 |
| 5-<10 | 15 | 15 | | | 85 | 85 | 100 | |
| More than 10 | | | | | 20 | 100 | 20 | |

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| Educational qualification | n | % | n | % | n | % | number | P |
|---|---|---|---|---|---|---|---|---|
| Nursing diploma | 11 | 10 | | | 99 | 90 | 110 | 0.015 |
| Technical  institute of nursing diploma | 17 | 34 | | | 33 | 66 | 50 | |
| Technical  institute of health diploma | 8 | 40 | | | 12 | 60 | 20 | |
| Bachelor in nursing | 9 | 15 | | | 51 | 85 | 60 | |
| **x2  chi square test   *significant P value <0.05    *non significant P value >0.05** | | | | | | | | |

**Table (5)**: **Relation between personal characteristics of nurses and Sustainable development behavior (n=240)**

| Personal characteristics | Sustainable development behavior | | | | | | number | $\chi^2$ | P |
|---|---|---|---|---|---|---|---|---|---|
| | High | | Moderate | | Low | | | | |
| | n. | % | n. | % | n. | % | | | |
| **Age per years** | | | | | | | | $\chi^2=$ | |
| 20-30 | 110 | 73.3 | 10 | 6.7 | 30 | 20 | 150 | 5.32* | 0.043 |
| 31-<40 | 50 | 71.4 | 15 | 21.4 | 5 | 7.2 | 70 | | |
| 40+ | 5 | 25 | 5 | 25 | 10 | 50 | 20 | | |
| **Marital  status** | | | | | | | | | |
| Single | 15 | 75 | 5 | 25 | | | 20 | $\chi^2=$ | |
| Married | 150 | 68.2 | 20 | 9.1 | 50 | 22.7 | 220 | 4.42* | 0.021 |
| **Gender** | | | | | | | | $\chi^2=$ | |
| Males | 5 | 50 | 4 | 40 | 1 | 10 | 10 | 4.52 | 0.34 |
| Females | 130 | 56.5 | | | 100 | 43.5 | 230 | | |
| **Years of experience** | | | | | | | | $\chi^2=$ | |
| 1-<5 years | 90 | 75 | 20 | 16.7 | 10 | 8.3 | 120 | 0.804* | 0.01 |
| 5-<10 | 70 | 70 | 20 | 20 | 10 | 10 | 100 | | |
| More than 10 | 15 | 75 | 5 | 25 | | | 20 | | |
| **Educational qualification** | | | | | | | | $\chi^2=$ | |
| Nursing diploma | 6 | 5.5 | 5 | 4.5 | 99 | 90 | 110 | 3.2* | 0.023 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| Technical institute of nursing diploma | 41 | 82 | 9 | 18 | | | 50 |
| Technical institute of health diploma | 12 | 60 | 8 | 40 | | | 20 |
| Bachelor in nursing | 48 | 80 | 12 | 20 | | | 60 |

$x2$ chi square test  *significant P value $<0.05$  *non significant P value $>0.05$
(r): Personal Correlation coefficient **p>0.05: Non significant, *p<0.05:** significant

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