

The Mediating Role of Felt Obligation in the Relation between Open Book Management and Climate Change Mitigation among Nurses

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Abstract

Background: Open book management emphasizes open information sharing without bureaucratic or dominant constraints. It supports nurses' behaviors, encourages autonomous thinking, fosters creativity and builds a positive work atmosphere where nurses feel obligated and committed to their organization for mitigating climate change. **Aim:** Assess the mediating role of felt obligation in the relation between open book management and climate change mitigation among nurses. **Design:** A descriptive correlational study design was employed. **Setting:** El Mehalla El Kobra General Hospital, which is affiliated with the Ministry of Health and Population. **Subjects:** a stratified random sample (280) of nurses were selected. **Tools:** Three tools were used: Open Book Management, Felt Obligation, and Climate Change Mitigation Questionnaires. **Results:** Most (88.2%) nurses had a moderate perception level about open book management and nearly two-thirds (63.9%) of them reported a high level of felt obligation. Over half (50.4%) of nurses had a high level of total perception of climate change mitigation and more than thirty (32.9%) had a moderate level. **Conclusion:** Felt obligation partially mediates the relation between open book management and climate change mitigation. **Recommendation:** Continuously engaging nurses in training programs about open book management and climate change mitigation. Providing a supportive work environment that values recognition, fair workload distribution, and professional development opportunities to foster nurses' sense of obligation

Key words: Climate Change Mitigation, Felt Obligation, Nurses, Open Book Management

Introduction

Healthcare organizations have experienced several approaches, techniques, and strategies in an attempt to manage better organizational performance in the currently challenging healthcare environment, where the risks are high and the demands are persistently fluctuating **(Faozen, & Sandy 2024)**. One of these approaches that gain eminence is open book management, an innovative attitude that is based on accountability, obligation, transparency, and collaboration all at the same time to encourage staff members to take responsibility and feel innovative in the organization **(Maisarah, Hassan & Elsetouhi 2023)**.

Open book management, some calls it “management by common vision”, as its core is the discovering common vision among nurses, and permits everyone to have the autonomy to trial and learn the new, and release nurses’ distress from fault or failure **(Abugabel, 2023)**. The standard of open book management is that the knowledge gained by nurses must benefit them to carry out their responsibilities and feel obligated, as well as wholly recognize the inclusive performance of the organization **(Mohamed, Ramzy & Abdelhafez, 2024)**.

Open book management including dimensions of sharing information, nurses’ training, empowerment, and rewarding **(Al-Taii, Ismael & Khudhur, 2020)**. In shared information, nurses receive financial information that helps them to

practice their own jobs and support their organization. Training enhances or even transforms nurses’ attitudes and behaviors, as well as develops their job-related knowledge, skills, and competencies. Empowerment enables nurses to participate in decisions based on the shared information. Finally, rewarding nurses occurs when the organization uses incentives based on their performance to increase productivity and efficiency **(Albaqawi et al., 2020; El-Sedeek et al 2024)**.

Felt obligation refers to nurses’ belief and responsiveness in their commitment to organization’s progress, care for the safety of the organization, and the achievement of organizational goals **(Chen et al, 2024)**. It is driven by factors like supportive leadership, feeling trusted, decent work, and supportive reward system **(Elgazar and Zoromba, 2024)**. Nurses with high sense of “felt obligation” demonstrate initiative by taking appointments that benefit the organization, even extending beyond their elected duties and liabilities **(Lu et al, 2022)**. Nurses felt obligation to response to health challenges that may be produced by growing life-threatening weather occasions **(Radwan et al, 2025)**.

Nurses also play an important role in addressing climate change. They have a key responsibility in protecting human health, which is closely linked to their duty to provide safe and high-quality care **(International Council of Nursing, 2018)**. In addition to promoting

health and well-being, nurses' perceived climate change mitigation includes educating patients and clients about the health impacts of climate change and raising awareness. Nurses also advocate for and help implement sustainable policies and practices, as well as collaborate with others to urge immediate action on climate change and prioritize green healthcare policies **(Mahmoud & Mahmoud, 2023)**.

Significance of the study

Nurses play an influential role in climate change mitigation and help individuals and groups to adjust to its effect. However, fostering nurses' active engagement in environmental sustainability requires organizational strategies that enhance their sense of responsibility and ownership toward such goals **(Mousa, Elshair & Elsayy, 2024)**. Open book management can be one of the most dynamic attitudes for running changing healthcare organization that focuses on sharing data, training nurses to embrace leadership roles and empowering them to make informed decisions. Moreover, create mutual trust and understanding; along with fostering innovation, collaboration and make them feel obligated to protecting health and wellbeing and to maintain social justice as a way to mitigate and fight climate change **(Mohamed, Ramzy & Abdelhafez 2024)**.

Open book management is limited debated in the healthcare sector as well as researches on nurses' perceptions, responsiveness, and actions related to climate change

mitigation. It is necessary to conduct this study to discover the relation between open book management and climate change mitigation among nurses and how nurses' felt obligation mediated this relation.

Theoretical Framework

The relation between open book management, felt obligation and climate change mitigation is analyzed utilizing the theories of Social Exchange Theory (SET) **(Blau, 1964)** and Stakeholder Theory **(Freeman & McVea 2001)**.

Open Book Management (OBM) refers to the transparent sharing of organizational information with employees, involving them in decision-making and encouraging a sense of ownership. According to Stakeholder Theory, employees are critical stakeholders whose behaviors and values influence organizational outcomes, including environmental sustainability. When nurses have access to organizational information and are engaged in decision-making, they are more likely to internalize organizational goals related to environmental responsibility and participate actively in climate change mitigation initiatives (e.g., reducing energy use, waste management, sustainable practices in hospitals).

Climate change mitigation in the healthcare sector involves reducing the environmental footprint through energy conservation, waste reduction, sustainable procurement, and promoting green practices. According to Pro-Environmental Behavior models, organizational context and psychological states play crucial roles in driving sustainable actions. Thus,

when open book management fosters a sense of responsibility, nurses are more inclined to engage in environmental stewardship behaviors. Based on Social Exchange Theory, when employees perceive transparency, trust, and inclusion through OBM, they develop a sense of felt obligation—a psychological state where individuals feel a moral duty to reciprocate the organization's trust and support with positive behaviors. Felt obligation encourages proactive and discretionary actions, including those that support sustainability and climate change mitigation. Nurses who feel valued and responsible are more likely to take initiative in eco-friendly practices within healthcare settings.

3. Climate Change Mitigation Behaviors among Nurses

Climate change mitigation in the healthcare sector involves reducing the environmental footprint through energy conservation, waste reduction, sustainable procurement, and promoting green practices. According to Pro-Environmental Behavior models, organizational context and psychological states play crucial roles in driving sustainable actions. Thus, when open book management fosters a sense of responsibility, nurses are more inclined to engage in environmental stewardship behaviors.

Aim of the study

Assess the mediating role of felt obligation in the relation between open book management and climate change mitigation among nurses.

Research questions

Following the literature review findings, the researcher proposed the following questions (Figure 1):

- What are the levels of open book management, felt obligation and climate change mitigation as perceived by nurses?
- Is nurses' felt obligation has a mediating role in the relation between open book management and climate change mitigation among nurses?

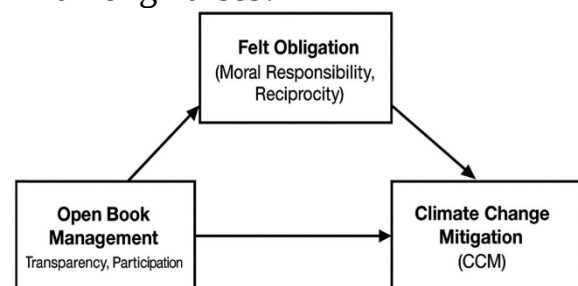


Figure 1. Theoretical framework

Subjects and Method

Research design: A descriptive correlational study design was used to achieve the study's aim.

Setting: the study was conducted at El Mehalla El Kobra Gneral Hospital which allied to Ministry of health and population.

Subjects: A stratified random sample (280) of nurses was selected from total total number of nurses (1000) based on EPI. Info Microsoft with a 95% confidence level, 5% error margin, and 50% response distribution. The calculation yielded a sample size of 278, and increased to 280 participants to facilitate proportional allocation across strata.

Tools:

To achieve the current study's aim two tools were used:

Tool I: Open Book Management Questionnaire

This tool developed by researchers based on **Nikzad and Maryam, (2012) and Alkhamis, (2018)** to measure nurses' perception regarding open book management. It consisted of 20 items allotted into four dimensions; information sharing, nurses' training, nurses' empowerment, and nurses' rewarding with five items for each dimension. Furthermore, eight items related to nurses' data were used.

Scoring system

The constructs employed in this study was measured by five – point Likert scale with choices ranging from “1= strongly disagree” to “5=strongly agree”. The scores of each dimension summit up and then transformed into percent score. The levels of open book management perception were scored statistically based on **Mohamed et al., (2024)** where $\geq 81\%$ considered % high level of perception; 80 %-41% moderate level; and $<40\%$ low perception.

Tool II: Felt Obligation Questionnaire

This tool was measured with the seven positively worded items developed by **Eisenberger (2001)** and used to measure nurses' felt obligation levels.

Scoring system

Nurses' responses considered against 3-point Likert scales ranging between 1 and 3; where 3 = always, 2= sometimes and 1= never. Nurses' felt obligation levels scored based on statistically cut-off values: $>75\%$ high level of felt obligation; 75%-60% moderate level; and $<60\%$ low obligation felt.

Tool III: Climate Change Mitigation Questionnaire

This tool was constructed by researchers based on **Winquest et al., (2022), Castener, (2024) and Radwan et al., (2025)**. It involved 15 statements for measuring nurses' role in climate change mitigation that dividing into three dimensions involving: raise awareness (5items), developing and implementing sustainable practice (7items), and partnership and collaboration (3 items).

Scoring system:

The rating scale for this tool ranged from 1-5 where 1 = strongly disagree to 5=strongly agree. The total score was obtained by adding up the scores from all categories. Then, the scores were ordered based on a statistical cut-off point into three levels: high climate change mitigation role ($>75\%$), moderate (60% to $<75\%$) and low ($<60\%$).

Validity and reliability: The questionnaire was introduced to a jury of five experts from nursing administration specialty to check face and content validity. According to this evaluation, required modifications were done, and a pilot study was conducted on 10% of nurses (n=28). Reliability of the tools was tested using Cronbach's alpha coefficient test which equal to 0.921, 0.894, 0.896 for tool I , II &III respectively.

Ethical considerations: Approval of Faculty of Nursing, Tanta University Scientific Research Ethics' Committee was obtained (code number 640-4-2025). A consent regarding acceptance to participate

was obtained from nurses after providing them with information regarding the study's aim and nature. Their obscurity was considered, and nurses were confident that all data was used for research aim only and they had the right to withdraw from study at any time.

Procedures

After explaining the purpose of the study, the researchers contacted the nurses in their work setting and requested for involvement in the study. The estimated time needed to fill all questionnaire was 20-30 minutes. The data collection period started at the beginning of May and ends in July 2025.

Statistical analysis of the data

The statistical analysis of the data was achieved using IBM SPSS software version 20.0 (Armonk, NY: IBM Corp, released 2011). Categorical data were summarized as numbers and percentages. For continuous data, normality was assessed using the Kolmogorov-Smirnov test. Quantitative data were designated using range (minimum and maximum), mean, standard deviation, median and interquartile range (IQR). Implication of the obtained results was judged at the 5% level. The used tests were Chi-square test for categorical variables, to compare between different groups, moreover, F-test (ANOVA) For normally distributed quantitative variables, to compare between more than two groups, Pearson coefficient test to correlate between two normally distributed quantitative variables and Bootstrapped mediation analysis test to assess whether the

effect of an independent variable on a dependent variable is transmitted through a mediator variable.

Results

Table (1) shows distribution of nurses according to their personal and work-related data. More than half (50.7%) of nurses were aged 30-40 with a mean age of 31.80 ± 6.31 . Majority (92.5%, 91.4%) of them are female and married. Over half (57.9%, 55.7%) had bachelor degree and less than ten years of experience with mean years of 9.10 ± 5.84 . The highest percent (14.3%, 12.1%) worked in medical and ICU unit. Nearly seventy percent (69.6%) didn't attain training program about open book management while for climate change more than three quadrant didn't attain any training.

Figure (2): Shows levels of nurses' perception about total open book management. Most nurses (88.2%) had moderate perception level about open book management.

Table (2) shows open book management and felt obligation mean scores. The table showed that the total mean percent score for open book management was 68.93 ± 9.96 . The highest mean percent score (77.55 ± 13.61) was for information sharing followed by (77.55 ± 13.61) for nurses training and nurses' empowerment (74.39 ± 13.90). While, the lowest one (47.57 ± 18.020) for nurse rewarding. Regarding felt obligation, the total mean was (28.29 ± 5.07) and total mean percent score was 76.05 ± 18.10 .

Figure (3) shows levels of nurses overall felt obligation. The figure

revealed that nearly two-thirds (63.9%) of nurse had high level in felt obligation. While little percent (19.6%, 16.4%) had moderate and low level in felt obligation.

Table (3) shows mean scores of climate change mitigation among nurses. The table showed that the overall mean percent score was 71.83 ± 13.23 . The nurse's role in raising awareness achieved the highest mean percent score (73.48 ± 17.94) followed by sustainable practice (71.82 ± 15.85) and partnership (69.08 ± 20.70).

Figure (4) illustrates overall levels of nurses' perception about climate change mitigation. The figure showed that over half (50.4%) of nurses reported a high level of total perception to climate change mitigation, and more than thirty (32.9%) had moderate level.

Table (4) and figure (5) show mediation analysis test of felt obligation. It was observed that felt

obligation partially mediate relation between open book and climate change mitigation where open book has a positive direct effect on felt obligation ($B=0.194$) as well as open book has a direct effect on climate change ($B= 0.303$). Also felt obligation has direct effect on climate change ($B=0.251$).

Table (5) shows the relation between the percentage scores of the studied variables and the participants' personal and work-related characteristics. There was a significant relation between open book management and age, department, work experience, and attendance of training programs. The results also revealed a significant relation between felt obligation and age, department, and marital status. In addition, the table showed a significant relation between climate change mitigation and age, department, and training.

Table (1): Distribution of nurses according to their personal and work-related data (n = 280)

Personal data	No.	%
Age (Years)		
<30	111	39.6
30 – 40	142	50.7
>40	27	9.7
Min. – Max.	20.0 – 50.0	
Mean $\pm$ SD.	31.80 ± 6.31	
Sex		
Male	21	7.5
Female	259	92.5
Marital status		
Married	256	91.4
Single	24	8.6
Education		
Nursing Diploma	42	15.0
Technical institute	52	18.6
Bachelor of Nursing	162	57.8
Postgraduate studies	24	8.6

Department		
Burn		
Dialysis	27	9.6
Emergency	28	10.0
Gyna	25	8.9
ICU	28	10.0
Medical	34	12.1
Pediatric	40	14.4
Out patient	25	8.9
Surgical	31	11.1
	42	15.0
Years' Experience		
<10	156	55.8
10 – 15	90	32.1
>15	34	12.1
Min. – Max.	1.0 – 26.0	
Mean $\pm$ SD.	9.10 $\pm$ 5.84	
Previous training on open book		
No	195	69.6
Yes	85	30.4
Previous training on climate change		
No	212	75.7
Yes	68	24.3

SD: Standard deviation

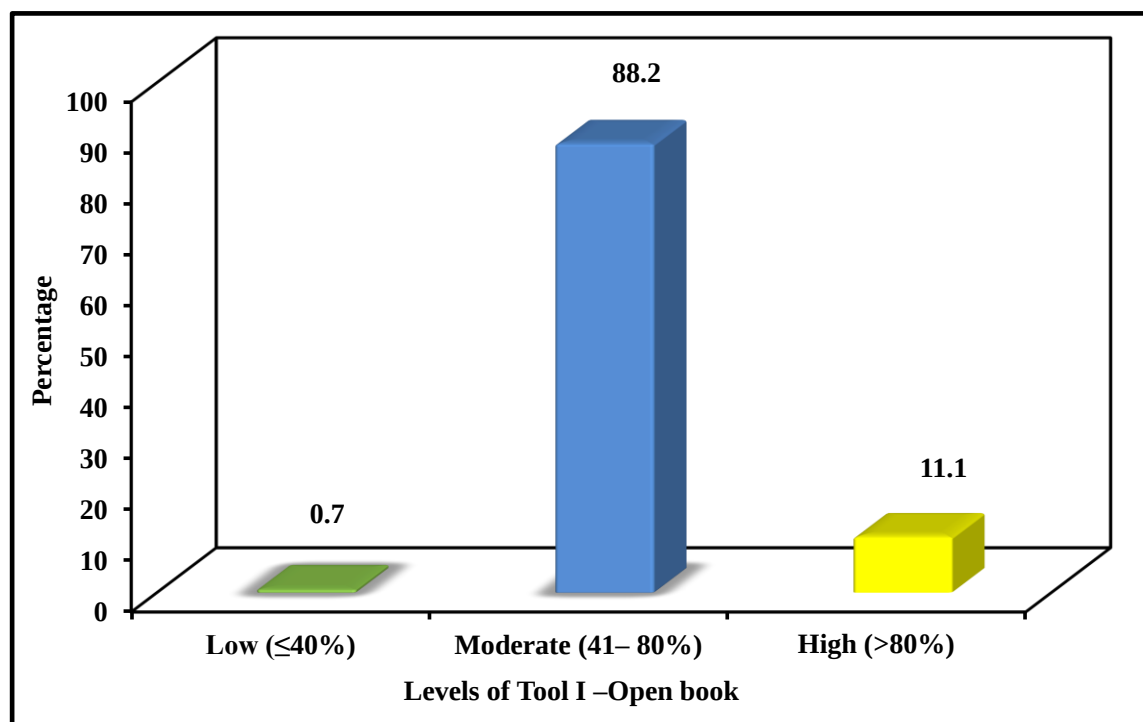
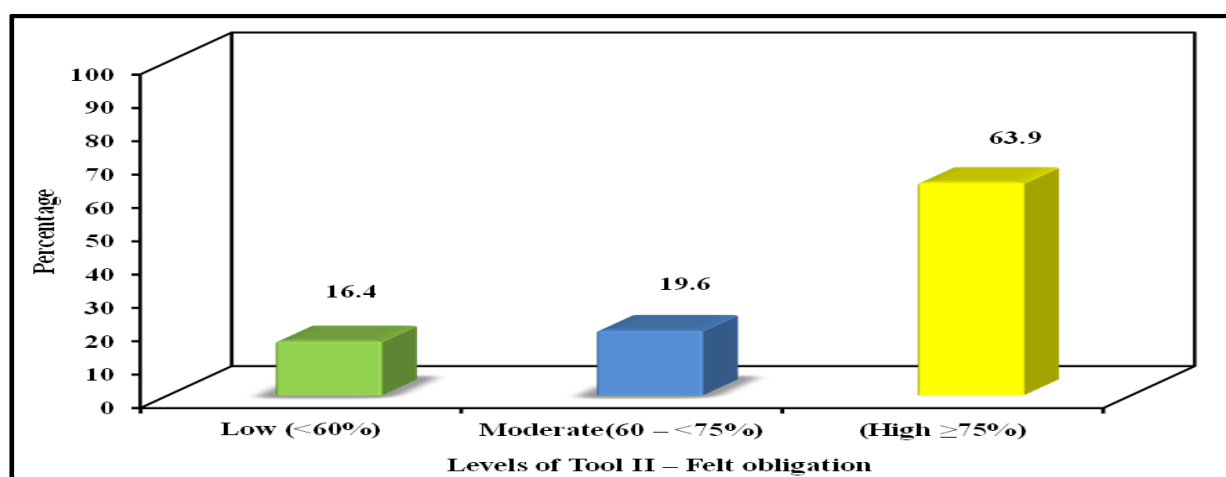


Figure (1): Levels of nurses' perception about total open book management (n = 280)

Table (2): Open book management and felt obligation mean scores (n = 280)

	Score Range	Total Score		Average Score (1 – 5)	Percent Score	Rank
		(Min. – Max)	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Information sharing	(5 – 25)	13.0 – 25.0	20.51 $\pm$ 2.72	4.10 $\pm$ 0.54	77.55 $\pm$ 13.61	1
Nurses training	(5 – 25)	10.0 – 25.0	20.24 $\pm$ 3.17	4.05 $\pm$ 0.63	76.20 $\pm$ 15.84	2
Nurse empowerment	(5 – 25)	13.0 – 25.0	19.88 $\pm$ 2.78	3.98 $\pm$ 0.56	74.39 $\pm$ 13.90	3
Nurse rewarding	(5 – 25)	8.0 – 24.0	14.51 $\pm$ 3.60	2.90 $\pm$ 0.72	47.57 $\pm$ 18.02	4
Overall open book	(20 – 100)	52.0 – 90.0	75.14 $\pm$ 7.97	3.76 $\pm$ 0.40	68.93 $\pm$ 9.96	
Felt obligation	(7 – 35)	9.0 – 35.0	28.29 $\pm$ 5.07	4.04 $\pm$ 0.72	76.05 $\pm$ 18.10	

**Figure (2): Levels of nurses overall felt obligation (n = 280)****Table (3): Mean scores of climate change mitigation among nurses (n = 280)**

	Score Range	Total Score		Average Score (1 – 5)	Percent Score	Rank
		Min. – Max.	Mean $\pm$ SD	Mean $\pm$ SD	Mean $\pm$ SD	
Raise awareness	(5 – 25)	7.0 – 25.0	19.70 $\pm$ 3.59	3.94 $\pm$ 0.72	73.48 $\pm$ 17.94	1
Sustainable practice	(7 – 35)	15.0 – 35.0	27.11 $\pm$ 4.44	3.87 $\pm$ 0.63	71.82 $\pm$ 15.85	2
Partnerships or collaborations	(3 – 15)	3.0 – 15.0	11.29 $\pm$ 2.48	3.76 $\pm$ 0.83	69.08 $\pm$ 20.70	3
Overall	(15 – 75)	37.0 – 75.0	58.10 $\pm$ 7.94	3.87 $\pm$ 0.53	71.83 $\pm$ 13.23	

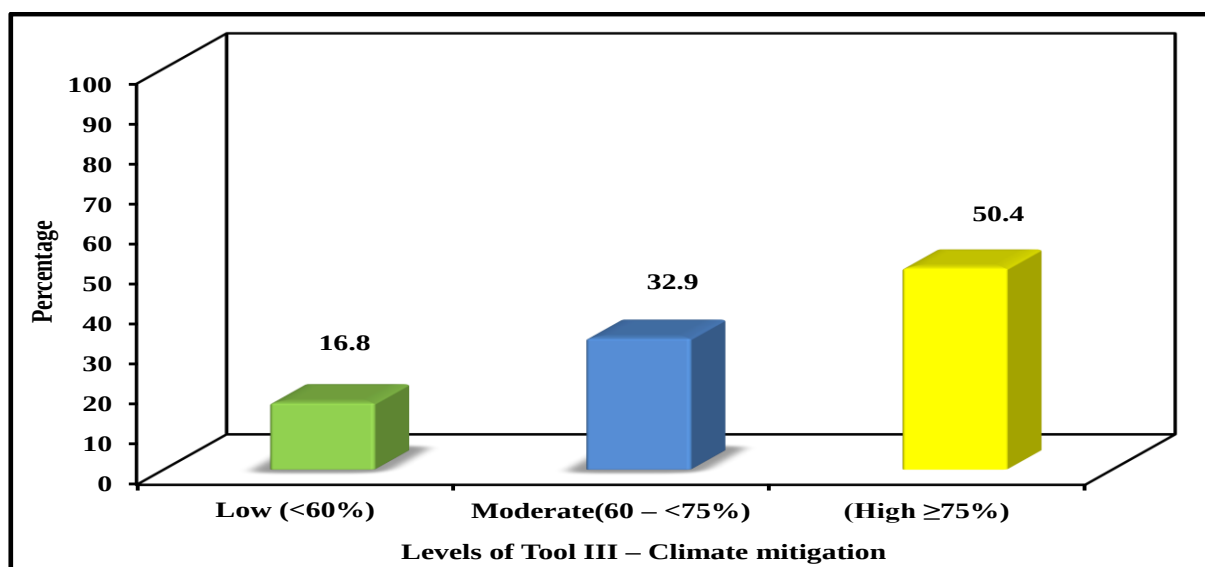


Figure (3): Overall levels of nurses' perception about climate change mitigation (n = 280)

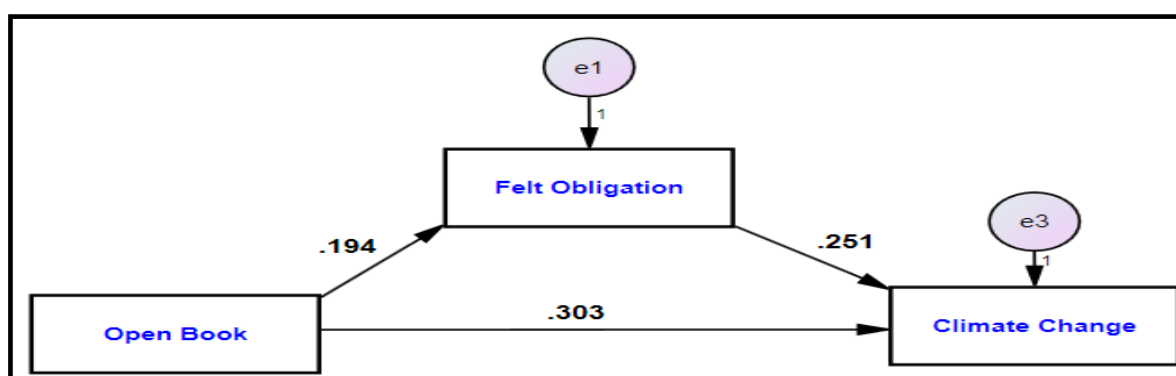


Figure (4) & Table (4): Mediation analysis test for felt obligation

	B	P	95% CI (LL – UL)
Paths			
a1	0.194	<0.001*	0.122 – 0.265
b1	0.251	0.006*	0.071 – 0.430
Direct Effect (c')	0.303	<0.001*	0.189 – 0.417
Indirect Effect (a1*b1)			
Open Book → Felt Obligation → Climate Change	0.049	0.015*	0.005 – 0.104
Total Effect (c' + a1*b1)	0.351	<0.001*	0.241 – 0.462

Bootstrapped mediation analysis test

a1: Open Book → Felt Obligation b1: Felt Obligation → Climate Change

c': Open Book → Climate Change Bootstrapped mediation analysis test

Table (5): Relation between percent score of studied variables with personal and work- related data (n = 280)

Personal data	N	Tool I: Open book	Tool II: Felt obligation	Tool III: Climate change mitigation
		Mean $\pm$ SD.	Mean $\pm$ SD.	Mean $\pm$ SD.
Age (Years)				
<30	111	75.55 $\pm$ 6.94	77.16 $\pm$ 17.15	72.90 $\pm$ 13.64
30 – 40	142	76.46 $\pm$ 7.71	77.54 $\pm$ 13.93	72.31 $\pm$ 12.0
>40	27	66.52 $\pm$ 8.20	63.62 $\pm$ 32.25	64.88 $\pm$ 15.97
F(p)		20.421* (<0.001*)	7.375* (<0.001*)	4.282* (0.015*)
Marital status				
Married	256	68.70 $\pm$ 10.19	75.33 $\pm$ 18.48	72.0 $\pm$ 13.43
Single	24	71.35 $\pm$ 6.72	83.63 $\pm$ 11.04	70.0 $\pm$ 11.03
t(p)		1.755 (0.088)	3.276* (0.002*)	0.707 (0.480)
Department				
Burn	27	62.96 $\pm$ 11.07	70.24 $\pm$ 20.71	65.68 $\pm$ 14.66
Dialysis	28	70.18 $\pm$ 11.12	82.65 $\pm$ 11.93	69.05 $\pm$ 11.16
Emergency	25	69.20 $\pm$ 11.85	82.43 $\pm$ 11.80	73.07 $\pm$ 13.09
Gyna	28	69.64 $\pm$ 6.96	81.12 $\pm$ 14.11	78.45 $\pm$ 12.63
ICU	34	69.23 $\pm$ 9.70	64.71 $\pm$ 24.14	66.81 $\pm$ 14.32
Medical	40	67.63 $\pm$ 8.62	77.14 $\pm$ 12.91	74.79 $\pm$ 10.37
Pediatric	25	68.45 $\pm$ 5.44	79.57 $\pm$ 12.86	78.20 $\pm$ 13.19
Outpatient	31	75.12 $\pm$ 9.11	82.03 $\pm$ 8.53	75.0 $\pm$ 10.06
Surgical	42	68.01 $\pm$ 10.97	69.81 $\pm$ 24.42	67.58 $\pm$ 13.54
F(p)		3.104* (0.002*)	4.802* (<0.001*)	4.560* (<0.001*)
Years' Experience				
<10	156	69.44 $\pm$ 9.50	76.33 $\pm$ 16.65	71.53 $\pm$ 12.58
10 – 15	90	69.93 $\pm$ 10.54	77.14 $\pm$ 14.77	73.41 $\pm$ 13.62
>15	34	63.93 $\pm$ 9.20	71.85 $\pm$ 29.26	69.02 $\pm$ 14.87
F(p)		5.083* (0.007*)	1.099 (0.335)	1.452 (0.236)
Previous training on open book				
No	195	67.65 $\pm$ 10.16	78.37 $\pm$ 16.19	72.03 $\pm$ 13.65
Yes	85	71.85 $\pm$ 8.85	70.71 $\pm$ 21.0	71.37 $\pm$ 12.29
t(p)		3.302* (0.001*)	2.995* (0.003*)	0.379 (0.705)
Previous training on climate change				
No	212	70.09 $\pm$ 8.08	76.25 $\pm$ 18.24	73.56 $\pm$ 12.20
Yes	68	65.31 $\pm$ 13.78	75.42 $\pm$ 17.77	66.42 $\pm$ 14.88
t(p)		2.712* (0.008*)	0.327 (0.744)	3.588* (0.001*)

SD: Standard deviation

t: Student t-test

F:F for One way ANOVA test

p: p value for Relation between **Percent score** of Open book, Felt obligation and Climate change mitigation with Personal data*: Statistically significant at $p \leq 0.05$

Discussion

Open-book management means transparency for nurses in sharing information about hospital performance, including financial performance. This method encourages nurses to become more

efficient in their decisions. Nurses believe in their obligation to the organization's development and the attainment of organizational objectives. As climate change is the major challenges facing nurses in the 21st century. Nurses' mitigation

strategies are very important to combat climate change-related health risks. (Macagba, 2019; Chen et al., 2024; Tiitta et al., 2025). Therefore, this study aimed to assess whether felt obligation mediates between open book management and climate change mitigation among nurses.

Felt obligation mediating role

The present study finds that felt obligation partially mediates the relation between open book management and climate change mitigation among nurses. open book has a positive direct effect on felt obligation as well as open book has a direct effect on climate change. Also felt obligation has direct effect on climate change. This indicates that open book management strategy supports nurses through access to organizational information, training, reward and empowerment, they develop a stronger sense of personal responsibility and commitment toward their organization's goals. Thus, a sense of felt obligation, in turn, translates into greater motivation to participate in climate change mitigation within the healthcare setting.

This result aligns with Khalil (2020), who revealed that information sharing, training, and empowerment have a significant and negative effect on organizational anomie. Similarly, Tan et al., (2023) found that felt obligation mediated the link between perceived organizational support and balance of work- life in the homogeneous sample. While Eisenberger et al., (2025) found that perceived organizational support was positively connected to felt

obligation, but felt obligation was not allied with job satisfaction, affective commitment, or extra-role performance.

Regarding open book management, result of the study discovered that the majority of nurses reported a moderate level of perception about open book management. This is in fact pertaining to only about one-third had training on open book management. Open book management provides nurses with sufficient knowledge and tools that are crucial for their success. This is congruent with El-Sedeek et al., (2024) found that there is a need for more continuous training on open-book to develop staff abilities in understanding the issues occurring at their units and increase their motivations. Mohamed et al., (2024) supported the result and found study subjects at three studied hospitals had a moderate perception of open book management.

Regarding open book dimensions: Information sharing had the highest mean percent score followed by nurses' training and empowerment. While, rewarding of nurses was the lowest score. This lowest level of rewarding may be due to nurses feel their contribution are not properly recognized. Empowering nurses and sharing information makes them feel important and valued, but this needs to match a reward system to motivates them. This agreed with result of Amuche et al., (2019) who found that the main obstacle to open book management is an unfair reward system. Eltouky (2022) found that over two-third of nurses are not

satisfied with their reward. **Zhang et al., (2024)** found nurse effort-reward imbalance is high. **Rickerson, (2025)** recommended about importance of implementing effective reward systems in health care organizations to retain nurses and increase job satisfaction.

Felt obligation

The study result revealed that more than sixty of nurses had high level of felt obligation. This result may be attributed to the presence of supported leader that trusted, valued, and encourage nurses during their work. **Lu et al., (2022)** recommended about importance of using trust strategies by managers to enhance subordinates' psychological safety and felt obligation. Our result aligns with **Chen et al., (2024)** who found high level of felt obligation among nurses and nurses' felt obligation partially mediate inclusive leadership and nurses' caring behavior.

Regarding climate change mitigation among nurses

Results of the study revealed that over half of studied nurses reported a high perception level toward their role in climate change mitigation, and nearly one-third had a moderate level. Although training opportunities for nurses about their role to mitigate climate change are still limited, the growing global and local attention to climate change through media, governmental policies, and hospital sustainability initiatives may raise perception levels among nurses. **Kirche et al., (2022)** found that the most common barrier pertained to a lack of knowledge regarding how to approach climate change. While

Mekawy (2023) disagreed with our result and found slightly more than fifty of staff nurses had a low perception of climate change. **Maiz , Rashed , and Shetaway (2024)** showed that the majority of nurses possessed minimal background about climate change, and social media considered as the primary source of information. Also, **Yeboah et al., (2024)** review recommended the importance of raising awareness for nurses about climate change and sustainable practices.

Regarding to dimension of climate change mitigation. Nurses' role in raising awareness had the highest mean percent score in climate change mitigation followed by sustainable practice and partnership in the last. This may be due to nurses are in frontline position who frequently interact with patient, communities put them in position to educate and raise awareness about climate change problems and importance of adherence to sustainable practice. While partnership came last because it may depend on some hospital factors beyond their control. This agreed with **Gaudreau et al., (2024)** review about integrating climate change mitigation strategies, concluded that there is a mismatch between the roles nurses could play in addressing climate change and the readiness of organizations to provide the required support.

Relation between personal data and study variables

Our study shows a significance relation between open book management and age, department, work experience and attendance of

training program. This may be due to younger and low experienced nurses are more open to modern management approaches that emphasize transparency, participation, and shared information. They tend to be more adaptable to change and technology-driven systems that motivate them to attain training programs.

This supported with **Mohamed et al., (2024)** who explored that nurses' age, experience years and job title were predictors of OBM. While **Šteffko, Trubač, & Papula (2024)** found no significant association between previous working experience and the positive approach to open book management. The results also show a significant relation between felt obligation and age, department, and marital status.

Younger and middle-aged nurses had a high score of felt obligation than older nurses. Similarly, nurses working in dialysis, emergency, gynecology, and reception units had significantly higher levels of felt obligation than those in intensive care and surgical units. Also, single nurses had a higher felt obligation score than married nurses. This result indicates the importance of considering personal characteristics as a factor affecting nurses' felt obligation. **Gassas & Salem (2023)** supported our result, emphasizing on influence of nurses' personal characteristics on their levels of commitment. While **Alwidyan et al., (2022)** don't support the result and found no significant relationship between perceived work obligation and marital status.

Result of the study showed a noteworthy relationship among climate change mitigation and factors like age, department and training. Younger nurses had a higher score for their role in climate change mitigation than older nurses. This is may be due to younger nurses tend to be more adaptable and open to innovation and they willing to participate in new initiatives **Skeirytė , Krikštolaitis , and Liobikienė (2022)** support this result and observed that younger people tend to perceptive climate change issues more often than older individuals. In relation to department nurses working in the gynecological and pediatric departments reporting the highest mean scores. This may be due to their close connection to vulnerable populations such as women and children, who are more affected by climate change health problems.

This finding aligns with **Costa et al (2025)** who emphasized that the key nursing role in monitoring vulnerable populations as they are more subject to the effects from adverse climate events. Also, there was a significant relation between training and nurses' mitigation of climate change. **Maiz , Rashed , and Shetaway (2024)** who recommended the importance of implementing instructional guidelines to improve nurses' perceptions regarding climate change and environmental sustainability practices because nurses are unsure of their role in mitigating climate change.

Conclusion

Felt obligation partially mediates the relation between open book

management and climate change mitigation. Most nurses had a moderate perception level about open book management, whereas nearly two-thirds of nurses reported a high level of felt obligation. Over half of nurses perceived their role in mitigating climate change at a high level and nearly one third had a moderate level.

Recommendations

For hospital administrators

- Take proactive steps to prevent and decrease the effort-reward inequity for nurses as ensure fair compensation and maintain transparent and supportive management practice.
- Provide continuous training programs about open book management and climate change.
- Prioritize partnership and collaboration with governmental, community, and academic stakeholders, as these alliances are essential for strengthening hospital resilience and achieving effective climate change mitigation.
- Consider nurses' personal characteristics when developing strategies to enhance felt obligation

For head nurses

- Increase awareness of nurses about their role to mitigate climate change by continuous training programs and participation in workshops
- Provide supportive work environment that values recognition, fair workload distribution, and professional development opportunities, as

such conditions foster nurses' sense of obligation and encourage greater commitment to organizational and environmental goals.

For nurses

- Seek to understand hospital goals, resources, and performance indicators to feel more involved and responsible for achieving sustainability and quality outcomes.
- Actively join environmental committees.
- Attain work shops on climate change and open book management.

For education

- Integrate open book management strategies and climate change mitigation in nursing curricula

Further research

- Study effect of Integrating open book management strategies and role of nurses to mitigate climate change in different hospitals setting and on large sample.

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