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Correlation between management and leadership competencies and sustainability measures in Jordanian governmental hospitals: managers' perception

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Introduction: Developing a new model for the healthcare system that includes a set of management and leadership competencies is crucial to the improvement of productivity and sustainability of organizations.

Objective: This study aims to identify the management and leadership competencies and sustainability measures from the perspective of Jordanian managers in governmental hospitals.

Methods: A descriptive correlational study design was utilized. A convenient sampling method was used to select managers in governmental hospitals in the Central region of Jordan. A self-administered questionnaire was conducted using the Management and Leadership Questionnaire (MLQ30) and the Sustainability in Healthcare Questionnaire (SHQ).

Results: The total mean score of the management and leadership scale was 3.49. The highest-ranked items were "Speaking confidently and presenting to groups" and "Building trust and modeling integrity". while the lowest-ranked items are "Thinking and managing globally" and "Creating and innovating." The importance of sustainability measures is ranked as follows: social, environmental, and economic factors. There was a positive, statistically significant relationship between managers' competencies and the importance of sustainability measures. The combined competencies can predict the application of sustainability measures.

Conclusion: The sustainability factor that has been found exhibits components of environmental, economic, and social dimensions and this aligns well with the literature. Future hospital managers are today's students, and the job they do will either positively or negatively affect their institutions whether governmental or private, and society. So, including core competencies of management and leadership that foster sustainable development in the curricula might be a significant step toward integrating sustainability in higher education, among other activities.

KEYWORDS

competencies, healthcare, leadership, management, measures, sustainability

1 Introduction

One of the most important services for people and the community is health (Murray et al., 2014). The standard of a country's healthcare system is one of the most important indicators of its socioeconomic development, according to Mensah (2019). Accordingly, the development of health economics globally depends on the healthcare industry (Mensah, 2019). Organizations in the health industry have sustainability policies and initiatives that address the economy, society, and environment because of their importance. The countries' economic and social welfare may be impacted by these policies and actions. Consequently, establishing guidelines by creating control systems and governing the activities of healthcare sector organizations considering sustainability is essential to the development of the country (Akkaya and Üstgörül, 2020).

Innovation, stakeholder needs, efficiency, and the effectiveness of any organization's operations are all critical components of sustainability management (Baumgartner, 2014). The economic, social, and environmental dimensions of sustainability should encompass all organizational essentials as well as strategic and operational procedures for a successful implementation of sustainability in healthcare organizations (Baumgartner, 2014). Management involves planning, analysis, and controlling of the hospital concerning sustainability (Marques et al., 2021). According to Akkaya and Üstgörül (2020), managers and leaders need to be aware of sustainability measures that request management competencies. Since many people see sustainability measures as a crucial component of any business's desired success, a variety of factors can influence an organization's sustainability measures, including managers' awareness of and proficiency with sustainability (Venn et al., 2022).

Hospital waste management policies should be examined, according to Cowie et al. (2020), to make sure recyclables are recycled. While consumers, patients, and other stakeholders are pressuring healthcare organizations to adopt sustainable practices, governments are pushing environmental laws that have an impact on the industry (Cowie et al., 2020). Since many healthcare organizations aim to enhance public health in addition to delivering high-quality healthcare services, they must work to avoid environmental degradation. Furthermore, as stakeholders in the consumer and industry sectors grow more environmentally aware, they will want organizations to show their commitment to sustainability. Global healthcare organizations need to be more creative to stay ahead of the curve and be the first to seize possibilities related to sustainability (Cowie et al., 2020). Through changing waste management practices, sharing equipment, investing in renewable energy, and becoming ready for managerial and regulatory changes, healthcare organizations will meet stakeholder requests, make financial savings, and improve public health. Solutions that have an impact on people and the earth excite sustainability managers to devise and implement them. They create and implement legislation in a variety of fields for the benefit of the current and future generations (Barbosa et al., 2020). Another responsibility of a sustainability manager is to educate the public about sustainable management. It is a special kind of work where idealism and practicality coexist. Good competencies are required of this manager, including true professional experience, a good academic background, and management and leadership skills (Barbosa et al., 2020).

According to Roshanghalb et al. (2018), healthcare businesses that possess inadequate management competencies are more likely to face challenges such as poor service quality, low profitability, staff turnover, low productivity, internal management problems, and dissatisfied clients. Negative thought patterns, negligence, and a lack of business expertise to run the organization are examples of weak management (Settembre-Blundo et al., 2021). Like many other countries, Jordan's health systems face significant managerial and financial challenges. These problems are primarily caused by a change in the demographic transition pattern, pandemics, and the introduction of contemporary technology, all of which drive up costs steadily (Nazer and Tuffaha, 2017). Managers across all industries face a variety of challenges when it comes to sustainability-rooted initiatives, and sustainability is still seen in a fairly haphazard manner.

According to Marimuthu and Paulose (2016) and Sroor (2022), sustainability now encompasses several additional aspects in addition to environmental protection, such as the wellbeing of the community, employees, and clients. So, leading healthcare business processes with sustainability components is essential for efficient resource management, continuous service improvement, cost-effectiveness, and the development of service excellence for healthcare organizations' sustainability (Marimuthu and Paulose, 2016). Thus, effective management is critical to the sustainability of the health system and the productivity of enterprises (Bartram, 2002). Research on managerial competencies and sustainability measures in hospitals worldwide is scarce in the literature. Therefore, additional research is required to explain this phenomenon and the relationship between sustainability measures and managerial competencies in healthcare organizations, particularly in Jordanian hospitals. This study fills a gap in the literature by emphasizing the relevance of management and leadership competencies in better sustainability measures to increase efficiency in the healthcare sector. And develops a new model for the Jordanian healthcare system including a set of management and leadership competencies that may foster the managers in the application of sustainability measures in hospitals. Furthermore, this study may be considered as a better investment to boost health system management development. So, this study aims to identify the management and leadership competencies and the importance of sustainability measures from the perspective of Jordanian managers in governmental hospitals and to investigate the relationship between managers' competencies and the importance of sustainability measures and selected demographics.

Specifically, the research attempts to answer the following:

- 1 What is the managers' perception of management and leadership competencies in governmental hospitals?
- 2 What is the importance of sustainability measures as perceived by managers in governmental hospitals?
- 3 What is the correlation between managers' competencies and the importance of sustainability measures?
- 4 What is the correlation between selected demographics (age, gender, academic degree, specialty, years of experience, management level, and years of working in the same institution), and the importance of sustainability measures?
- 5 What are the predictors of sustainability measures in Jordanian governmental hospitals?

The tested hypotheses formulated for this study are:

- 1 There is a relationship between management competencies and sustainability decision-making skills.
- 2 There is a relationship between managers' demographic and sustainability decision-making skills.

2 Methodology

2.1 Design

A descriptive correlational study design was utilized to create standing representations of variables as well as to establish the correlation between distinct variables (McBurney and White, 2009).

2.2 Sampling

A convenient sampling method was used to select participants. The selection of this particular approach is based on its practicality, cost-effectiveness, and efficiency in targeting a certain subgroup of the population, namely primary healthcare nurses and midwives. Convenience sampling allows for the efficient collection of data from persons who are readily available and fulfill particular criteria for inclusion (Obilor, 2023). The accessible population was all managers in governmental hospitals in the central region of Jordan (Amman, Alzarqa, and ALSalt) in the selected settings. The sample size was calculated using the G*Power 3.1.10 program (Paul et al., 2007). Using the regression test, the minimum required sample size was 100 (power = 0.95, α = 0.05, and medium effect size = 0.15 with 14 predictors). Also, 20% was added to avoid incomplete questionnaires and participants' withdrawal. Therefore, the minimal assumed sample size required was 130. The inclusion criteria for the sample selection include only managers who (a) a full-time employee; (b) have been employed in the same hospital settings for a minimum of 1 year, and (c) are assigned formally as managers in any field in the institution. Those on leave during the study period were excluded from the study. Although this study is descriptive, confounders were managed through inclusion and exclusion criteria: participants must be currently employed at hospitals at the time of the data collection to capture the insights of current practices and challenges; with a minimum of 6 months of experience to ensure participants have substantial exposure to the management healthcare environment, making their contributions to understanding the sustainability measures more valuable. In addition, the researcher made sure that the sample had a sufficient number of managers for measuring differences from different governmental hospitals in the central region of Amman with diverse sociodemographic characteristics.

2.3 Setting

Jordan has a highly developed healthcare industry; the World Bank ranks Jordan as the top healthcare service provider in the area and the top five globally (World Bank and UNDP, 2016). The country's healthcare system is split between public and private institutions, military, and university hospitals (Ministry of Health, 2022). Hospitals are becoming more numerous because of population expansion. Governmental hospitals with the highest capacity in the central region

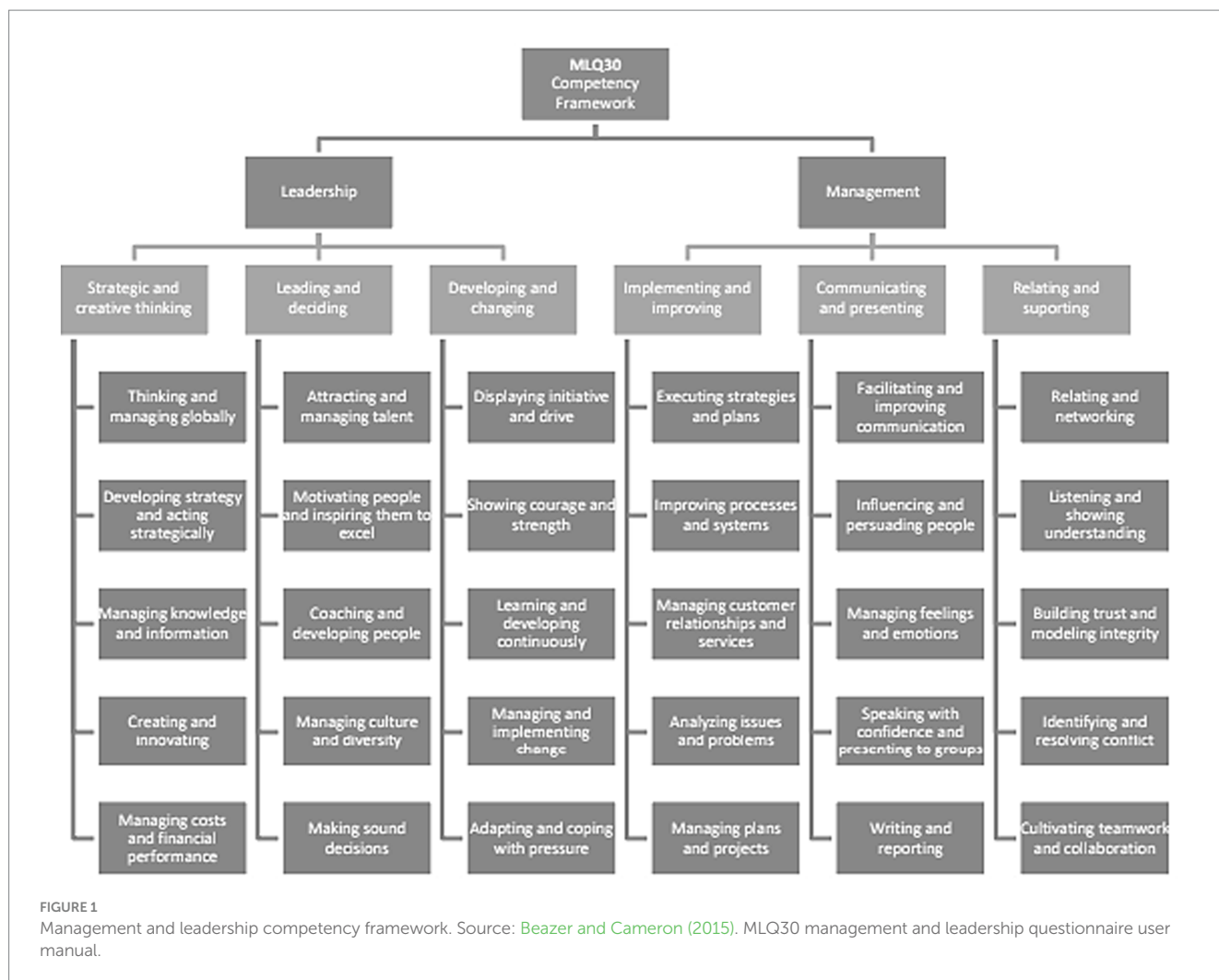
of Jordan (Amman, Alzarqa, and ALSalt) were included in this study. 42.8% of the occupancy rate is in governmental hospitals. The majority, or around 60% of the population in Jordan, receives the necessary healthcare services from the Ministry of Health institutions at all levels (Ministry of Health, 2022). The highest capacity governmental hospitals were chosen to be the selected settings in this study for their high occupancy rate and managers' numbers. Al-Basheer, Al-Salt, Al-Zarqa, Prince Faisal, and Prince Hamza hospitals are primary, secondary, tertiary, and educational facilities since they serve as a teaching ground for Jordanian physicians, medical students, nurses, and other allied health professionals.

2.4 Instruments

A self-administered questionnaire was distributed to managers, and the survey package was comprised of four main parts:

- Demographic Questionnaire: It includes Age, gender, educational level, specialization, years of experience, years of experience in the same institution, years in a manager role in the same institution, and management level.
- Management and Leadership Questionnaire (MLQ30): was developed through a rigorous and staged process by Beazer and Cameron (2015). The MLQ30 competency model assesses 30 aspects of an individual's management and leadership qualities and skills across six main categories. The questionnaire is available in two forms. This study adopted the normative form of the questionnaire, which is 30 items of a five-point Likert scale ranging from 1 = "Emerging" to 5 = "Elite" (Emerging, Developing, Competent, Superior, and Elite). There are 15 leadership competencies and 15 management competencies (Figure 1). Those competencies are categorized under three main subcategories including implementing and improving, communicating and presenting, and relating and supporting. The internal consistency reliability of the scale ranged from 0.80 to 0.94, and the median reliability for the scales was 0.87 (Beazer and Cameron, 2015).
- Sustainability in Healthcare questionnaire (SHQ): was developed by Mehra and Sharma (2021), which is an implementation of the Analytic Hierarchy Process (AHP) for identifying the importance of sustainability measures in healthcare using standard Saaty's Likert scale (1–9) (low importance to high importance) (Mehra and Sharma, 2021). It includes 21 sustainability measures, which have been restructured and presented for analysis into 12 sustainability metrics based on expert recommendations, the 12 metrics themed in general, and major three subcategories (Figure 2). No study worldwide assessed the reliability and validity of the questionnaire, so this study was a pioneer in testing its' validity and reliability.

Based on MLQ30 and SHQ 21 models, the researchers in this study integrated (Figure 3) those models to reflect this study's purpose since the competency framework developed by Beazer and Cameron (2015) introduced the clusters of transformative and transactional competencies that may lead the managers in hospitals to practice sustainability that can be reflected by the comprehensive theoretical model for Sustainability in Healthcare that established by Mehra and



Sharma (2021). In this study the researcher developed a new model for the healthcare system in Jordan includes a set of management and leadership competencies, in addition to selected demographic characteristics that may foster the application of sustainability measures in hospitals (Figure 3).

2.5 Translation of the English instruments

Translation of the English instruments into Arabic was implemented because Arabic is the native tongue of the managers in healthcare institutions in Jordan, and all the study’s questionnaires were administered in Arabic. The process included forward-backward translation, preliminary pilot testing, and final validation. This process is adopted from the (Tsang et al., 2017) translation guidelines. Also, the Arabic-translated versions were evaluated by an Arabic auditor who got a Ph.D. in Arabic.

2.6 Instruments validity

The validity of the translated tools was assessed using face validity. The validity was ascertained by three experts in healthcare

management who evaluated this tool. Each expert gave a brief description of the study and tools and the items in these tools. This type of validity is the simple first step to measuring the questionnaire’s overall validity, which is concerned with whether a measure seems relevant and appropriate for what it is assessing on the surface (Polit and Beck, 2020). After that, a description for each statement on each tool was determined by the expert according to the relevance of what it is measuring, appropriate for the participants, and adequate for its purpose.

2.7 Pilot study

The pilot study was conducted to ensure that all questionnaire items are clear and understandable, the research instrument and feasibility of the research design, determine the preliminary reliability of the translated questionnaire, and how long it takes to complete the questionnaire. The enrolled participants from different settings (N = 15) were chosen to participate in this pilot study. The sample selected for the pilot was in accord with the inclusion criteria of the main study. The test of Cronbach alpha reliability showed internal consistency of 0.93 for the MLQ30 and 0.94 for the SHQ 21. Also, the results of the pilot study showed that managers at all levels of management found the items in the questionnaire

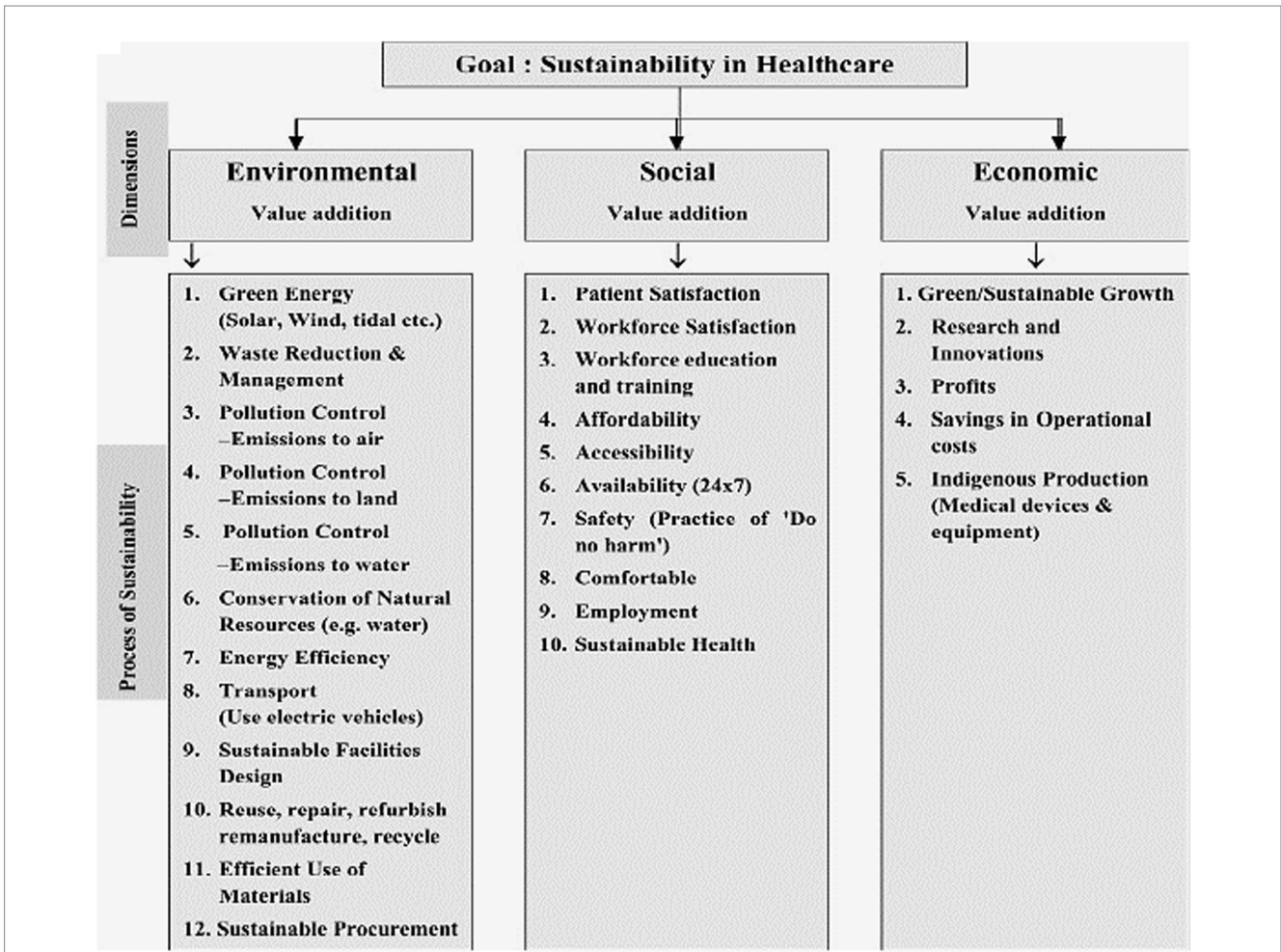


FIGURE 2 Conceptual model for sustainability in healthcare. Source: Mehra and Sharma (2021). Measures of sustainability in healthcare. Sustainability analytics and modeling, 1, 100,001.

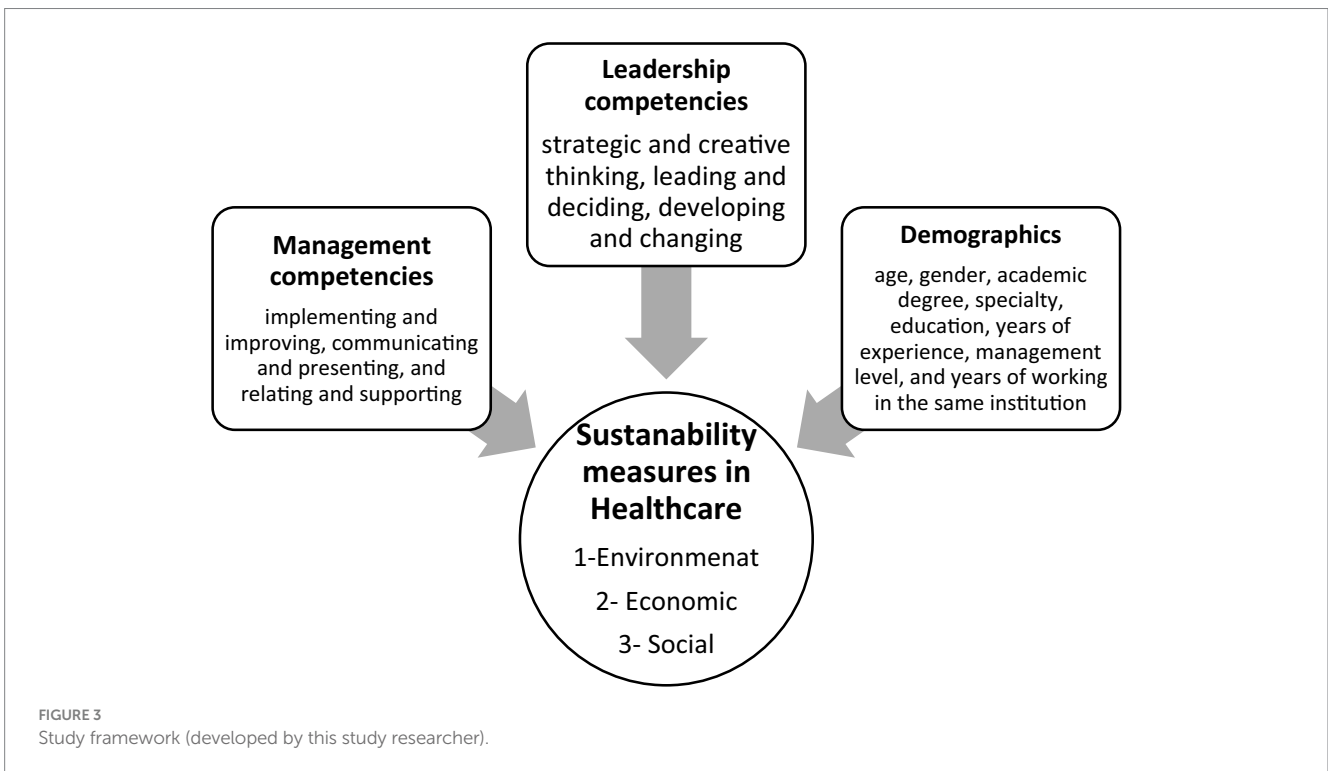


FIGURE 3 Study framework (developed by this study researcher).

easy to understand, they verbalized no need for changes in the items and spent a mean of 20 min completing the whole questionnaire.

2.8 Ethical considerations

Ethical approvals from Institutional Review Boards (IRBs) in IAU (No. 12585), the Ministry of Health in Jordan (MOH), and selected hospital administrations were obtained. Study participants were informed about the study’s purpose and that completing the questionnaire would be deemed consent to participate in the research. A cover letter explaining the study’s goals, guaranteeing their privacy, and outlining their right to withdraw at any time was given to participants. The privacy of the information, to which only the researcher would have access. Permission is assured because every instrument used in this investigation is publicly available online.

2.9 Data collection

To get the required sample size, the study questionnaire was given both personally and electronically. Data collection took place between September and October/2023. Additionally, the participants were asked to take part in the study both personally and online via social media sites like Facebook and WhatsApp. On the opening page of the paper and online survey, a cover letter, participant information sheet, and consent form were supplied that described the study’s goals and participation. The researcher attended to each unit and department to meet the manager after granting permission from the hospital administration. Then the researcher explained the purpose of the study to managers, and upon their permission, a questionnaire will be left for them to fill out.

2.10 Data analysis

Descriptive statistics summarizes or describes the characteristics of a data set, and because of that, it was adopted in this study (Bhandari, 2023). IBM SPSS version 22 was used to analyze data. Data was screened for any missing or outliers. After that, Descriptive statistics of the participant’s demographic data were computed using central tendency and dispersion measures, including mean, percentages, standard deviation, and frequency. Managers’ perceptions of management competencies and the importance of sustainability measures mean, and standard deviation were measured. Relationships between management competencies, participants’ sociodemographic characteristics, and sustainability measures were tested by the Pearson correlation test (*r*) and ANOVA. Multiple linear regression was utilized to assess the predictors of Sustainability measures. The Alpha <0.05 was considered statistically significant.

3 Results

3.1 Characteristics of the sample

The research sample consisted of 128 participants with a response rate of 98.4%. Table 1 illustrates the distribution of the research sample

according to demographic variables, including gender, age, academic degree, specialty, management level, years of experience in an administrative position, and years of working in the same institution.

3.2 Managers’ perception of management and leadership competencies in governmental hospitals

The total mean score of the management and leadership scale was 3.49 out of 5 (SD = 0.84). Table 2 shows the highest-ranked items in the MLQ scale reveal significant insights into the management and leadership competencies of hospitals’ managers valued the most. Notably, respondents gave the highest mean score to the statement “Speaking with confidence and presenting to groups” (Mean = 3.82). This result highlights the importance of self-confidence, indicating that managers perceive a strong sense of self-confidence in front of groups. Additionally, “Building trust and

TABLE 1 The distribution of the research sample according to demographic variables (N = 128).

Item		N	%
Gender	Male	77	%60.2
	Female	51	39.8%
		128	100%
Management level	Low management	38	29.7%
	Middle management	80	62.5%
	High management	10	7.8%
		128	100%
Academic degree	BSC	77	%60.2
	Postgraduate	51	39.8%
		128	100%
Age	From 24 to 34 years	11	8.6%
	From 35 to 44 years	56	43.8%
	From 45 to 55 years	48	37.5%
	Over 55 years old	13	10.2%
		128	100%
Specialty	Medicine	39	%30.5
	Nursing and allied health professions	77	%60.2
	Management and other business specialty	8	%6.3
	Engineering, IT, literature, and others	4	%3.1
		128	100%
Number of years of experience in an administrative position	Less than five years	63	49.2
	From five to ten years	46	35.9
	More than ten years	19	14.8
		128	100%
Number of years of experience in the same hospital	Less than five years	41	32.0%
	From five to ten years	64	50.0%
	More than ten years	23	18.0%
		128	100%

TABLE 2 Highest-ranked items for the MLQ 30 scale (N = 128).

Item	Type of competency	Mean score	Std. Deviation
Speaking with confidence and presenting to groups	Management	3.82	1.06
Building trust and modeling integrity	Management	3.73	1.04
Adapting and coping with pressure	Leadership	3.66	1.01
Relating and networking	Management	3.65	1.00
Showing courage and strength	Leadership	3.64	1.05

TABLE 3 Lowest ranked items for the MLQ 30 scale (N = 128).

Item	Type of competency	Mean score	Std. Deviation
Thinking and managing globally	Leadership	3.20	1.07
Creating and innovating	Leadership	3.23	1.24
Managing knowledge and information	Leadership	3.29	1.24
Developing strategy and acting strategically	Leadership	3.30	1.11
Improving processes and systems	Management	3.32	1.05

modeling integrity “with a mean score of 3.73, suggests that trust and integrity are highly valued by respondents. Finally, “Adapting and coping with pressure” garnered a mean score of 3.66, indicating that hospital managers believe in the effectiveness of coping and adaption to work pressure as a major competency. These findings highlight the significance of positive self-confidence, trust and integrity, and adaptation to work pressure as crucial competencies of managers in the healthcare sector.

On the contrary, the lowest-ranked items in the MLQ scale shed light on areas of concern and perception among hospital managers. Notably, the statement “Thinking and managing globally” received the lowest mean score (Mean = 3.20). Similarly, “Creating and innovating” received a relatively second lowest mean score of 3.23, indicating that respondents, on average, do not strongly believe that managers should possess creativity and innovation competencies. Additionally, “Managing knowledge and information” garnered a mean score of 3.29, suggesting that respondents may not perceive a strong sense of the importance of knowledge and information management competencies in their organizations’ (Table 3).

3.3 The importance of sustainability measures as perceived by managers

The total mean score for the sustainability healthcare questionnaire total mean score of SHQ according to Saaty’s scale is moderate (5.98 out of 9, SD = 1.69), and the Sig value is less than 0.05 for the total score. Additionally, the mean value is greater than the hypothetical mean, meaning that the study sample agrees with the content of the SHQ. Table 4 shows the mean scores and sample T-test for all SHQ items.

The results in Table 4 indicate that the highest ranked items were items 11 and 12 with means of 6.27 and 6.20 and those items are social category of sustainability measures. The lowest-ranked items are item 18, which is considered an economic measure of sustainability, and item 4 which is an environmental measure. With means of 5.88, and 5.80.

3.4 The correlation between managers’ competencies and the importance of sustainability measures

The results in Table 5 indicate that the Pearson correlation coefficients between the subcategories of the MLQ and SHQ are positive and statistically significant. This means there is a positive linear relationship between managers’ competencies and the importance of sustainability measures.

3.5 The correlation between demographics and the importance of sustainability measures

There are no significant differences in the mean scores of the research sample on the questionnaire subcategories and its overall score based on the demographics, indicating no relationship between age ($F(0.281) = 364.1, p = 0.839$), gender ($t 1.14, df = 126, p = 0.256$), academic level ($t -1.169, df = 126, p = 0.244$), specialty ($F(0.555) = 714.1, p = 0.646$), years of experience ($F(1.064) = 1,272.1, p = 0.348$), managerial level ($F(0.631) = 807.7, p = 0.534$), years of experience in the same institution ($F(1.594) = 1,261.5, p = 0.207$), and the importance of sustainability measures.

3.6 Predictors of sustainability measures in Jordanian governmental hospitals

Multiple regression was used to determine the impact of the categories of managerial competencies on sustainability measures, according to the following steps.

Testing the model’s validity between independent variables (strategic and creative thinking, leadership and decision-making, innovation and change, implementation and improvement, communication and presentation, relationship, and support) and the dependent variable (sustainability measures) by analyzing

TABLE 4 The mean scores and one sample T-test for the items of the SHQ (N = 128).

	Mean	Std. Deviation	t	Sig.
Goal of SHQ environmental, social, and economic				
Q 1. How important is environmental sustainability with respect to social sustainability?	0.00	3.70	2.03	5.66
Q 2. How important is environmental sustainability with respect to economic sustainability?	0.00	4.73	2.17	5.91
Q 3. How important is social sustainability with respect to economic sustainability?	0.00	5.06	2.04	5.91
General average for the category	0.00	4.97	1.88	5.83
SHQ: environmental				
Q 4. How important are circular practices with respect to facility design?	0.00	4.44	2.05	5.80
Q5. How important are circular practices with respect to waste reduction and management?	0.00	5.36	2.08	5.98
Q 6. How important are circular practices with respect to sustainable procurement?	0.00	6.40	2.03	6.15
Q 7. How important is facility design with respect to waste reduction and management?	0.00	5.73	2.10	6.06
Q 8. How important is facility design with respect to sustainable procurement?	0.00	6.02	2.17	6.16
Q9. How important is waste reduction and management with respect to sustainable procurement?	0.00	5.76	2.03	6.03
General average for the category	0.00	6.42	1.82	6.03
SHQ: social				
Q 10. How important is patient satisfaction with respect to employee satisfaction?	0.00	5.68	2.32	6.16
Q 11. How important is patient satisfaction with respect to affordability?	0.00	6.78	2.12	6.27
Q 12. How important is patient satisfaction with respect to sustainable health?	0.00	6.19	2.18	6.20
Q 13. How important is employee satisfaction with respect to affordability?	0.00	5.16	2.11	5.96
Q 14. How important is employee satisfaction with respect to sustainable health?	0.00	5.29	2.14	6.00
Q 15. How important is affordability with respect to sustainable health?	0.00	5.48	2.00	5.97
General average for the category	0.00	6.55	1.89	6.09
SHQ: economic				
Q 16. How important is green growth with respect to research and innovations?	0.00	5.29	1.97	5.92
Q 17. How important is green growth with respect to savings in operational costs and enhanced profits?	0.00	5.47	2.00	5.97
Q 18. How important is green growth with respect to indigenous production?	0.00	4.95	2.00	5.88
Q 19. How important are research and innovations with respect to savings in operational costs and enhanced profits?	0.00	5.83	2.21	6.14
Q 20. How important is research and innovations with respect to indigenous production?	0.00	5.23	2.10	5.97
Q 21. How important are savings in operational costs and enhanced profits with respect to indigenous production?	0.00	4.94	2.18	5.95
General average for the category	0.00	5.86	1.88	5.97

variance. Table 6 shows the results. Table 6 indicates that the Sig value for the (F) test is less than (0.05), indicating a linear relationship between managerial competencies and sustainability measures. In other words, managerial competencies are valid for predicting sustainability measures.

Table 7 shows that the correlation coefficient between managerial competencies and sustainability measures is (0.454), which is a positive and statistically significant value at (0.01), indicating a significant positive relationship between managerial competencies and sustainability measures. Furthermore, from Table 7, the determination coefficient value is (0.206), meaning that managerial competencies explain 20.6% of the variance in sustainability measures. The remaining percentage of the variance is explained by other variables not covered in the current study.

Extracting the results of the multiple regression analysis for the impact of managerial competencies on sustainability measures:

Table 8 illustrates the results of the multiple regression analysis for the impact of managerial competencies on sustainability measures. The value for the t-test is less than 0.05, indicating a statistically significant impact of combined managerial competencies on sustainability measures.

4 Discussion

Lack of management competencies has been identified as a significant obstacle to achieving the sustainability goals of healthcare sectors globally. As part of the overall management development process, this study aims to identify the management competencies and importance of sustainability measures from the perspective of Jordanian managers in governmental hospitals. This study's results indicated that managers in the hospitals under study perceived several

TABLE 5 Pearson correlation coefficients between MLQ and SHQ (N = 128).

	The goal of sustainability in healthcare	Environmental factor	Social factor	Economic factor	Total score SHQ
Strategic and creative thinking	0.480**	0.362*	0.422**	0.425**	0.391**
Leading and deciding	0.410**	0.368*	0.401**	0.280*	0.393**
Developing and changing	0.465*	0.405*	0.429**	0.330**	0.438*
Implementing and improving	0.502*	0.418*	0.413**	0.280*	0.427**
Communicating and presenting	0.494*	0.369**	0.372**	0.263*	0.392**
Relating and supporting	0.447*	0.376*	0.367**	0.289*	0.393**
The total score of MLQ	0.490*	0.425**	0.438**	0.312**	0.445**

**Correlation is significant at the 0.01 level.

*Correlation is significant at the 0.05 level.

TABLE 6 Results of the one-way analysis of variance for the relationship between managerial competencies and sustainability measures (N = 128).

	Sum of squares	df	Mean square	F	Sig.
Regression	33,289.099	6	5,548.183	5.227	0.000
Residual	128,432.401	121	1,061.425		
Total	161,721.500	127			

TABLE 7 The correlation and determination coefficient values between managerial competencies and sustainability measures (N = 128).

R	R square
0.454	0.206

competencies that enable hospital managers at any level of management to perform their tasks optimally, especially relating and supporting competencies including building trust and integrity, resolving conflicts, and handling work pressure that enables them to manage relationships effectively, whether with employees, clients, or other stakeholders. This result was similar to many other studies that considered this competency a core for hospital managers (Malmoon et al., 2020; Setiawan et al., 2021). The previous results highlight the importance of these skills in addition to “speaking with confidence and presenting to groups” in developing the performance of managers, which is reflected in the performance of the hospital in general. These are necessary skills for the manager so that managers can make the appropriate decisions and solve problems considering the available information and data (Malmoon et al., 2020).

This study’s results showed the managers’ perception of the importance of social dimension as a major factor in applying sustainability measures. This factor contributes to patient satisfaction with both the services provided their cost, and sustainable health, and this factor is not only related to patients; It considers the satisfaction of hospital employees, and therefore the social factor enhances the social responsibility of the hospital toward both patients and employees. This result was similar to the Hussain et al. (2018) study results. Recent years have seen a rise in awareness of the significance of social sustainability, with the healthcare sector starting to play a part in sustainability and the inductive function of social benefit, which would assist society’s growth and wellbeing (Machado et al., 2015). The social dimension encompasses the organization’s internal and external environments and

is linked to human attributes such as competencies, commitment, and experience (Hussain et al., 2018). While sustainability focuses on the advantages for society, the social component is connected to the social acts that hospitals do. This study’s results related to the social dimension may be also due to the reason that in Jordanian health settings, social sustainability relates to the ability of hospitals and healthcare systems to enhance quality of life and improve wellbeing in a population is the major role and responsibility. The healthcare system in Jordan focuses on facilitating connections, enabling access, improving health, and enhancing equity (Al Shamas, 2020).

The results also were similar to Vaishnavi and Suresh (2023) considering the interest of managers in the hospitals under study in the importance of applying the principles of environmental sustainability in hospitals and how to implement them effectively in managing medical waste, saving energy and water, promoting environmentally friendly transportation, renewable energy practices, rationalizing consumption, managing solid and hazardous waste, implementing water conservation and management strategies, and effectively manage chemical waste and expired medicines. Moreover, the results showed that managers in the hospitals are aware of the importance of the economic factor as one of the goals of sustainability in health care. Implementing sustainability leads to cost savings, especially regarding energy costs, which reflects positively on the hospital’s profits and benefits employees and patients, since cost savings will reflect positively on treatment costs for patients (Borges de Oliveira and de Oliveira, 2022).

This study’s results support the proposed theoretical framework mentioned previously in the introduction in the part of the relationship between management and leadership competencies and sustainability measures and show that the hospitals’ managers’ possession of leadership and management competencies may enable them to apply the principles and measures of sustainability in healthcare, as the application of these principles and procedures requires implementing sustainability plans in healthcare, formulating a clearly defined road map, and providing the hospital with all the necessary tools to conduct its operations in a manner that takes into account all sustainability standards, and building a sustainable health care system capable of keeping pace with future needs and developments. And setting established goals based on adopting sustainable work frameworks and methodologies and directing hospital workers and training them on sustainability measures in healthcare, and these matters

TABLE 8 Results of the multiple regression analysis for the impact of managerial competencies on sustainability measures ($N = 128$).

Model		Unstandardized coefficients		Standardized coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	60.147	12.650		4.755	0.000
	Strategic and creative thinking	1.079	1.157	0.146	0.932	0.353
	Leading and deciding	-0.375	1.280	-0.053	-0.293	0.770
	Developing and changing	1.854	1.816	0.226	1.021	0.309
	Implementing and improving	1.364	1.768	0.171	0.771	0.442
	Communicating and presenting	0.077	1.498	0.010	0.052	0.959
	Relating and supporting	-0.178	1.489	-0.023	-0.120	0.905

depend mainly on the extent of the efficiency of the managers and their possession of leadership and management competencies (Ramirez et al., 2013; Kakemam et al., 2020). However, in the other part of the theoretical framework that correlates sustainability measures with demographic characteristics of the managers, this study highlighted that there was no correlation between demographic characteristics and the managers' perceptions of the importance of sustainability measures which are similar to Kakemam et al. (2020) results. It is worthwhile mentioning that this study's results in different from previous literature in widening the competencies to include not only management but also leadership competencies, in addition, to correlating sustainability measures with managers' demographics.

5 Recommendations

5.1 Recommendations for governmental hospitals

- Developing a comprehensive strategy for implementing sustainability in government hospitals that includes administrative, human, and material requirements in cooperation and coordination between the management of those hospitals, the Ministry of Health, and the relevant authorities.
- Implementing continuous training courses for managers in sustainability in hospitals on applying modern administrative trends and sustainability measures.
- Providing economic and moral incentives to managers and employees who present creative ideas that contribute to sustainability in hospitals.
- Implementing seminars, forums, and lectures on sustainability measures implementation with the participation of all managers and employees in governmental hospitals.
- Benefiting from the experiences of developed countries in applying sustainability in hospitals.
- Implementing an awareness campaign about sustainability in hospitals using traditional and digital media.
- Reconsidering the job description for managers of hospitals' departments, and units so that competencies, roles, and responsibilities related to specific management, leadership, and sustainability awareness are included, especially their ability to build trust and integrity with employees and clients, as well as their ability to plan and implement the measures related to sustainability.

- A performance appraisal for managers in hospitals should be prepared to include their evaluation of the extent to which they apply sustainability measures, in addition to determining the set of competencies on which they should be evaluated.

5.2 Recommendation for future research

- Future research could explore the specific social factors influencing sustainability in hospitals, compare sustainability practices in public versus private hospitals, and assess the long-term impact of management training on sustainability outcomes.
- Use other approaches to improve the sustainability measures in Jordanian hospitals. Using the Importance-Performance Analysis (IPA) tool could indeed offer valuable insights. IPA can help identify which sustainability measures are seen as both important and underperforming, thus pinpointing areas that need focus for improvement. This method would provide a structured approach for prioritizing sustainability efforts, ensuring that resources are directed toward areas with the greatest impact on overall sustainability performance.
- Conduct the same study and comparison between governmental and private hospitals.
- Increase the target sample in future research and use another method of selecting the research sample such as probability sampling.
- Assess the relationship between management competencies and sustainability measures application using different instruments which may include other competencies such as morals and ethics.

5.3 Recommendation for education

- Include management and leadership competencies in higher education curricula to foster the application of sustainability in all fields.

6 Limitations

Limitations in this study include the geographical location, which was only the central governance in Jordan, also the scarcity of studies published about sustainability in healthcare in Jordan. In addition, the use of the sustainability healthcare model of Mehra and Sharma

(2021), and their suggested instrument was the first in this dissertation. Generalizability may be also a limitation of this study. This study used convenience sampling for recruiting participants. Based on using convenience sampling, the results may not be able to be generalized to the entire population (Rivera, 2019).

7 Conclusion

To examine the relationship between management competencies and sustainability measures, five questions guided this study. The results showed the perceptions of managers in governmental hospitals in Jordan as moderate regarding management competencies, in addition, the most important domain of sustainability measures to be applied in hospitals according to their perception was the social domain. A significant positive relationship was found between management competencies and sustainability measures while no relationship was detected between demographics and sustainability measures. Accordingly, management competencies were a significant predictor for sustainability measures. This study gave insight into a set of management and leadership competencies that may encourage the application of sustainability measures, so it is an addition to the body of knowledge in this field. This study explained that in every location, the sustainability factor that has been found exhibits components pertaining to environmental, economic, and social dimensions and this aligns well with the research that has been studied in the initial section of the study. This is shown in our results as well, where the elements of social are the most important, followed by environmental then economic aspects of sustainability. Future hospital managers are today's students, and the job they do will either positively or negatively affect their institutions whether governmental or private, and society. The inclusion of core competencies of management and leadership that foster sustainable development in the curricula might be a significant step toward the integration of sustainability in higher education, among other activities (research, management, social plans, etc.). Faculties in higher education institutions should try to integrate sustainability into businesses, organizations, and society to the degree that graduates include competencies for sustainability. On the other hand, it appears that these study results may help in shaping the competencies needed to be taught in the university curriculum.

Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

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Ethics statement

This research was reviewed by the Institutional Review Board at IAU (No. 12585), the Ministry of Health in Jordan (MOH). The Ethical Committees at the IAU have approved the protocol for the research project where the researcher works, and it conforms to the provisions of the Declaration of Helsinki in 1995 (as revised in Edinburgh 2000). Informed consent was obtained from the participant as well. The anonymity of the study participant was maintained throughout the research process. Written informed consent was obtained from the individual(s) for the publication of any potentially identifiable images or data included in this article.

Author contributions

RA: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing. MA-D: Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Project administration, Resources, Software, Supervision, Validation, Visualization, Writing – original draft, Writing – review & editing.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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