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Challenges of distance learning encountering nursing students after the COVID-19 pandemic: a study from the Middle East

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Abstract

Background The COVID-19 pandemic necessitated an abrupt transition to online learning in nursing education, presenting unprecedented challenges. This research aims to comprehensively assess the challenges faced by nursing students during this transition, exploring key issues, recommending strategies, and analyzing their impact on student perceptions.

Methods Using a cross-sectional design, the study surveyed 941 nursing students across eight Arab countries—Jordan, Iraq, Lebanon, Palestine, Oman, KSA, UAE, and Egypt—to ensure a representative sample and enhance external validity. Data collection involved a thorough survey covering academic, technological, and administrative challenges. Reliability analysis, descriptive statistics, and variance analysis using Kruskal–Wallis and Mann–Whitney tests were conducted to examine differences between countries and sociodemographic variables.

Results Descriptive statistics revealed significant demographic disparities. Single individuals in Jordan and those with lower family income in Palestine and Lebanon reported notably higher challenges. Female students in Iraq and Lebanon perceived greater challenges compared to males. Students pursuing diplomas in Jordan and bridging programs in Lebanon faced elevated difficulties. Governmental university students in Lebanon and private university students in Jordan encountered distinct challenges. Lack of available internet was particularly challenging in Jordan and Lebanon, whereas students using tablets in Lebanon and laptops in Palestine reported heightened challenges. Economic disparities, notably in family income, further hindered engagement with online learning materials. Across countries, academic challenges included managing coursework and accessing resources, exacerbated by administrative inefficiencies, especially in Palestine and Lebanon. Students in the UAE reported fewer challenges, facilitated by robust internet infrastructure and comprehensive institutional support.

Conclusion This study provides critical insights into the challenges faced by nursing students during the Middle East's online learning transition. Key challenges encompass technological issues, academic workload, and administrative inefficiencies, with significant disparities across countries. The findings underscore the urgent need for targeted interventions, particularly in Palestine, to enhance online learning experiences. Policymakers and educational

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institutions can leverage these insights to advocate for student-centric approaches and policy development aimed at improving online learning across the region.

Keywords Education, Distance, Middle East, Students, Nursing, COVID-19, Online learning, E-learning, Arab countries

Introduction

Nursing stands as the linchpin of healthcare, with professionals playing a pivotal role in ensuring patient well-being [1–4]. Their duties span a spectrum of critical healthcare responsibilities, often involving direct interactions with patients and their families [5, 6]. Nursing education, therefore, strives to equip future nurses with the necessary knowledge and expertise for this indispensable role [7, 8].

Due to the Coronavirus disease 2019 (COVID-19) pandemic that was rapidly spreading, the public health experts agreed that the social distancing measures and the compulsory lockdowns are the most effective way to combat the disease spread [9, 10]. The global outbreak of COVID-19 prompted public health experts to advocate for social distancing measures and compulsory lockdowns as the most effective means to curb the disease spread [9, 10]. The resulting disruptions significantly impacted the worldwide educational system [11], necessitating swift adaptations. Educational institutions turned to distance learning as a primary alternative, marking a dramatic shift towards digital platforms as the new norm for classrooms [12–14]. Recognized as a revolutionary force in healthcare education worldwide, distance learning is increasingly integrated into nursing education [15–17].

In the aftermath of the pandemic, nursing schools grappled with the need for recovery strategies and contingency plans. The call for updating curricula to incorporate virtual and online components, ensuring flexibility in the face of unforeseen circumstances, became paramount [18]. While distance learning presents advantages such as enhanced mobility, affordability, and flexibility, it is crucial to acknowledge potential challenges for students, urging educational institutions to stay adaptable [18].

Numerous studies conducted in the Middle East region have explored the challenges of distance learning in general students' education at the individual country level. For example, a 2016 study in Iraq investigated the challenges to online learning faced by students in general [19]. Another study in 2021 focused on the challenges faced by pharmacy and medical students in Jordan [15]. Similarly, a 2021 study in Oman examined the challenges faced by students in general [11]. A third study, conducted in Libya in 2020, focused on the challenges faced by students studying medicine [20]. In these studies,

participants highlighted issues such as limited internet bandwidth, inadequate computer facilities, and a lack of specialized labs, impacting the efficiency of online learning [11, 15, 19–21]. Additional concerns included a lack of prior experience with online tools, technology literacy, and insufficient technical support, compounding the complexities of the online learning environment [19, 22, 23]. Challenges encompassed not only technological aspects but also the absence of social contact, difficulties in assessing practical skills, and various psychological challenges [11, 24–26]. Raised issues included the lack of control over assessment criteria, making practical skill teaching challenging through online platforms, factors included difficulties in following dynamic online lectures [25, 26]. On the flip side, students faced challenges such as finding appropriate study spaces, acquiring necessary supplies, maintaining privacy, managing familial financial constraints, and sustaining a strong internet connection—especially challenging for those in larger families [11, 24, 26]. Moreover, psychological challenges, including lack of motivation, unwillingness, disinterest, stress, anxiety, and concerns about timely completion of academic semesters, were reported by students [11, 15, 19, 22, 27, 28]. A few participants also noted physical challenges such as excessive eye strain, neck problems, or difficulty typing [25].

Despite numerous studies focusing on students in general, few studies worldwide have specifically addressed the challenges faced by nursing students [29–39]. The challenges included adapting to virtual methodologies, difficulty concentrating during online classes, concerns about academic performance, lack of practical or clinical experiences, and uncertainty about online education's effectiveness in developing essential skills for future practice. Furthermore, nursing students expressed concerns about the sudden shift from in-person to online learning, constraints in internet connectivity, and the need for customized support systems to address the difficulties presented by the new educational setting. The results emphasize the complex nature of challenges encountered by students and stress the need for specific interventions to improve the online learning experience. Nevertheless, despite the unique demands of nursing clinical training and the critical nature of ensuring patient safety, only two studies, to our knowledge, have specifically examined the challenges faced by nursing students in the Middle East. One study was conducted in Egypt [21], and another in

Jordan [40]. Despite the increasing reliance on distance learning, a comparative analysis of the unique challenges faced by different Middle Eastern countries is notably absent. This study emerges as the first effort to bridge this critical gap in the existing literature by examining the challenges faced by undergraduate nursing students during the transition to online learning in a multi-country study within the Middle East region.

In response to the identified research gap, the present study articulates clear objectives to deepen our understanding of the challenges and dynamics surrounding online learning in Middle Eastern higher education institutions post the COVID-19 epidemic. The aims include (1) investigating nursing students' perceptions regarding the barriers hindering the online learning process. This objective seeks to unravel the subjective experiences and challenges faced by students during the shift to online education; and (2) exploring significant differences in the barriers across the included countries and participants' demographic traits.

Methodology

Study design

The cross-sectional design chosen for our study aligns with our objective of identifying and analyzing the diverse challenges to online learning among nursing students. It allows us to compare these challenges across different demographic groups and countries simultaneously, offering valuable insights into the immediate challenges faced by students. This approach facilitated the collection of data from a wide-ranging and geographically diverse population, thereby enhancing the relevance of our findings to nursing education settings across the Middle East.

Participants

The study includes a diverse sample of undergraduate nursing students from eight Arab countries in the Middle East region namely, Jordan, Iraq, Lebanon, Palestine, Oman, Kingdom of Saudi Arabia (KSA), United Arab Emirates (UAE), and Egypt. The countries selected were nominated based on the availability of nursing schools that offer an academic nursing degree and the availability of representatives who could help in data collection. A convenience sample from the selected countries was approached online through social networks. The selection of participants encompasses a broad range of backgrounds, ensuring a comprehensive representation of the challenges faced by nursing students in different contexts. It is worth mentioning that 325 responses of the Jordanian participants were reported in a separate report to exclusively explore the Jordanian context [40]. However, those participants were not excluded from this study to explore the international differences. On the other hand,

Bahrain, Kuwait, Qatar, Syria, Turkey, Yemen, and Sudan were excluded from the data analysis because of few responses received.

Sample size calculation

Sample size calculation was performed using G*Power software 3.1 [41], with significance set at 0.05, power at 0.95, and employing the Kruskal–Wallis test with a medium effect size, the initial calculation suggested a sample size of 448. However, the large and diverse sample enhances the external validity and generalizability of the study findings.

Study instrument

The questionnaire started with an information sheet introducing the background and aim of the study. Following, demographic characteristics such as gender, marital status, family size, income level, region, living arrangements, study program, university type, internet access, and device availability were collected based on previous studies [21, 40]. Specifically, study [40] explained that married students and those living with their families face fewer challenges compared to single students and those living alone, due to the support they receive from their spouses or families.

The next section utilized a validated and structured survey instrument developed by Ja'ashan (2020) to capture the multifaceted aspects of challenges related to online learning [42]. The survey included 11 five-point Likert scale items, ranging from 5 (strongly agree) to 1 (strongly disagree), and measured three distinct dimensions: academic challenges, technological challenges, and administrative challenges. Specifically, academic challenges included items on the lack of interaction with staff, lack of time for online exams/assignments, and inaccessibility of course materials. Technological challenges encompassed the lack of required technology/software, lack of technical support, inaccessibility of audio/video materials, lack of training courses, and the complexity of e-learning software. Administrative challenges addressed internet access problems, negative comments about e-learning, and inadequate ICT infrastructure. These items were adapted from the original scale, and we have ensured consistency in terminology by using "challenges" throughout the manuscript for clarity.

To ensure the questionnaire's validity and relevance across diverse cultural contexts within the Middle East region, we conducted a rigorous validation process. This process included assessing both face and content validity. Face validity was evaluated by pilot testing the questionnaire with a sample of participants from various cultural backgrounds to gauge clarity, language appropriateness, and cultural sensitivity. Additionally, content validity was

ensured through feedback from subject matter experts in nursing education and cross-cultural studies, who reviewed the questionnaire for comprehensiveness and relevance. Adjustments were made based on their feedback to enhance the questionnaire's reliability and ensure its applicability across different cultural settings. This comprehensive validation process aimed to minimize potential biases and ensure that the questionnaire effectively captured the experiences and perspectives of nursing students in the Middle East.

Data collection

Utilizing Google Forms®, a hyperlink of the questionnaire was shared with participants using WhatsApp®, Facebook®, and email addresses over a period of 10 weeks; 17-January and 31-March 2023. The survey links were shared by university instructors. Accordingly, the researchers tried to keep the instructors' involvement in the data collection to a minimum and provided a voluntary and anonymous survey to reduce the potential bias in students' responses. The eligibility requirements for participants were defined as nursing students currently enrolled in any of the eight universities in Arab countries. There were no limitations made based on gender, age, year, or study program.

Statistical analysis

The Statistical Package for the Social Sciences (SPSS) software version 24 was used in the data analysis. The internal consistency of the survey scales measuring academic, technological, and administrative challenges was assessed through Cronbach's Alpha values to ensure the robustness of the measurement tools, providing confidence in the accuracy and consistency of the collected data. Descriptive statistics, including mean values and standard deviations (SD), were employed to summarize the demographic characteristics of the study participants. Also, a detailed analysis of challenges was conducted, focusing on academic, technological, and administrative dimensions. Mean values, SD, and overall scores were calculated to provide a nuanced understanding of nursing students' perceptions of online learning challenges. The comprehensive analysis facilitated the identification of specific areas requiring attention and intervention.

Then, the normal distribution of data was assessed using the Shapiro–Wilk test for each challenge's scale and the total scale. The decision to employ non-parametric tests for variance analysis was made based on the non-normally distributed data, ensuring the appropriateness of the chosen statistical methods. Consequently, we conducted a variance analysis using Kruskal–Wallis's test to examine the differences in perceived challenges to

online teaching across multiple countries (Jordan, Iraq, Lebanon, Palestine, Oman, KSA, UAE, Egypt). Then, mean ranks were calculated for each challenge dimension within each country, providing insights into how these challenges vary geographically among nursing students in the Middle East. Also, we performed a variance analysis using Kruskal–Wallis and Mann–Whitney tests to assess the impact of sociodemographic factors on the overall challenge scores perceived by nursing students in the Middle East. Then, mean ranks were used to quantify differences in challenge perceptions across these demographics, providing a comprehensive view of how sociodemographic factors influence the challenges faced in online learning environments.

Ethical considerations

The study proposal was reviewed and approved by the Institutional Review Board (IRB) Committee at Jerash University (3/4/2022/2023). In alignment with Helsinki ethical standards [43], informed consent to participate was obtained from all of the participants. Measures were meticulously implemented to safeguard the anonymity and privacy of the collected data, ensuring that participants' rights are upheld throughout the study. Participation was voluntary and participants were informed about their ability to quit at any time of the research.

Results

Reliability analysis

The reliability analysis, assessed through Cronbach's Alpha values, reveals the internal consistency of the survey scales measuring academic, technological, and administrative challenges faced by nursing students in online learning. The academic challenges scale demonstrated moderate internal consistency ($\alpha=0.62$), suggesting some variability in responses within this domain. Whereas, the technological challenges scale exhibited acceptable internal consistency ($\alpha=0.78$), indicating homogeneity in measuring technological challenges. The administrative challenges scale showed also an acceptable internal consistency ($\alpha=0.75$). Importantly, the total scale, encompassing all three domains, displayed strong internal consistency ($\alpha=0.86$), affirming the reliability of the composite measurement in capturing the overall challenges encountered by nursing students in the online learning environment.

Descriptive statistics

Table 1 presents a concise summary of the demographic characteristics of the study participants across different countries ($N=941$).

Table 1 Demographic characteristics of study participants across countries (N = 941)

Demographics	Mean Ranks							
	Jordan	Iraq	Lebanon	Palestine	Oman	KSA	UAE	Egypt
Nb of participants	341 (36.2%)	205 (21.8)	93 (9.9)	84 (8.9)	82 (8.7)	79 (8.4)	22 (2.3)	35 (3.7)
Gender								
Male	100 (29.6%)	52 (25.4%)	25 (26.9%)	23 (27.4%)	20 (24.4%)	49 (62.0%)	4 (18.2%)	11 (31.4%)
Female	240 (70.4%)	153 (74.6%)	68 (73.1%)	61 (72.6%)	62 (75.6%)	30 (38.0%)	18 (81.8%)	24 (68.6%)
Marital status								
Single	260 (76.2%)	181 (88.3%)	89 (95.7%)	67 (79.8%)	67 (81.7%)	72 (91.1%)	19 (86.4%)	26 (74.3%)
Married	72 (21.1%)	22 (10.7%)	4 (4.3%)	15 (17.9%)	14 (17.1%)	6 (7.6%)	3 (13.6%)	8 (22.9%)
Divorced/Widowed	9 (2.6%)	2 (1%)	0 (0%)	2 (2.4%)	1 (1.2%)	1 (1.3%)	0 (0%)	1 (2.9%)
Nb of family members								
< 5 members	70 (20.5%)	27 (13.2%)	49 (52.7%)	20 (23.8%)	13 (15.9%)	20 (25.3%)	4 (18.2%)	18 (51.4%)
5 to 9 members	246 (72.1%)	135 (65.9%)	44 (47.3%)	50 (59.5%)	38 (46.3%)	50 (63.3%)	15 (68.2%)	16 (45.7%)
10 or more members	25 (7.3%)	43 (21.0%)	0 (0%)	14 (16.7%)	31 (37.8%)	9 (11.4%)	3 (13.6%)	1 (2.9%)
Family income								
< 500 USD	172 (50.4%)	102 (49.8%)	79 (84.9%)	36 (42.9%)	16 (19.5%)	10 (12.7%)	3 (13.6%)	29 (82.9%)
500–999 USD	143 (41.9%)	87 (42.4%)	12 (12.9%)	28 (33.3%)	30 (36.6%)	17 (21.5%)	3 (13.6%)	5 (14.3%)
1000–1499 USD	18 (5.3%)	11 (5.4%)	2 (2.2%)	10 (11.9%)	10 (12.2%)	18 (22.8%)	6 (27.3%)	1 (2.9%)
1500 USD or more	8 (2.3%)	5 (2.4%)	0 (0%)	10 (11.9%)	26 (31.7%)	34 (43.0%)	10 (45.5%)	0 (0%)
Region								
Northern	212 (62.2%)	74 (36.1%)	2 (2.2%)	15 (17.9%)	17 (20.7%)	11 (13.9%)	8 (36.4%)	20 (57.1%)
Central	119 (34.9%)	24 (11.7%)	33 (35.5%)	33 (39.3%)	58 (70.7%)	52 (65.8%)	13 (59.1%)	9 (25.7%)
Southern	10 (2.9%)	107 (52.2%)	58 (62.4%)	36 (42.9%)	7 (8.5%)	16 (20.3%)	1 (4.5%)	6 (17.1%)
Living place								
With family	323 (94.7%)	185 (90.2%)	93 (100%)	80 (95.2%)	29 (35.4%)	66 (83.5%)	20 (90.9%)	32 (91.4%)
University dormitory	9 (2.6%)	13 (6.3%)	0 (0%)	0 (0%)	37 (45.1%)	3 (3.8%)	0 (0%)	2 (5.7%)
With colleagues/ friends	5 (1.5%)	3 (1.5%)	0 (0%)	2 (2.4%)	12 (14.6%)	1 (1.3%)	1 (4.5%)	1 (2.9%)
Alone	4 (1.2%)	4 (2%)	0 (0%)	2 (2.4%)	4 (4.9%)	9 (11.4%)	1 (4.5%)	0 (0%)
Study program								
Bachelor	170 (49.9%)	175 (85.4%)	44 (47.3%)	72 (85.7%)	65 (79.3%)	75 (94.9%)	21 (95.5%)	30 (85.7%)
Bridging (Diploma to Bachelor)	168 (49.3%)	30 (14.6%)	1 (1.1%)	8 (9.5%)	17 (20.7%)	4 (5.1%)	1 (4.5%)	4 (11.4%)
Diploma	3 (0.9%)	0 (0%)	48 (51.6%)	4 (4.8%)	0 (0%)	0 (0%)	0 (0%)	1 (2.9%)
Study year								
1st year	68 (19.9%)	34 (16.6%)	10 (10.8%)	10 (11.9%)	4 (4.9%)	3 (3.8%)	0 (0%)	11 (31.4%)
2nd year	45 (13.2%)	93 (45.4%)	53 (57.0%)	12 (14.3%)	2 (2.4%)	18 (22.8%)	7 (31.8%)	4 (11.4%)
3rd year	103 (30.2%)	42 (20.5%)	26 (28.0%)	25 (29.8%)	32 (39.0%)	31 (39.2%)	8 (36.4%)	1 (2.9%)
4th year	125 (36.7%)	36 (17.6%)	4 (4.3%)	37 (44.0%)	44 (53.7%)	27 (34.2%)	7 (31.8%)	19 (54.3%)
University								
Governmental	113 (33.1%)	203 (99.0%)	51 (54.8%)	38 (45.2%)	82 (100%)	50 (63.3%)	18 (81.8%)	28 (80.0%)
Private	227 (66.6%)	2 (1%)	40 (43.0%)	44 (52.4%)	0 (0%)	29 (36.7%)	14 (63.6%)	6 (17.1%)
Available internet								
Not available	7 (2.1%)	8 (3.9%)	2 (2.2%)	7 (8.3%)	1 (1.2%)	0 (0%)	0 (0%)	3 (8.6%)
Mobile data	141 (41.3%)	32 (15.6%)	26 (28.0%)	21 (25.0%)	6 (7.3%)	28 (35.4%)	1 (4.5%)	9 (25.7%)
Internet router	123 (36.1%)	157 (76.6%)	29 (31.2%)	49 (58.3%)	57 (69.5%)	30 (38.0%)	17 (77.3%)	23 (65.7%)
Two sources	70 (20.5%)	8 (3.9%)	36 (38.7%)	7 (8.3%)	18 (22.0%)	21 (26.6%)	4 (18.2%)	0 (0%)
Available devices								
No available devices	1 (0.3%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Mobile phone	218 (63.9%)	168 (82.0%)	41 (44.1%)	43 (51.2%)	5 (6.1%)	10 (12.7%)	3 (13.6%)	17 (48.6%)
Desktop computer	8 (2.3%)	6 (2.9%)	3 (3.2%)	2 (2.4%)	3 (3.7%)	3 (3.8%)	0 (0%)	0 (0%)
Laptop	4 (1.2%)	1 (0.5%)	0 (0%)	2 (2.4%)	1 (1.2%)	1 (1.3%)	0 (0%)	0 (0%)
Tablet	3 (0.9%)	1 (0.5%)	4 (4.3%)	3 (3.6%)	2 (2.4%)	1 (1.3%)	1 (4.5%)	0 (0%)
More than one device	107 (31.4%)	29 (14.1%)	45 (48.4%)	34 (40.5%)	71 (86.6%)	64 (81.0%)	18 (81.8%)	13 (37.1%)

KSA Kingdom of Saudi Arabia, UAE United Arab Emirates

Demographic characteristics across countries

The distribution of participants across countries is outlined, with Jordan having the highest number of participants (36.2%), followed by Iraq (21.8%), Lebanon (9.9%), and Palestine (8.9%). The marital status distribution among nursing students in the study reveals notable variations across different countries. The majority of participants in all countries reported being single, with percentages ranging from 74.3% to 95.7%. The majority of participants in most countries reported having family sizes ranging from 5 to 9 members. Lebanon stood out with the highest proportion of students reporting smaller family sizes (less than 5 members) at 52.7%. On the other hand, Oman had the highest percentage of participants with larger families (10 or more members) at 37.8%.

Family income disparities across countries

The analysis of family income distribution among nursing students across different countries underscores disparities in economic conditions. In Lebanon, a substantial majority (84.9%) of participants reported a family income of less than 500 United States Dollar (USD). In contrast, the prevalence of higher family incomes (1500 USD or more) among nursing students in Kingdom of Saudi Arabia (KSA) (43.0%) and the United Arab Emirates (UAE) (45.5%) was observed. The majority of students across most countries resided with their families, with percentages ranging from 35.4% to 100%.

Educational pursuits and study year distribution

The majority of participants in most countries pursued a Bachelor's degree, with significant percentages ranging from 47.3% to 95.5%. Bridging programs, facilitating the transition from a Diploma to a Bachelor's degree showed considerable variability among countries, with percentages ranging from 1.1% to 49.3%. Jordan and Oman reported the highest percentages of students enrolled in bridging programs. Lebanon stood out with a substantial number of students pursuing Diploma programs, representing over half of the participants in this country (51.6%). Notably, Jordan and Egypt had a higher percentage of fourth-year students at 36.7% and 54.3%, respectively. In contrast, Lebanon and the UAE exhibited a substantial proportion of second-year students, with percentages reaching 57.0% and 31.8%, respectively. The majority of nursing students in Jordan attended private universities, constituting 66.6% of the total participants. In contrast, the situation was markedly different in Oman, where a substantial percentage (100%) of students attended governmental universities.

Internet access distribution

Jordan and the KSA showed a higher reliance on mobile data, with percentages at 41.3% and 35.4%, respectively. In contrast, the UAE and Iraq exhibited a predominant use of internet routers, with percentages reaching 77.3% and 76.6%.

Devices availability distribution

Mobile phones were the most widely used devices, with Iraq, Jordan, and Palestine reporting the highest percentages (82.0%, 63.9%, and 51.2%, respectively). Notably, Oman, the UAE, and the KSA had a substantial percentage of students using more than one device (86.6%, 81.8%, and 81.0% respectively).

Comparative analysis among nursing students across countries

Table 2 presents descriptive statistics of challenges, offering insights into nursing students' perceptions across different countries. Mean values, SD, and overall scores provide a nuanced understanding of the data.

The academic challenges

Jordan, Egypt, and the KSA nursing students reported moderate academic challenges (Mean $\pm$ SD: 2.95 ± 0.95 , 2.95 ± 0.98 , and 2.94 ± 0.85 , respectively), while Palestine exhibited the highest academic challenges score (3.41 ± 0.80). Notably, the SDs indicate varying perceptions within each country, contributing to nuanced interpretations.

The technological challenges

Analysis of technological challenges reveals a range of experiences. Iraq and Palestine had the highest technological challenges (3.19 ± 0.85 , and 3.19 ± 0.81 , respectively), while the UAE reported the lowest (2.19 ± 0.86). Variability within each country, depicted by SD, emphasizes the diverse challenges faced by nursing students in adopting technology for learning.

The administrative challenges

Palestine and Lebanon had the highest administrative challenges (3.83 ± 0.74 and 3.78 ± 0.59 , respectively), contrasting with the UAE, which reported the lowest (2.41 ± 0.93). Standard deviations highlight the extent of variation in administrative challenges experienced by nursing students across countries.

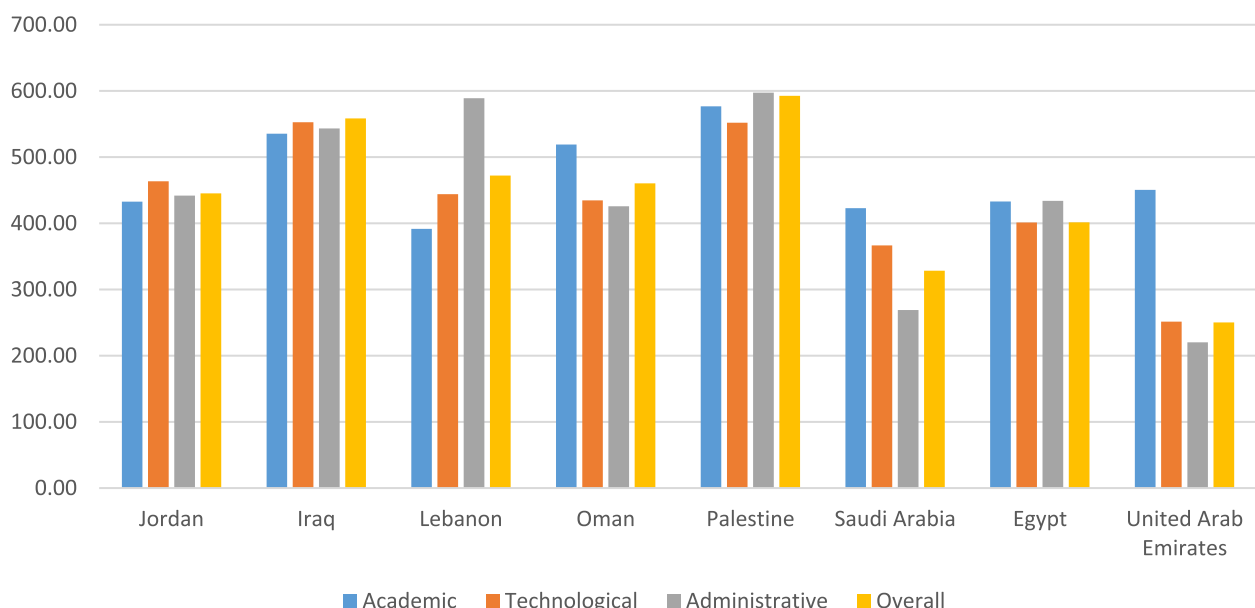
The challenges overall score

The overall score of challenges, reflecting a composite of academic, technological, and administrative challenges, ranged from 2.47 ± 0.69 in the UAE to 3.42 ± 0.67 in Palestine. See Fig. 1.

Table 2 Online teaching challenges across countries ($N=941$)

Challenges	Mean $\pm$ Standard Deviations							
	Jordan	Iraq	Lebanon	Palestine	Oman	KSA	UAE	Egypt
Academic challenges								
Lack of interaction with staff	3.05 $\pm$ 1.24	3.43 $\pm$ 1.21	3.16 $\pm$ 1.01	3.51 $\pm$ 1.01	3.24 $\pm$ 1.05	3.23 $\pm$ 1.26	3.05 $\pm$ 1.4	3.14 $\pm$ 1.09
Lack of time for online exams/ assignments	3.30 $\pm$ 1.29	3.35 $\pm$ 1.21	2.74 $\pm$ 1.00	3.77 $\pm$ 1.08	3.85 $\pm$ 1.07	3.29 $\pm$ 1.30	3.64 $\pm$ 1.05	3.06 $\pm$ 1.33
Inaccessibility of course materials	2.52 $\pm$ 1.2	3.14 $\pm$ 1.26	2.58 $\pm$ 0.95	2.94 $\pm$ 1.12	2.60 $\pm$ 1.08	2.29 $\pm$ 1.18	2.32 $\pm$ 1.17	2.66 $\pm$ 1.19
Total academic	2.95 $\pm$ 0.95	3.31 $\pm$.929	2.83 $\pm$ 0.78	3.41 $\pm$ 0.80	3.23 $\pm$ 0.76	2.94 $\pm$ 0.85	3 $\pm$ 0.96	2.95 $\pm$ 0.98
Technological challenges								
Lack of required technology/software	2.90 $\pm$ 1.20	3.38 $\pm$ 1.24	3.27 $\pm$ 1.13	3.12 $\pm$ 1.19	2.76 $\pm$ 1.05	2.42 $\pm$ 1.25	2.05 $\pm$ 1.13	2.83 $\pm$ 1.29
Lack of technical support	3.16 $\pm$ 1.17	3.43 $\pm$ 1.16	2.97 $\pm$ 0.97	3.42 $\pm$ 1.12	3.28 $\pm$ 1.08	3.14 $\pm$ 1.2	2.36 $\pm$ 1.18	2.86 $\pm$ 1.22
Inaccessibility of audio/video materials	2.61 $\pm$ 1.14	2.82 $\pm$ 1.15	2.56 $\pm$ 0.90	2.90 $\pm$ 1.21	2.41 $\pm$ 1.02	2.13 $\pm$ 1.11	2.00 $\pm$ 1.02	2.54 $\pm$ 1.15
Lack of training courses	3.51 $\pm$ 1.16	3.44 $\pm$ 1.21	2.89 $\pm$ 0.99	3.69 $\pm$ 1.05	3.33 $\pm$ 0.92	3.11 $\pm$ 1.25	2.73 $\pm$ 1.24	2.86 $\pm$ 1.24
Complexity of e-learning software	2.41 $\pm$ 1.03	2.86 $\pm$ 1.16	2.60 $\pm$ 0.8	2.80 $\pm$ 1.06	2.44 $\pm$ 1.0	2.19 $\pm$ 1.08	1.82 $\pm$ 0.85	2.63 $\pm$ 0.97
Total technological	2.92 $\pm$ 0.83	3.19 $\pm$ 0.85	2.86 $\pm$ 0.74	3.19 $\pm$ 0.81	2.84 $\pm$ 0.67	2.6 $\pm$ 0.78	2.19 $\pm$ 0.86	2.74 $\pm$ 0.91
Administrative challenges								
Internet access problems	3.16 $\pm$ 1.19	3.72 $\pm$ 1.17	3.84 $\pm$ 0.76	3.63 $\pm$ 1.02	3.34 $\pm$ 1.04	2.37 $\pm$ 1.13	2.09 $\pm$ 1.19	3.37 $\pm$ 1.11
Negative comments about e-learning	3.32 $\pm$ 1.20	3.56 $\pm$ 1.14	3.73 $\pm$ 0.69	4.10 $\pm$ 0.79	3.15 $\pm$ 1.02	2.92 $\pm$ 1.25	3.14 $\pm$ 1.39	2.86 $\pm$ 1.19
Inadequate ICT infrastructure	3.34 $\pm$ 1.19	3.57 $\pm$ 1.05	3.76 $\pm$ 0.84	3.75 $\pm$ 1.06	3.33 $\pm$ 0.96	2.71 $\pm$ 1.17	2.00 $\pm$ 1.02	3.49 $\pm$ 1.09
Total Administrative	3.27 $\pm$ 0.99	3.61 $\pm$ 0.91	3.78 $\pm$ 0.59	3.83 $\pm$ 0.74	3.27 $\pm$ 0.75	2.67 $\pm$ 0.87	2.41 $\pm$ 0.93	3.24 $\pm$ 0.96
Overall score	3.03 $\pm$ 0.78	3.34 $\pm$ 0.73	3.10 $\pm$ 0.59	3.42 $\pm$ 0.67	3.07 $\pm$ 0.60	2.71 $\pm$ 0.66	2.47 $\pm$ 0.69	2.94 $\pm$ 0.73

KSA Kingdom of Saudi Arabia, UAE United Arab Emirates, ICT Information and Communications Technology

**Fig. 1** Mean ranks of challenges across countries. Shows the mean ranks of the three challenges as well as the overall score across the countries

Normal distribution test

In assessing the normal distribution of data, each challenge's scale, as well as the total scale, exhibited non-normally distributed data based on the Shapiro–Wilk test. This led to the decision to employ non-parametric tests for variance analysis.

Variance analysis

The results of the variance analysis conducted across countries concerning challenges to online teaching are shown in Table 3. Across all three challenge categories—academic, technological, and administrative—substantial differences in mean ranks were evident, as indicated by

Table 3 Variance analysis of online teaching challenges across countries ($N = 941$)

Challenges	Mean Rank								P value
	Jordan	Iraq	Lebanon	Palestine	Oman	KSA	UAE	Egypt	
Academic challenges	432.74	535.32	391.58	576.83	518.98	422.96	450.45	433.01	< 0.001
Technological challenges	463.56	552.78	443.94	551.87	434.71	366.49	251.43	401.20	< 0.001
Administrative challenges	441.83	543.35	589.01	597.51	425.72	269.05	220.20	433.83	< 0.001
Overall score	445.13	558.39	472.13	592.72	460.46	328.30	250.36	401.56	< 0.001

Kruskal Wallis Test was used. KSA Kingdom of Saudi Arabia, UAE United Arab Emirates

the Kruskal–Wallis tests, all yielding p -values less than 0.001. Notably, Palestine consistently exhibited the highest mean ranks across all challenge categories, reflecting greater challenges in online teaching perceived by nursing students in that region. On the contrary, the UAE consistently presents the lowest mean ranks, suggesting relatively lower perceived challenges. The patterns revealed in the variance analysis are further elucidated in Fig. 1, providing a visual representation of the mean ranks and emphasizing the distinct profiles of online teaching challenges across the surveyed countries.

The results of the variance analysis of the overall challenge scores across demographics are presented in Table 4. As shown, the mean ranks were higher in females than males, in Lebanon and Iraq ($p = 0.007$ and $p = 0.038$, respectively). Regarding marital status, those who are single had the highest ranks in Jordan (184.36, $p < 0.001$). As for the family income, those with an income < 500 USD had the highest mean ranks in Lebanon and Palestine ($p = 0.013$ and $p = 0.009$, respectively). It was notable that students at government universities had a lower mean rank than those at private universities in Jordan (24,331.50 vs 33,638.50, $p < 0.001$), while it was the opposite in Lebanon (2779 for government and 1407 for private, $p = 0.001$). Concerning internet availability, it was not surprising that those with no internet had the highest mean ranks in Jordan and Lebanon ($p = 0.002$ and $p = 0.001$, respectively).

Discussion

The current study successfully achieves its multifaceted aims, providing an in-depth exploration of nursing students' perspectives on challenges impeding online learning. Through a comprehensive investigation, the research unveils the key challenges and challenges encountered by nursing students in the Middle East Region, offering valuable insights into their experiences. Moreover, the study recommends potential strategies to overcome these challenges and investigates the impact of challenges on nursing students' perceptions of online learning.

Summary of the main findings

This study emphasizes the complexity and diversity of the challenges encountered by nursing students in the online learning environment. Notably, Palestine and Lebanon stand out with the highest administrative challenges, while Iraq and Palestine report the highest technological challenges. Palestine consistently emerges with the highest mean ranks across all challenge categories, signaling heightened challenges perceived by nursing students in that region. Conversely, the UAE consistently presents the lowest mean ranks, indicating relatively lower perceived challenges.

Significant differences in nursing students' perceptions of online learning challenges were observed across various sociodemographic factors in the Middle East. Challenges were notably higher among single individuals in Jordan and those with low family income in Palestine and Lebanon. Female students reported higher challenges compared to males in Iraq and Lebanon. Students pursuing diplomas in Jordan and bridging programs in Lebanon also faced elevated challenges. Moreover, students in governmental universities in Lebanon and private universities in Jordan encountered distinct challenges. Lack of available internet was particularly challenging for students in Jordan and Lebanon, while those using tablets in Lebanon and laptops in Palestine reported higher challenges.

Comparison with previous studies

The comparison of our findings with the previous studies reveals shared patterns in mobile data reliance [37] in Jordan and the KSA align with broader trends observed in the literature [29, 30]. Variations in device availability and technological challenges across Iraq, Egypt, Jordan, and the UAE and KSA underscore the diverse infrastructural landscapes across countries [32, 33, 37, 38]. Academic challenges exhibit similar patterns of variation, emphasizing the importance of context-specific interventions [39]. Our results, especially in Palestine and Lebanon are similar to a study finding in the Japanese context [34].

Table 4 Variance analysis of online overall challenge score across demographics (N=941)

Overall challenge score	Mean Rank							
	Jordan	Iraq	Lebanon	Palestine	Oman	KSA	UAE	Egypt
Gender^b								
Male	15,800.00	4589.00	863.50	966.00	922.50	1845.00	41.50	236.00
Female	42,511.00	16,526.00	3507.50	2604.00	2480.50	1315.00	211.50	394.00
P value	0.077	0.038	0.007	0.908	0.317	0.244	0.701	0.176
Marital status^a								
Single	184.36	104.48	45.88	40.21	42.31	40.26	11.05	19.04
Married	125.76	94.11	72.00	53.87	39.07	36.33	14.33	16.31
Divorced/Widowed	147.00	66.50	-	34.00	21.50	43.50	-	4.50
P value	<0.001	0.505	0.058	0.128	0.628	0.911	0.415	0.328
Nb of family members^a								
<5 members	158.41	104.93	47.71	44.80	34.88	45.53	13.75	16.97
5 to 9 members	174.53	101.61	46.20	41.51	41.46	39.99	10.63	18.56
10 or more members	171.50	106.14	-	42.75	44.32	27.78	12.83	27.50
P value	0.482	0.895	0.787	0.877	0.486	0.155	0.645	0.578
Family income^a								
<500 USD	172.35	106.05	50.44	51.29	39.25	44.10	18.00	19.19
500–999 USD	165.30	101.37	28.67	37.73	48.88	42.76	8.17	11.70
1000–1499 USD	185.83	92.64	21.25	42.80	35.85	38.44	10.25	-
1500 USD or more	210.56	91.90	-	23.90	36.54	38.24	11.30	15.00
P value	0.530	0.838	0.013	0.009	0.192	0.837	0.256	0.304
Region^a								
Northern	174.38	109.72	78.25	48.77	42.88	49.09	11.56	18.13
Central	162.38	89.02	43.39	37.36	41.08	37.39	12.08	18.11
Southern	201.95	101.49	47.97	44.60	41.64	42.22	3.50	17.42
P value	0.342	0.308	0.187	0.256	0.963	0.279	0.443	0.988
Living place^a								
With family	167.07	102.05	47.00	42.54	41.57	42.58	10.73	17.36
University dormitory	293.83	97.15	-	-	39.09	19.17	-	28.50
With colleagues/friends	261.30	170.17	-	39.00	48.50	9.00	21.00	17.50
Alone	98.88	115.50	-	44.25	42.25	31.50	17.50	-
P value	<0.001	0.240	-	0.974	0.700	0.094	0.193	0.326
Study program^a								
Bachelor	196.63	102.47	40.85	43.89	43.76	39.79	11.05	18.27
Bridging (Diploma to Bachelor)	143.14	106.08	88.50	28.94	32.85	43.88	21.00	12.25
Diploma	279.00	-	51.77	44.63	-	-	-	33.00
P value	<0.001	0.758	0.046	0.253	0.092	0.728	0.133	0.179
Study year^a								
1st year	172.24	112.90	43.15	31.05	36.50	33.67	-	17.14
2nd year	192.42	101.29	45.98	53.29	36.75	28.19	10.71	17.88
3rd year	164.76	86.79	48.92	43.36	37.41	44.60	13.81	30.00
4th year	167.76	116.99	57.63	41.51	45.15	43.30	9.64	17.89
P value	0.442	0.104	0.793	0.198	0.524	0.078	0.428	0.691
University^b								
Governmental	24,331.50	21,023.50	2779.00	1473.00	3403.00	1939.00	212.00	488.00
Private	33,638.50	91.50	1407.00	1930.00	-	1221.00	41.00	107.00
P value	<0.001	0.170	0.001	0.333	-	0.534	0.670	0.928
Available internet^a								
Not available	270.71	126.25	70.00	52.93	7.50	-	-	17.17

Table 4 (continued)

Overall challenge score	Mean Rank							
	Jordan	Iraq	Lebanon	Palestine	Oman	KSA	UAE	Egypt
Mobile data	158.46	103.28	62.77	48.17	43.25	42.66	21.00	21.78
Internet router	165.40	101.67	44.36	40.44	39.60	36.47	10.82	16.63
Two sources	196.12	104.81	36.46	29.50	48.83	41.50	12.00	17.17
<i>P</i> value	0.002	0.725	0.001	0.190	0.245	0.554	0.307	0.435
Available devices ^a								
No available devices	-							
Mobile phone	163.05	102.55	58.05	51.71	47.00	47.80	13.00	18.21
Desktop computer	145.56	84.58	47.00	40.50	10.50	61.83	-	26.00
Laptop	103.13	133.50	-	64.75	7.50	19.50	-	22.00
Tablet	211.17	81.50	60.63	31.83	33.75	27.00	17.50	-
More than one device	188.92	109.12	35.72	30.60	43.12	38.28	10.92	14.96
<i>P</i> value	0.094	0.862	0.001	0.002	0.093	0.251	0.559	0.288

^a Kruskal Wallis Test was used; ^b Mann-Whitney test was used

Interventions from prior studies to overcome online learning challenges in nursing post-COVID-19

Interventions to address the multifaceted challenges faced by nursing students in the post-COVID-19 online learning landscape can draw insights from previous studies. Foundational interventions include fostering Academic Self-Efficacy (ASE) through resilience-building activities and culturally sensitive social support mechanisms. Enhancing the online learning environment can be strategically achieved by tailoring lecture formats, incorporating a mix of recorded and real-time sessions based on factors influencing learning flow, such as self-regulated learning ability and motivation [37]. The successful implementation of online international collaborative programs, as demonstrated in the South Korean study [44], presents a promising intervention to enrich nursing education with diverse perspectives and global competencies. Addressing the impact of reduced clinical practice opportunities necessitates interventions like faculty development programs and support structures, including mentorship programs and enhanced clinical simulations [45]. Augmenting the online learning environment can benefit from insights such as incorporating effective humor [46]. Additionally, interventions can draw from insights into psychological resilience [34, 47], psychological support through mental telehealth diverse programs [38], virtual simulation (augmented reality) [48], and providing regular feedback [34]. Finally, the success story in the UAE, emphasized in our study, provides a model for Middle East countries, highlighting key elements like internet router access, adaptable online platforms, and financial support for technological resources.

Strengths and limitations of the study

This research stands out with its pioneering nature, representing a groundbreaking contribution to the field. As the first study dedicated to unraveling the challenges faced by undergraduate nursing students in the Middle East region during the pivotal shift to online learning, it marks a significant milestone. This unique focus introduces fresh perspectives and lays the foundation for subsequent investigations into the intricacies of online education in this specific geographic context. Another key strength lies in the inclusion of a big and diverse sample size, with participants from eight Arab countries. The large sample size enhances the robustness and generalizability of the findings. Third, research makes a significant contribution to the evolution of nursing education by critically exploring the challenges and opportunities inherent in online learning. This offers insights instrumental in shaping the future trajectory of nursing education that is crucial in adapting educational practices to align with the demands of a rapidly evolving global landscape.

This study underscores the pressing challenges faced by Palestinian nursing students, particularly in the aftermath of the first COVID-19 outbreak and the recent conflict in Gaza. The shift back to distance learning amid the conflict, especially in the West Bank, accentuates the urgency of addressing ongoing challenges. On the other hand, the continuous economic crisis in Lebanon since 2020 has significantly impacted various sectors, including education. This is evident in the higher challenge scores for Lebanese students with lower family incomes and those enrolled in government universities. Moreover, the

impact is also apparent in the high administrative challenges score among Lebanese nursing students. Policy-makers and academics in the Middle East region should prioritize targeted infrastructure investments, considering the unique needs of each country. It is crucial to create mobile-friendly learning platforms and adaptable technology strategies, inspired by successful practices in nations such as the UAE. Also, qualitative analysis is necessary to perform explanatory research and get a deeper understanding of the causes behind success or failure. Moreover, financial assistance for technology resources, faculty training, and the establishment of administrative frameworks remains crucial, with specific support directed to areas facing significant administrative, technical, and academic challenges. Continuous longitudinal impact evaluations and exploration of successful instructional practices, informed by broader literature, are essential. These insights provide a critical direction for formulating robust and inclusive online education policies particularly in post-COVID-19 and post-conflict in Palestine.

However, despite these strengths, this study has some weaknesses. For instance, there was a non-proportional number of participants across the included countries, which may affect the generalizability of the results. Additionally, the cross-sectional design and convenience sampling employed in this study limit the ability to establish causality and may introduce selection bias. Furthermore, the survey link was distributed by nursing instructors, which might have introduced potential bias in students' responses. To minimize this bias, we kept the instructors' involvement in data collection to a minimum and ensured that the questionnaire was anonymous and voluntary. We have discussed the potential impact of these limitations on our results and emphasized the need for future research to address these issues.

Conclusion

This research sheds light on the challenges faced by nursing students in the online learning environment in the Middle East. Technological challenges, such as limited access to reliable internet and necessary devices, were significant in Palestine and Lebanon, hindering students' ability to participate effectively. Academic challenges included difficulties in managing coursework, accessing resources, and preparing for exams, with notable variations across countries. Administrative challenges, such as ineffective institutional support and communication, exacerbated the struggles, particularly in Palestine and Lebanon. Economic disparities further compounded these issues, with significant variations in family income impacting students' ability to engage with online learning materials.

The variation in scores across different countries suggests that nursing students in Palestine report facing more significant challenges, while those in the UAE perceive relatively fewer challenges. By delineating distinct profiles of online teaching challenges across surveyed countries, the study emphasizes the necessity for targeted interventions. The findings underscore the importance of ongoing research to enhance educational practices and provide a valuable resource for educators and policymakers seeking to improve online learning experiences.

Abbreviations

ASE	Academic Self-Efficacy
COVID-19	Coronavirus-19 disease
IRB	Institutional Review Board
KSA	Kingdom of Saudi Arabia
SD	Standard deviations
UAE	United Arab Emirates
USD	United States Dollar

Supplementary Information

The online version contains supplementary material available at <https://doi.org/10.1186/s12912-024-02236-w>.

Supplementary Material 1

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Authors' contributions

Haitham Khatatbeh: Conceptualization and Design, Data collection, Writing- Reviewing and Editing, and Supervision. Faten Amer: Data Interpretation, Writing- Original draft preparation, Writing- Reviewing and Editing, and Supervision. Amira Mohammed Ali: Conceptualization and Design, Data collection. Mohammed ALBashtawy: Conceptualization and Design, Data collection. Arie Kurnianto: Conceptualization and Design. Manar Abu-Abbas: Conceptualization and Design, Data collection. Omar Alomari: Data collection. Rana A. Al-Awamleh: Data collection, Writing- Reviewing and Editing. Tariq Al-Dwaikat: Data collection. Sahar Hammoud: Data collection, Data Analysis, Writing- Reviewing and Editing, and Supervision. All authors have critically revised and approved the final draft of the manuscript. All authors are responsible for the reported research and have approved the manuscript as submitted.

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Availability of data and materials

Authors agree to make data and materials supporting the results or analyses presented in their paper available upon reasonable request.

Declarations

Ethics approval and consent to participate

The study proposal was reviewed and approved by the Institutional Review Board (IRB) Committee at Jerash University according to the decision (3/4/2022/2023). Informed consent to participate was obtained from all of the participants.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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