JETIR.ORG ISSN: 2349-5162 | ESTD Year : 2014 | Monthly Issue

JOURNAL OF EMERGING TECHNOLOGIES AND INNOVATIVE RESEARCH (JETIR)

An International Scholarly Open Access, Peer-reviewed, Refereed Journal

IMPACT OF EFFECTIVE HANDOFF COMMUNICATION ON THE TRANSITION OF PATIENT CARE IN KALBA HOSPITAL

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Abstract : In healthcare, handoffs also called handovers are defined as the transfer of critical data about the patient between different healthcare providers during the transition of care. The effectiveness of the handoff system directly impacts patient health and quality of care.

Nurses play a crucial role in providing premium care to their patients; they are the main effectors in the handoff system as the core of their duties is patient care transition.

Several factors influence the efficiency of the handoff communication system, such as bad teamwork, ignorance, disruptions and noise during the transition of care, time limits, work pressure, fatigue, and high workload…among others. The safety of the patient is jeopardized with an erroneous handoff system. Specifically, inefficient handoffs trigger treatment inaccuracies, medication errors, and bad prognosis…and many other unfortunate events. A correctly implemented handoff communication system inhibits the occurrence of these adverse outcomes.

Keywords: Handoff, Communication, Patient Safety, Nursing

Introduction

Background

In healthcare, handoff communication, with its vast terminology "shift reports, handovers, transitions in care, bedside reporting…" refers to the exchange of patient-related information between healthcare providers on a temporary or permanent basis. Transferred information in this interactive process mainly comprises the medical history of the patient, hisdiagnosis, medications, the previously done procedures, and procedures that need to bedone…among others (1, 2). This handover is not restricted to communicating critical information, yet it encompasses the transfer of charge, authority, and accountability regarding the patient (3). Indeed, handoffs are a central component of medical practice since they directlyimpact patient care, safety, and health outcomes (1, 4).

Nowadays, we are experiencing an increase in the complexity of healthcare services caused bytechnological advances, diversity of specializations, and collaborations between different departments and various hospitals, in addition to emerging diseases and outbreaks (5). Indeed,a patient admitted to a hospital will have several healthcare providers depending on the complexity of his medical condition. Accordingly, information regarding his case will be communicated between many nurses, general practitioners, and specialty doctors, contributing to his therapeutic strategies (5). The complexity in care necessitates the implementation of an effective handoff system to form a linkage between these different caregivers, ensure the correct transfer of essential information, reduce the probability of mistakes, and enhance patient safety while delivering regular care even though provided by multiple healthcare workers (1, 6).

Among the multidisciplinary team of healthcare providers, nurses constitute a significant and vital proportion; their ultimate mission is to deliver premium care to their patients (7). The handoff usually happens at several time points of a nurse's day, at the end of a shift, during a patient transition within the same department, various departments, or even hospitals. Thus, in nursing practice, a handoff is a crucial process enabling the continuity of care and ensuring patient safety and well-being (8).

Problem statement

Despite the well-acknowledged importance of effective handoffs in nursing practice, errors in conveying medical data are still commonly encountered. The effectiveness of the handoff communication system is impaired by many factors, such as miscommunication, lack of awareness, interruptions, turbulences during the transition of care, staff shortage, time limits, stress, exhaustion, and high workload (5). Significantly, alterations in handoff systems are associated with an increase in adverse events, reduced patient satisfaction, and decreased quality of care(7). Kalba hospital is a dynamic institution where handoffs are numerous. Consequently, this complex setting is prone to mismanaged handoffs which could disrupt patient health, safety, and, eventually, the quality of care offered by this institution.

Purpose of The Study

This study is conducted to assess the effectiveness of the handoff system at Kalba hospital while shedding light on the commonly encountered problems during this process as perceived by the nurses. In this direction, the study aims to improve the handoff communicationsystem, thus reducing errors during the transition of care.

Research Question

- What is the adherence level of nurses to the handoff system at Kalba hospital?
- What is the perception of nurses toward the effectiveness of the handoff system?
- What are the barriers hindering the efficiency of the handoff system?

Significance of the study

Monitoring the effectiveness of the handoff communication system is a critical player directly affecting patient safety and the quality of care. Notably, a poor handoff system triggers errors during the transition of care and thus endangers patient safety. To our knowledge, this is the first study to address the handoff communication systems among nurses in UAE. Thus, studying this pivotal event, its perception among nurses, and factors affecting its efficiency leads to the identification of gaps in the handover system and eventually ameliorates patient transition and the quality of care at Kalba hospital.

Literature Review

The Joint Commission (JCI) and the World Health Organization (WHO) emphasized the importance of the handoff process. They defined the implementation of a standardized handoff as an essential prerequisite to reinforce the exchange of vital information between caregivers (8). The significance of effective handoff was evaluated in multiple studies. Notably, a systematic review published in 2020 showed that effective handoffs efficiently reduced erroneous or missing information transmission (9).

For a successful handoff system to be implemented, efficient communication remains the key. In this direction, several well-structured tools of communication are available. However, the *Standardized Situation, Background, Assessment, Recommendation* (SBAR) method is the optimal handoff structure. The effectiveness of this tool has been highlighted in several studies covering various clinical settings. For example, in a study by Campbell et al., the SBAR method was associated with a smooth and straightforward information exchange (10).

However, the handoff process is error-prone; the potential reasons behind ineffective handoffs were investigated and listed in several studies whereby many interpersonal and work-related factors were shown to be possible contributors to a handoff failure, such as lack of communication, high workload, nursing staff shortage, lack of time were considered to negatively affect handoff during the transition of care (11). Santos et al. highlighted noise as a crucial factor hindering effective communication during handoff (12). Moreover, Machaczeket al. focused on distractions, as nursing stations are permanently crowded areas where distractions frequently occur, thus impeding effective handovers(13). Another study, publishedin 2019, shed light on interruptions as a common barrier during handoffs(14).

Collectively, it is well-established that the handoff process is a fundamental component of a quality plan in a healthcare setting. When properly implemented, it will lead to an enhancementof patient health, safety, and patient satisfaction (4)

Knowledge gap

Despite the extensive knowledge of the importance of efficient handoffs during the transition of care, the effectiveness of the handoff systems in UAE hospitals is not addressed yet. Moreover, Nurses' perception of the available handoff system and the factors influencing its efficacy are poorly elucidated.

Methodology

Study design

This descriptive cross-sectional study examines nurses' perceptions of the handoff systemeffectiveness at Kalba hospital, an 88-bed healthcare institution in the UAE.

Participants

The targeted research population consists of nurses working at Kalba hospital.

Inclusion criteria:

Inpatient Care nurses, Out Patient Department, and Registered nurses between 25 and 50 yearsof age were included in the study.

Exclusion criteria

Nurses aged above 50 years, Students, assistant nurses, indirect patient nurses, and physicianswere not included in the study.

Data collection instrument:

Data was gathered through a well-structured questionnaire administered via email as agoogle forms survey. The survey consisted of 26 closed-ended questions with a 5 minutes completion time, categorized into five different sections. The first part consisted of 6 questions specifying the demographic variables of the participants (Age, Gender, Educational level, Working duration at Kalba, Position, and Department). The second part encompassed 5questions tackling adherence to the handoff system and the commonly encountered problems during handoff. The third part assessed communication patterns among nurses through 4 questions. The fourth section evaluated management practices and policies through 7 questions. The last part evaluated the Handoff system effectiveness as perceived by the respondents through 4 different questions evaluating the perceived changes in handoff quality, patient satisfaction, and adverse event occurrence after the implementation of the handoff system.

Likert-type questions were scored on a 5-point scale with "1 =Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree and 5 = Strongly Agree". All the questions were single-choice questions except One question about the encountered barriers during handoff, whereby participants couldselect all that apply from the available options.

Ethical considerations

The study proposal was presented to the Ministry of Health and Prevention and approved by the Research Ethics Committee (MOHAP/DXB-REC/FMA/No.21/2022).

Informed consent was obtained, and voluntary participation was guaranteed. The survey was anonymously completed by the nurses, and the confidentiality of the data was ensured.

Data Analysis

Data emanating from surveys were analyzed using IBM SPSS Statistics 29.0. Descriptive statistics were performed, and the association between variables was determined using the Analysis of Variance (ANOVA) test and the Chi-Square test. Likert scale answers were re-coded and regrouped into three levels: "Strongly disagree" and "Disagree" were both coded as "Disagree =1", "Neutral" coded as "Neutral=2", and "Strongly Agree" and "Agree" were both coded as "Agree=3".

Results

Data collection and Sample characteristics

Surveys were distributed to 169 nurses working at Kalba Hospital; 2 disagreed to participate, and all other nurses completed the survey. The sample was refined according to theincluding and excluding criteria, whereby 17 nurses were excluded as they were above 50 yearsof age, and 3 nurses were excluded as they were neither Registered nurses, Inpatient nurses, orOPD nurses. Therefore the final sample consisted of 147 nurses.

Characteristics of the participants:

Demographic characteristics:

The sample consisted of 16 (10.9%) males and 131 (89.1%) females (N=147). Participants agesranged from 20 to 50 years. 13 participants (8.8%) were between 20 and 30 years, 65 (44.2%)
nurses were between 30 and 40 years, and 69 nurses (46.9%) were between 40 and 50 years ofage.

Concerning the education level, 83 (56.5%) nurses had a Bachelor of Science in Nursing (BScN), 10 (6.8%) nurses had a Master of Science in Nursing (MSN), and 54 (36.7%) participants had a Nursing Diploma (Table 1).

Table 1

Demographic characteristics of the participants

Characteristic	n	%
Gender		
Male	16	10.9 %
Female	131	89.1%
Age		
20-30 years	13	8.8%
30-40 years	65	44.2%
40-50 years	69	46.9%
Education Level		
BScN	83	56.5%
MSN	10	6.8%
Diploma	54	36.7%
Total	147	100%

Note. n indicates the frequencies, and % indicates the percentages.

Work-related characteristics:

Concerning their work at Kalba hospital, the majority of the participants were Registered Nurses n=135 (91.8%), 6 nurses (4.1%) were In Patient care nurses, and 6 (4.1%) were OPD Nurses. The majority of the participants worked at Kalba hospital for more than 5 years, n=111(75.5%), 22(15.0%) nurses worked for less than 1 year, 9 (6.1%) nurses worked for 1-3years, and 5(3.4%) nurses worked for 3-5 years.

The participants belonged to 13 different departments at Kalba Hospital. The majority n=29 (19.7%) were in the Accident and Emergency(AE), 15 (10.2%) nurses in the Critical Care Unit(CCU), 15 (10.2%) nurses in the female ward, 14 (9.5%) in the Pediatric and Maternity ward (PW&MAT), 11(7.5%) in the Special Care Baby Unit(SCBU), 10(6.8%) in the Intensive Care Unit(ICU), 10(6.8%) in the Labour Rooms(LR), 10(6.8%) in the Operation theatre (OT),10(6.8%) in the Nursing office, 9(6.1%) in the Out Patient Department(OPD),7 (4.8%) in the Isolation 1 , 5(3.4%) in the Male ward and 2 nurses(1.4%) in the Isolation 2 (Table 2).

Table 2

Work-related characteristics of the participants

Characteristic	**n**	**%**
Position		
Registered Nurse	135	91.8 %
Patient care Nurse	6	4.1%
OPD nurse	6	84.1%
Working years at Kalba		
<1year	22	15.0%
1-3 years	9	6.1%
3-5 years	5	3.4%
>5 years	111	75.5%
Department		
AE	29	19.7%
CCU	15	10.2%
Female Ward	15	10.2%
PW&MAT Ward	14	9.5%
SCBU	11	7.5%
I.C.U.	10	6.8%
Nursing Office	10	6.8%
OT	10	6.8%
LR	10	6.8%
OPD	9	6.1%
Isolation1	7	4.8%
Male Ward	5	3.4%
Isolation2	2	1.4%
Total	147	100%

Note. n indicates the frequencies, and % indicates the percentages.

Adherence to the handoff tool

Among the participants, 146 nurses (99.3%) reported revising online documentation (laboratory results, medical history, medication…) before giving or receiving a report and using the SBAR format in their report. Thus the study population showed a high level of adherence to the handoff tool

Communication

Four questions evaluated the communication patterns of nurses at Kalba hospital. Among the participants, 121 (82.3%) nurses reported that they were encouraged to speak in case of undesired events, whereby 26 (17.7%) stated they were not encouraged. A cross- tabulation of the two categorical variables, communication patterns, and the departments, showed higher levels of nurses who are not encouraged to speak in case of undesired events inthe CUU, Female ward, the PW&MAT, and ICU with 26.90%, 23.10%, 15.4%, and 11.50 % respectively. Chi-square analysis revealed that this difference between departments is statistically significant, p=0.006 (Table 3, Figure 1). Additionally, 142 nurses (96.6%) reported that they fill the Occurrence variance report (OVR) when errors occur to identify gaps. Moreover, 146(99.3%) nurses said that they were informed of the mistakes happening in the department, which constitutes the vast majority of the study population. Notably, 100% of the participants (n=147) stated that corrective and preventive measures are discussed among department staff.

Table 3

Cross-tabulation of Staff encouragement to speak in case of an undesired event by department

Q12-Staff is encouraged to speak in case of undesired events	Yes		No		p-value
	n	%	n	%	
Department					
CCU	8	6.60%	7	26.90%	
Female Ward	9	7.40%	6	23.10%	
PW&MAT Ward	10	8.30%	4	15.40%	
ICU	7	5.80%	3	11.50%	
Isolation 2	1	0.80%	1	3.80%	
LR.	9	7.40%	1	3.80%	p=0.006**
SCBU	10	8.30%	1	3.80%	
Nursing Office	9	7.40%	1	3.80%	
OPD	8	6.60%	1	3.80%	
OT.	10	8.30%	0	0.00%	
Isolation 1	7	5.80%	0	0.00%	
Total	121	100%	26	100%	

Note. ** p<0.01. n indicates the frequencies, and % indicates the percentages.

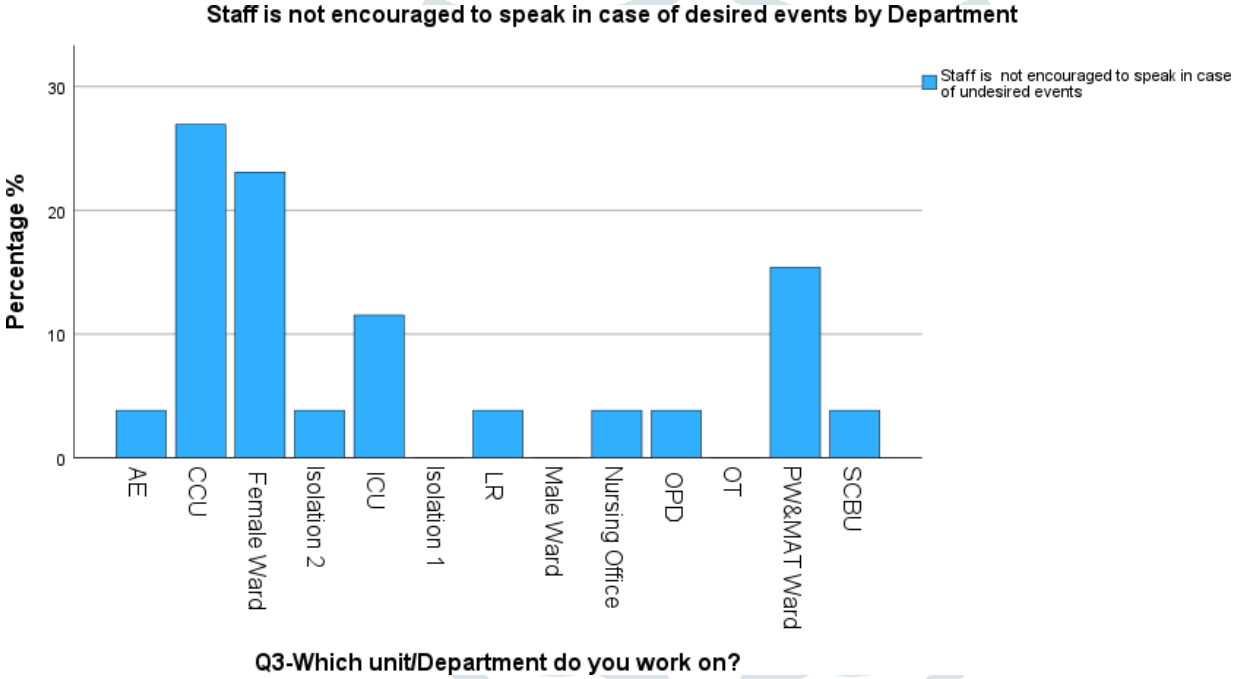

Figure 1: Percentage of staff not encouraged to speak in case of an undesired event by the department at KalbaHospital.

Management

Management practices were evaluated through questions about the institution's culture in prioritizing patient safety and handoff importance, as well as in conducting audits and training to ensure the correct implementation of the system. The results showed that 146 (99.3%) nurses reported that handoff effectiveness is a priority in their department, and 100 %stated that patient safety is a priority in their department.

In addition, 126 (85.0 %) nurses agreed that frequent audits are performed to ensure system implementation. Descriptive statistics revealed an average score of 2.81 (SD=0.50), indicating that nurses tend to agree that audits are frequently performed (no statistical difference within departments or independent variables). Most nurses (97.3%) reported that written step-by-step procedures are available and accessible to staff, and 94.6% conveyed that positive support is provided to employees who perform the handoff correctly.

Concerning training, the vast majority of the nurses (95.2%) believed that departmental training in effective handover is frequently done in their departments. As for training provided to new staff, 124 (84.4%) agree that training is administered to new staff, and 8 (5.4%) disagree. The mean score was 2.79 (SD =0.526), indicating a general agreement among nurses that training is adequately provided to new employees.

However, when looking at the educational level of nurses, it is noted that 100% of those with MSN agree that training is appropriately administered to new staff. Descriptive statistics showed mean scores of 3 (SD =0.0) in nurses with MSN, 2.69 (SD=0.61) in nurses with BScN, and 2.88(SD=0.37) in those with a Nursing Diploma. The association between the educational level of nurses and their perception of the training for new staff is statistically significant (p=0.049).

Another critical parameter noted in this direction is the working period of nurses, whereby employees with more than 5 years of experience had a score of 2.85 (SD=0.46) compared to lower values in their counterparts with lower years of experience. Specifically, if we look at those with less than 1 year at Kalba, they present a score of 2.63 (SD=0.58). These differences are statistically significant (p=0.041), implicating that those with 1 year of experience are not feeling that the training is enough,

contrary to the experienced staff (> 5 years), as seen in table 4.

Table 4
Perception of nurses about handoff training to new staff

Characteristic	n	M	SD	p-value
Age Category				
20-30 years	13	2.69	0.63	
30-40 years	65	2.74	0.56	p=0.348
40-50 years	69	2.86	0.46	
Gender				
Males	16	2.69	0.60	
Females	131	2.80	0.51	p=0.415
Educational level				
BScN	83	2.70	0.61	
MSN.	10	3.00	0.00	p=0.049*
Nursing Diploma	54	2.89	0.37	
Working Years				
<1 year	22	2.63	0.58	
1-3 year	9	2.55	0.72	
3-5 years	5	2.4	08.9	p=0.041*
>5 years	111	2.85	0.46	
Department				
AE	29	2.76	0.57	
CCU	15	3.00	0.00	
Female Ward	15	2.80	0.56	
ICU	10	2.80	0.63	
Isolation 1	7	3.00	0.00	
Isolation 2	2	3.00	0.00	
LR	10	2.80	0.63	p=0.880
Male Ward	5	2.60	0.89	
Nursing Office	10	2.70	0.48	
OPD	9	2.67	0.50	
OT	10	2.70	0.48	
PW&MAT Ward	14	2.86	0.36	
SCBU	11	2.64	0.80	
Position				
In Patient Care Nurse	6	3.00	0.00	
OPD. Nurse	6	2.50	0.83	p=0.251
Registered Nurse	135	2.79	0.52	
Total	147	2.79	0.52	

Note. * p<0.05, n indicates the frequencies, M indicates the mean, SD indicates the Standard deviation Perception scores range from 1(Disagree) to 3(Agree).

Handoff Barriers

Problems encountered during handoff were classified into two main categories: (1) related and (2) non-related to the electronic system.

1- Barriers related to the electronic handoff system

Concerning the electronic handoff system, 118 (80.3%) of the respondents agree that it is well–adapted. Descriptive statistics revealed an average score of 2.71 (SD=0.61), indicating that nurses tend to agree that the electronic system is well adapted. No significant differences were observed between the different demographic and work-related variables. Additionally, 18 (12.2%) nurses report frequent improper data completion, along with 4 (2.7%) nurses reportingconstant improper data completion on the system (Figure 2). Importantly, significant differences were obtained between departments. The highest scores were obtained in ICU, indicating a higher occurrence of incorrect data completion. (Mean =2.5, SD=0.84), Nursing office (Mean=2.5, SD=0.52) followed by OPD (Mean=2.33 , SD=0.7). Other departments reported significantly lower scores indicating rare or no incidents of improper data completion(Table 5).

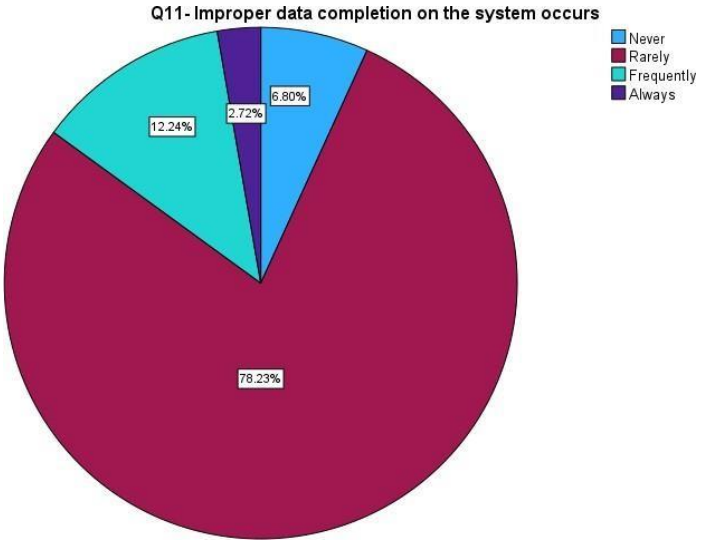

Figure 2:Improper data completion frequencies among the participants.Table 5: *Improper data completion on the system*

Characteristic	n	M	SD	p-value
Age Category				
20-30 years	13	2.15	0.68	p=0.808
30-40 years	65	2.08	0.51	
40-50 years	69	2.13	0.54	
Gender				
Males	16	2.31	0.47	p=0.109
Females	131	2.08	0.54	
Educational level				
BScN	83	2.12	0.52	p=0.801
MSN.	10	2.00	0.00	
Nursing Diploma	54	2.11	0.60	
Working Years				
<1 year	22	2.14	0.56	p=0.876
1-3 year	9	2.22	0.66	
3-5 years	5	2.00	0.70	
>5 years	111	2.10	0.52	
Department				
AE	29	2.00	0.46	
CCU	15	2.13	0.35	
Female Ward	15	1.87	0.35	
ICU	10	2.50	0.85	
Isolation 1	7	1.86	0.37	
Isolation 2	2	2.00	0.00	p=0.024*
LR	10	1.80	0.42	
Male Ward	5	2.20	0.83	
Nursing Office	10	2.50	0.52	
OPD	9	2.33	0.70	
OT	10	2.20	0.42	
PW&MAT Ward	14	2.21	0.57	
SCBU	11	2.00	0.44	
Position				
In Patient Care Nurse	6	2.17	0.75	
OPD. Nurse	6	2.17	0.98	
Registered Nurse	135	2.10	0.50	p=0.928
Total	147	2.11	0.53	

Note. * p<0.05. M indicates the mean, SD indicates the Standard deviation, and n indicates the frequencies. Scores range from 1 (Never) to 4 (Always).

2- Barriers not related to the electronic system

Concerning the problems occurring during handoffs, among the responses, 41.2% indicated interruptions, 21.8% High workload, 19.5% reported insufficient time, and 17.6% noise(Figure 3).

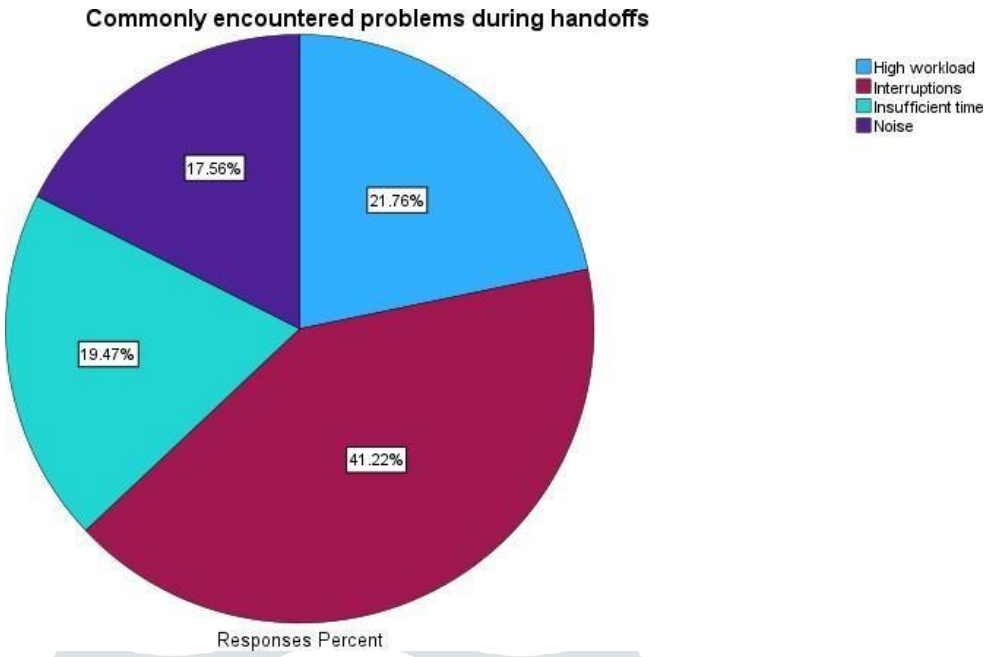

Figure 3: Frequency of commonly encountered problems during handoffs among the participants.

Perceived effectiveness of the handoff tool

Nurses' perception of a change in overall handoff quality due to the implementation of the system was assessed on a score of 1 to 3, with 1=Disagree and 3 = Agree. Among all participants, 79.6% agree that a change in overall handoff quality is perceived after implementing the handoff tool. Descriptive statistics show an overall mean of 2.76 (SD=0.51),indicating that nurses tend to agree that the handoff system modified the quality of the handovers. This perception was affected by the age and education of the participants.

The lowest scores were observed in the nurses aged between 20-30 years, whereby they presented a mean score of 2.46 (SD=0.66) compared to higher scores of 2.72 (SD=0.54) and
2.84 (SD=0.44) for the age categories 30-40 and 40-50 respectively, p=0.042.
Moreover, nurses' educational level affected their perception of the change engendered by thehandoff system. The highest scores were observed in nurses with an MSN, with a mean of 3.0(SD=0.00), compared to 2.88 (SD=0.31) in those with a Diploma, and 2.63 (SD=0.61) in those with a BScN, p=0.06 (Table 6-a).

The second perception was about the improvement in patient satisfaction. Among the participants, 71.4% agreed that patient satisfaction is improved due to the implementation of the handoff system, 23.1 were neutral, and 5.4% disagreed. The mean score of this perceptionwas 2.66 (SD=0.57), indicating an overall trend of agreement that the handoff system led to patient satisfaction amelioration. This perception is affected by the educational level of nurses,whereby the highest scores were seen in those with a Master's degree, with a mean of 2.9 (SD
=0.31), compared to 2.79 (SD=0.45) and 2.54 (SD=0.64) in those holding a Diploma and a BScN respectively, p=0.016 (Table 6-b).

The third perception was about the reduction in the occurrence of adverse events. Among the participants, 69.4% believed that adverse events are reduced, and 30.4 % perceived that it is not reduced. Descriptive statistics showed that the mean score of this perception was 2.66 (SD=0.543), indicating a trend of favorable agreement among participants that adverse eventswere reduced due to the handoff system. This perception was affected by the educational levelof nurses and the working years at Kalba hospital. By looking at the education of nurses, the highest agreement scores were observed in those with an MSN with a mean of 2.9 (SD= 0.31). Significantly lower values were obtained in thosewith a BScN and Diploma with respective scores of 2.79 (SD=0.45) and 0.54 (SD=0.59), p=0.09.
As for the working years, the highest scores were obtained in nurses with more than 5 years atKalba, mean =2.72 (SD=0.5), with significantly lower values for the other categories, p=0.039(Table 6-c).

Table 6-a

Effectiveness of the handoff system: perception of overall handoff quality change

Q23: A change in the handoff quality is perceived due to the implementation of the handoff system				
Characteristic	**n**	**M**	**SD**	**p-value**
Age Category				
20-30 years	13	2.46	0.660	
30-40 years	65	2.72	0.545	p=0.042*
40-50 years	69	2.89	0.441	
Gender				
Males	16	2.75	0.447	
Females	131	2.76	0.528	p=0.967
Educational level				
BScN	83	2.64	0.616	
MSN.	10	3.00	0.000	p=0.006**
Nursing Diploma	54	2.89	0.317	
Working Years				
<1 year	22	2.64	0.581	
1-3 year	9	2.44	0.726	
3-5 years	5	2.60	0.548	p=0.105
>5 years	111	2.81	0.477	
Department				
AE	29	2.79	0.491	
CCU	15	2.87	0.352	
Female Ward	15	2.93	0.258	
ICU	10	2.70	0.483	
Isolation 1	7	3.00	0.000	
Isolation 2	2	3.00	0.000	
LR	10	2.70	0.675	p=0.461
Male Ward	5	2.60	0.894	
Nursing Office	10	2.70	0.483	
OPD	9	2.56	0.527	
OT	10	2.90	0.316	
PW&MAT Ward	14	2.64	0.633	
SCBU	11	2.45	0.820	
Position				
In Patient Care Nurse	6	2.83	0.408	
OPD. Nurse	6	2.83	0.408	p=0.863
Registered Nurse	135	2.75	0.529	
Total	147	2.76	0.51	

Note. * p<0.05. **p<0.01 n indicates the frequencies, M indicates the mean and SD indicates the Standard Deviation. Scores range from 1 (Disagree) to 3 (Agree).

Table 6-b

Effectiveness of the handoff system: perception of patient satisfaction improvement

Q24: Patient satisfaction is improved due to the implementation of the handoff system				
Characteristic	**n**	**M**	**SD**	**p-value**
Age Category	13	2.54	0.66	
20-30 years	65	2.62	0.60	
30-40 years	69	2.72	0.53	p=0.406
40-50 years	147	2.66	0.57	
Gender				
Males	16	2.69	0.47	
Females	131	2.66	0.59	p=0.841
Educational level				
BScN	83	2.54	0.65	p=0.016*
MSN.	10	2.90	0.31	
Nursing Diploma	54	2.80	0.45	
Working Years				
<1 year	22	2.59	0.59	p=0.931
1-3 year	9	2.67	0.70	
3-5 years	5	2.60	0.54	
>5 years	111	2.68	0.57	
Department				
AE	29	2.83	0.46	p=0.189
CCU	15	2.80	0.41	

Female Ward	15	2.67	0.48	
ICU	10	2.20	0.78	
Isolation 1	7	3.00	0.00	
Isolation 2	2	3.00	0.00	
LR	10	2.60	0.69	
Male Ward	5	2.40	0.89	
Nursing Office	10	2.70	0.48	
OPD	9	2.56	0.52	
OT	10	2.70	0.48	
PW&MAT Ward	14	2.57	0.64	
SCBU	11	2.45	0.82	
Position				
In Patient Care Nurse	6	2.50	0.54	p=0.611
OPD. Nurse	6	2.83	0.40	
Registered Nurse	135	2.66	0.58	
Total	147	2.66	0.57	

Note. * p<0.05. **p<0.01, n indicates the frequencies, M indicates the mean, and SD indicates the Standard Deviation. Scores range from 1 (Disagree) to 3 (Agree).

Table 6-c

Effectiveness of the handoff system: perception of adverse events reduction.

Q25: Adverse events are reduced due to the implementation of the handoff system				
Characteristic	**n**	**M**	**SD**	**p-Value**
Age Category	13	2.54	0.66	
20-30 years	65	2.60	0.55	
30-40 years	69	2.74	0.50	p=0.234
40-50 years	147	2.66	0.54	
Gender				
Males	16	2.56	0.51	
Females	131	2.67	0.54	p=0.449
Educational level				
BScN	83	2.54	0.59	
MSN.	10	2.90	0.31	p=0.009**
Nursing Diploma	54	2.80	0.45	
Working Years				
<1 year	22	2.55	0.51	
1-3 year	9	2.22	0.83	
3-5 years	5	2.60	0.54	p=0.0.39*
>5 years	111	2.72	0.50	
Department				
AE	29	2.69	0.47	
CCU	15	2.67	0.61	
Female Ward	15	2.73	0.45	
ICU	10	2.40	0.69	
Isolation 1	7	2.86	0.37	
Isolation 2	2	2.00	0.00	
LR	10	2.80	0.42	p=0.074
Male Ward	5	2.40	0.89	
Nursing Office	10	2.60	0.51	
OPD	9	2.56	0.52	
OT	10	3.00	0.00	
PW&MAT Ward	14	2.36	0.74	
SCBU	11	2.91	0.30	
Position				
In Patient Care Nurse	6	2.33	0.81	
OPD. Nurse	6	2.67	0.51	p=0.324
Registered Nurse	135	2.67	0.53	
Total	147	2.66	0.54	

Note. * p<0.05. **p<0.01 n indicates the frequencies, M indicates the mean and SD indicates the Standard Deviation. Scores range from 1 (No), 2 (Maybe), and 3 (Yes).

The last evaluation assessed whether the nurses perceived that the available system needed further improvement, whereby 54.42% of the respondents agreed that it required further amelioration, and 45.58% disagreed (Figure 4). This perception was significantly affected bythe gender of the participants, and their working years at Kalba, as seen from the cross- tabulation of this perception with the independent variables. 81.3% of males and 51.6% of females agreed that the system needed improvement, p=0.022. Moreover, of those working at Kalba for less than 1 year, only 36.4% agreed that the system needs improvement, compared to higher values in the other categories, p=0.025 (Table 7).

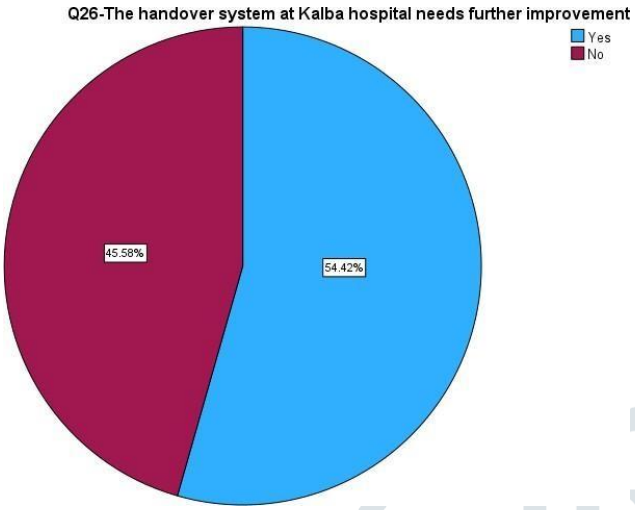

Figure 4: Participants' perceptions about the need to improve the handoff system at KalbaHospital.

Table 7

Effect of the nurse's characteristics on their perception of handoff improvement at Kalba.

Q26: The handover system at Kalba hospital needs further improvement					
Characteristic	**Yes**		**No**		**p-value**
	n	**%**	**n**	**%**	
Age					
20-30 years	5	6.3%	8	11.9%	
30-40 years	41	51.3%	24	35.8%	p=0.133
40-50 years	34	42.5%	35	52.2%	
Gender					
Male	13	16.3%	3	4.5%	
Female	67	83.8%	64	95.5%	p=0.022*
Department					
AE	15	18.8%	14	20.9%	
CCU	8	10.0%	7	10.4%	
Female Ward	8	10.0%	7	10.4%	
ICU	7	8.8%	3	4.5%	
Isolation 1	1	1.3%	6	9.0%	
Isolation 2	0	0.0%	2	3.0%	
LR.	5	6.3%	5	7.5%	p=0.315
Male Ward	5	6.3%	0	0.0%	
Nursing Office	6	7.5%	4	6.0%	
OPD	5	6.3%	4	6.0%	
OT.	7	8.8%	3	4.5%	
PW&MAT Ward	8	10.0%	6	9.0%	
SCBU	5	6.3%	6	9.0%	
Working Years					
<1 year	8	10.0%	14	20.9%	
1-3 years	7	8.8%	2	3.0%	
3-5 years	5	6.3%	0	0.0%	p=0.028*
>5 years	60	75.0%	51	76.1%	
Position					
In Patient Care Nurse	5	6.3%	1	1.5%	
OPD. Nurse	4	5.0%	2	3.0%	p=0.270
Registered Nurse	71	88.8%	64	95.5%	

Note. * $p<0.05$, n indicates the frequencies, and % indicates the percentage.

Discussion

The findings of this research indicated that nurses at Kalba Hospital presented elevatedlevels of adherence to the handoff

tool. The vast majority of nurses (99.3%) reported revising online documentation and abiding by the SBAR format. The findings also shed light on the communication patterns at Kalba hospital, specifically in the case of undesirable events, whereby the majority of the nurses were committed to filling OVR, were updated with all errors occurring in the department, and discussed corrective and preventive measures which reflect an effective communication and a culture of safety among nurses. However, it was noted that a small proportion of nurses (17.7%) were not encouraged to speak in case of undesired events, specifically in 4 departments, the CCU, Female ward, PW&MAT, and ICU.

Moreover, the study assessed management policies and actions toward fostering effective handoff processes. Importantly, all nurses at Kalba prioritized patient safety, and 99.3% had handoff effectiveness as a priority, reflecting the organization's safety culture. Moreover, audits were frequently done, as reported by the vast majority of nurses, and training was performed for employees to use the handoff properly. This is concordant with a recent study focusing on the importance of continuous training and audits in implementing and sustaining an effective handoff process(15).

However, our study revealed that experienced staff with more than 5 years at Kalba tend to agree that proper training is administered to new staff; this perception was different in less skilled employees. Notably, the training is directed at the new employees. Thus, their perception of the training they receive is crucial. Indeed, a study by Weingart et al. showed that newly employed nurses with insufficient training are prone to handoff failures, adverse events, decreased job satisfaction, and burnout (16).

The present study highlights the main barriers Kalba nurses encounter during handoff. The electronic system was perceived as appropriate for the handoff by 80.3% of the nurses, and a proportion of participants reported issues with this electronic system. These concerns were mainly observed in the ICU, nursing office, and OPD. Other commonly encountered barriers during handoff were predominantly Interruptions followed by neighbouring percentages for the other barriers: high workload, insufficient time, and noise. This is in accordance with a study conducted by Spooner et al. demonstrating that interruptions frequently occur and lead to miscommunication of information during handover (17)

Chiefly, the study investigated the perceived effectiveness of the nurse's handoff tool, whereby overall elevated efficacy was obtained among nurses at Kalba. Most of the nurses agreed that implementing the handover system led to a change in handover quality, improved patient satisfaction, and reduced adverse events. The perceived effectiveness of the handover system was affected by the respondents' age, educational level, and working years.

These results align with previous studies exploring the factors influencing nurses' satisfaction with the quality of handover systems(18, 19).

Limitations

This study had some limitations. First, it was conducted in a single setting (only at Kalba hospital); thus, the results could not be fully generalized to other hospitals in the UAE. Moreover, the effectiveness of the handoff tool was explored using a few variables. Thus other factors contributing to handoff effectiveness need to be investigated in future studies.

Conclusion

Collectively, this study demonstrated that nurses at Kalba hospital have high levels of adherence to the handoff system; they efficiently communicate in an environment fostered by a safety culture. They perceive the handoff system as effectively inducing changes in the handoff quality, patient satisfaction, and adverse event occurrence. Moreover, the main barriers encountered during this process were highlighted, with interruptions being the most frequently reported problem. This study sheds light on the need to provide continuous training to employees, specifically for new employees, and focus on the troubleshoots encountered in electronic system usage.

The results of this study will serve as a baseline for the management to act upon, resolve the identified challenges, and thus upgrade the handoff system at Kalba hospital and, eventually, patient safety, and nurses job satisfaction.

Acknowledgements

The author acknowledges the invaluable support of Kalba Hospital staff and unit managers. This project would not have reached completion if not for their great motivation.

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