RESEARCH ARTICLE

Patients and family members perspectives on the use of bedside whiteboards and its implication to treatment outcomes and patient satisfaction: A pilot survey in general and tertiary hospitals in Makkah, Saudi Arabia [version 1; peer review: peer review discontinued]

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Abstract

Background: Effective communication between the members of the healthcare team and the patient and families are essential components for patient-centered care. It improves patient outcomes. Likewise, poor communication between healthcare team members and the patient and families is associated with poor patient outcomes. Due to several communication challenges, the use of visual tools such as bedside whiteboards to enhance communication has been widely implemented; however, the exact benefit of its use from the patient perspective is still understudied. Thus, this study aims to determine the impact of bedside whiteboard use in facilitating patient's involvement in achieving the day's goal, adherence to pain medication schedule and use, tests, and procedures schedule, patients and family engagement with the healthcare team, and discharge planning.

Methods: This study is a descriptive cross-sectional study conducted among 335 patients and/or family members admitted in six hospitals in Makkah city: Al Noor hospital, Hera hospital, King Abdul-Aziz hospital, King Abdullah Medical City, King Faisal specialist hospital, and Maternity and Children hospital. The survey questionnaire used was adapted from previous studies and revalidated to ensure its suitability to the study subjects. Data collection was performed from August 1 to 31, 2020, and data analysis was done with SPSS software.

Results: Of the 335 participants, the majority were satisfied with bedside whiteboards for their use (4.36), and they recommended it to be used in hospitals because they perceived that through this medium of communication, their connection with the healthcare team would

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be easier (4.35). In regression analysis, the day's goal and patient and/or family engagement are found to be significant predictors of patient satisfaction.

Conclusions: Whiteboards are a valuable tool to help patients achieve their daily goals and improve their engagement with the healthcare team, impacting patient satisfaction.

Keywords

Whiteboards, patient perspective, family perspective, effective communication, treatment outcome, patient satisfaction

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Introduction

Effective communication is vital in providing patient-centered care. Studies show that poor communication between healthcare providers and patients and their families affects patient outcomes and satisfaction (McCabe, 2004; Amoah *et al.*, 2019; Anoosheh *et al.*, 2009; Vuković *et al.*, 2010; Kwame & Petrucka, 2021). Several factors might contribute to the poor communication between the healthcare team members and patients and their family members, including but not limited to patients' medical condition, anxiety, pain, medication, and level of comprehension or misunderstanding. In addition, the health providers use technical jargon or medical/clinical language to patients, insufficient explanations given to patients, and lack of details or inaccurate instructions related to patients related to time constraints and competing demands faced by health providers (Ali, 2017). As a result, patients misunderstand their illness or the treatments that are being recommended that impacts patient outcomes. Due to the numerous communication challenges, visual tools such as bedside whiteboards to enhance communication have been widely implemented (Tan *et al.*, 2013; Sehgal *et al.*, 2010; Goyal *et al.*, 2017). However, the exact utility of its use from the patient perspective is still understudied. Although various studies have examined different aspects related to bedside whiteboard use and patient satisfaction (Singh *et al.*, 2011; Tse *et al.*, 2014; Gonzalez-Shalaby, 2016; Goyal *et al.*, 2017), evidence of the use of bedside whiteboards (WB) in facilitating effective involvement of the patient in various aspects of care and related decision-making process is also lacking. Thus, this study aims to determine the impact of bedside whiteboard use in facilitating patient's involvement in achieving the goal for the day, adherence to the pain medication schedule and use, scheduled tests and procedures, engagement of patients and family with the health care team, and discharge plan of care. Through this initial pilot survey, recommendations about bedside whiteboard use in hospitals in Saudi Arabia can be drawn. Its implementation may improve the quality of communication between health providers and patients and their families and increase patient satisfaction.

Research aims and objectives

This study aims to determine the perspectives of patients and family members on the use of bedside whiteboards and its implication to their decision-making and active involvement in treatment. Specifically, the objective of this study is to examine the use of bedside whiteboards and its implications to the following:

1. Achieving the patients' goal of the day,
2. Adherence to the pain medication schedule,
3. Adherence to the scheduled tests and procedures,
4. To enhance engagement of patients and family with the health care team, and
5. Involvement in the discharge plan of care.

This study also assesses the views of patients and relatives on using bedside whiteboards would meet patients' needs and satisfaction to treatment.

The results of this study will serve as a basis for the implementation of bedside whiteboards and be included in individual patient care management. In addition, the use of bedside whiteboards will bridge the communication gap between patients and family members and the healthcare team, which is critically important for patients' optimal care.

Research hypothesis

1. There is a positive correlation between the goal of the day and patient and/or family members' satisfaction.
2. There is a positive correlation between the pain medication schedule and patient and/or family satisfaction.
3. There is a positive correlation between the engagement of the patient and/or family members by raising their concerns or question to the healthcare team members and patient and/or family satisfaction.
4. There is a positive correlation between the discharge date and patient and/or family satisfaction.
5. There is a positive correlation between the scheduled test/procedure and patient and/or family satisfaction.

Methods

Variables

Dependent variable

The dependent variable of this study is the patient and/or family's perceived satisfaction with the use of bedside whiteboards in the implementation of patient treatment plans and achieving patient desired outcomes. In addition, its effectiveness is gauged by improvement in the communication between health providers and patients and their family members and facilitating patient involvement in the care management.

Independent variables

1. Patient goal of the day. This is to inform the patient and/or family members about the daily goals through the use of a bedside whiteboard. They will be asked whether writing the patient's daily goal on the bedside whiteboard will improve communication of the treatment plan between the health provider and patient and the family member. Thus, the efficiency of adherence to it increases.
2. Pain medication schedule. It lets the patient and/or family members know the next pain medication time to be given to the patient. The study measured the pain medication schedule by asking the patient and/or family members if the healthcare team communicates effectively by writing the pain medication schedule on the whiteboard.
3. Patient and/or family members' engagement by raising their concerns or question. It is to let the patient and/or family members share any question to health care team members on the whiteboard, and healthcare team members will answer it. The study measured the engagement of the patient and/or family members by asking the patient and/or family members if healthcare team members have effective communication by answering the patient's question on the whiteboard.
4. Discharge date. It lets the patient and/or family members know about the patient's discharge date ahead of time. The study measured the discharge date by asking the patient and/or family members if healthcare team members communicate effectively by writing the discharge date ahead of time on the whiteboard.
5. Schedule test/procedure. It is to let the patient and/or family members know about the test/procedure plan for the patient ahead of time. The study measured the scheduled test/procedure by asking the patient and/or family members if healthcare team members communicate effectively by writing the scheduled test/procedure ahead of time on the whiteboard.

Ethical approval and consent to participate

The study has been the subject of expedited review by King Abdullah Medical City Institutional Review Board registered at the National Biomedical Ethics Committee, King Abdulaziz City for Science and Technology, with IRB no: 18-490 approved on December 01, 2020, with Registration no. H-02-K-001. All patients and relatives who agreed to participate in the online survey, filled and submitted the survey questionnaire, were accepted as implied consent. All data entered into Microsoft Excel® and SPSS was coded and rendered anonymous as to patient identity. All collected information relative to the patient's identity is confidential.

Study design

The method type applied in this study is quantitative. The cross-sectional technique was designed to collect information about the perspectives of patients and their relatives about the use of bedside whiteboards and how this would impact their involvement in care management in terms of achieving patient's daily goals, adherence to scheduled pain medication, adherence to scheduled laboratory tests and procedures, engagements with the healthcare team, involvement in the discharge plan of care and satisfaction.

Study population and sample

The intended study population was patients admitted in six general hospitals in Makkah City. It includes Al Noor Hospital, Hera Hospital, King Abdul-Aziz Hospital, King Abdullah Medical City, King Faisal Specialist Hospital, and Maternity and Children Hospital. The sample size estimation was based on the total number of patients admitted equivalent to the total number of beds ($n = 1378$) in all general hospitals in Makkah City (Ministry of Health, 2018).

The sample size was calculated using the [Raosoft sample size calculator](#) based on a 5% margin of error, 95% confidence level, and 50% response distribution in a population of approximately 1378 patients, which led to the inclusion of 335 participants in the study. Patients and relatives with the age of 18 years and above, male or female, Saudi or non-Saudi, with hospital stay of at least three days, participated voluntarily were included in this study. However, patients with age less than 18 years, newly admitted or with hospital stay of less than three days, admitted in critical areas such as Intensive Care Units, Critical Care Units, and Emergency Units were excluded from this study.

Study tools

The questionnaire used in this study to assess patient and family members' perspectives on the use of bedside whiteboards and how it would impact their involvement in care management consisted of six parts with 45 items. It includes questions on achieving patients' goal of the day (9 items), pain medication schedule (8 items), schedule of test and procedures (8 items), patient and family engagement (8 items), discharge date (7 items) and satisfaction (8 items). All items in the questionnaire were adapted from previous studies ([Karn, 2016](#); [Sehgal et al., 2010](#); [Shalaby 2016](#); [Singh et al., 2011](#); [Tan et al., 2013](#)). The questionnaire was developed in both English and Arabic language. The adopted English version items in the questionnaire were translated into Arabic and back to English by experts in both languages to assure consistency. The developed questionnaire's face and content validity was checked through iterative feedback from expert health practitioners and administrators (i.e., 2 Physicians, 2 Nurses, and 2 Health Administrators).

Moreover, all items were assessed on a five-point Likert scale ranging from "strongly agree," "Agree," "Uncertain," "Disagree," and "Strongly Disagree." The finalized questionnaire was pilot tested on eight samples and obtained a Cronbach alpha of 0.56 for goal for the day (moderate reliability) and 0.701 to 0.949 for other scales (high reliability) (see [Table 1](#) below). Demographic data were also collected at baseline. A copy of the questionnaire can be found in the [Extended data](#).

Data collection and management

The sample size is 335 with a confidence level of 95% and a confidence interval of 5%. The survey questionnaire was distributed online through [Survey Monkey](#) for four weeks, from August 1, 2020, to August 31, 2020. Patients were asked to complete the questionnaire, and the collected data underwent analysis using SPSS, which looked for alpha P-value >0.05. Respondents who did not meet the inclusion criteria and with incomplete responses in the questionnaire were excluded during data entry.

In cross-sectional studies, nonresponse bias is expected. To address potential bias, the researcher designed a well-structured survey to ensure sufficient completion rates; keep surveys short, lasting less than 10 minutes. In addition, ensure the respondents know that any information given is entirely confidential or anonymous. The more sensitive the questions, the more important this factor can be.

Statistical analysis

All data were entered and analyzed using SPSS version 24.0 for Windows (SPSS, Chicago, Illinois, USA). Descriptive statistics, including mean, median, mode, standard deviation, variance, and percentile, were used to obtain summative results for continuous variables (i.e., on all the items and the individual items) and frequencies and percentages for categorical variables (i.e., demographic variables). In addition, Pearson correlation was used to determine associations between the dependent variable (i.e., satisfaction) to independent variables (i.e., goal of the day, pain medication

Table 1. The questionnaire reliability test results (n = 8).

Scale name	Mean scale score	Standard deviation	Variance	Min-max	Cronbach's alpha
Goal of the day	1.48	.39	.154	(1-2)	.560
Pain medication schedule	1.64	.51	.270	(1-2.25)	.884
Patient and/or family engagement	1.46	.40	.164	(1-2)	.746
Discharge date	1.26	.39	.160	(1-2)	.941
Schedule test and procedure	1.57	.59	.357	(1-2.25)	.949
Satisfaction	1.66	.48	.233	(1-2.29)	.701
Total	69.8	17.18	295.2	(48-95)	.944

schedule, schedule of test and procedures, patient and family engagement, and discharge date). Statistical significance for all analyses was set at $p < 0.05$.

Results

The findings presented in [Table 2](#) indicate that mean score for the Goal of Day scale was 34.61 (Standard deviation (SD) = 4.59), pain (mean = 34.54, SD = 4.68), patient and/or family engagement (mean = 34.19, SD = 4.69), Discharge date (mean = 29.89, SD = 4.26), Schedule test procedure (mean = 34.74, SD = 4.45), and Satisfaction (mean = 30.08, SD = 4.17) (See [Table 2](#) and [Figures 1–5](#)).

Participants in the study were 335 selected from six hospitals. Males accounted for 50.1 %. Saudi nationals made up 86 % of the participants. The majority (56.7 %) were aged between 31 to 50 years. [Table 3](#) also indicates that the majority of the participants (54.3 %) had an undergraduate education level. All patients were admitted for a period of more than three days. A high proportion of the participants were from the general surgery (20.9 %) and internal medicine ward (29 %).

The findings presented in [Table 4](#) show that the mean scores for each question item ranged between 4.12 (SD = 0.862) and 4.44 (SD = 0.644). The median score was four for all the question items except for questions 21, 35, 36 that had a median score of five.

Regression analysis was carried out to evaluate how the goal of the day, pain, patient and/or family engagement, discharge date, and scheduled test procedure predict satisfaction. As shown by the r-squared value, the developed regression model made up of the five independent variables predicted a 61.9 % variation in satisfaction. The statistically significant F-value of 106.9 ($p = 0.00$) indicates that the model fits the data well. The findings shown in [Table 5](#) indicate

Table 2. Statistics for the measurement scales.

Scale name	Mean scale score	Standard deviation	Variance	Min-max
Goal of day	34.61	4.59	21.14	(15-40)
Pain	34.54	4.68	21.99	(18-40)
Patient and/or family engagement	34.19	4.69	22.05	(18-40)
Discharge date	29.89	4.26	18.19	(15-35)
Schedule test/procedure	34.74	4.45	19.80	(22-40)
Satisfaction	30.08	4.17	17.39	(17-35)
Total	198.07	23.11	534.48	(134-230)

Figure 1. Frequency distribution for the goal of day responses.

Figure 2. Frequency distribution for the pain medical schedule responses.

Figure 3. Frequency distribution for the discharge date responses.

Figure 4. Frequency distribution for the schedule test procedure responses.

Figure 5. Frequency distribution for the patient satisfaction responses.

Table 3. Sociodemographic characteristics of responses.

Variables	Participants (n=335)
Gender	
1. Male	168 (50.1%)
2. Female	167 (49.9%)
Nationality	
1. Saudi	288 (86%)
2. Non-Saudi	47 (14%)
Age	
1. 18-30	92 (27.5%)
2. 31-50	190 (56.7%)
3. >50	53 (15.8%)
Education Level	
1. High school or less	36 (10.7%)
2. Diploma	40 (11.9%)
3. Undergraduate	182 (54.3%)
4. Postgraduate	77 (23%)
Type of PT	
1. Patient	105 (31.3%)
2. Family member	230 (68.7%)
Accompanying patient during admitted in the hospital	
1. Yes	164 (49%)
Name of Hospital	
1. King Abdullah medical city	176 (52.5%)
2. Al Noor hospital	78 (23.3%)
3. Hera hospital	33 (9.9%)
4. King Abdul-Aziz hospital	16 (4.8%)
5. King Faisal hospital	13 (3.9%)
6. Maternity and children hospital	19 (5.7%)

Table 3. *Continued*

Variables	Participants (n=335)
Ward of admitting	
1. Internal Medicine Ward	97 (29%)
2. Cardiac Ward	48 (14.3%)
3. Cardiac Surgery Ward	18 (5.4%)
4. Neurology Ward	21 (6.3%)
5. Neurosurgery Ward	15 (4.5%)
6. Oncology Ward	35 (10.4%)
7. Hematology Ward	10 (3%)
8. General Surgery	70 (20.9%)
9. Pediatric	15 (4.5%)
10. Maternity	6 (1.8%)

Table 4. Participants level of agreement to five elements.

Item No.	Variables	Mean	Median	SD
	Patient goals of the day			
1	If my goals will be written on the bedside whiteboard, it will be easy to monitor them and commit to healing.	4.28	4	.750
2	The healthcare team should develop clear and achieve patient goals and write them on my health board.	4.26	4	.804
3	The health care team will improve communication with their patients and help them achieve their goals if they use my health board.	4.31	4	.722
4	Patient goals will be easy to implement and track if they are outlined in my health board.	4.35	4	.738
5	My health board will ensure that there are no patient goals ignored and all goals have been considered during the healing process.	4.27	4	.722
6	I think that communication about patient goals of the day will be smooth when using my health board features.	4.25	4	.813
7	Writing beside speaking rather than speaking alone, would be a better measure to let the patients and family members know the goal of the day.	4.36	5	.765
8	I think your engagement in the goal for the day helps in reducing hospital readmission rate.	4.39	4	.661
	Pain medication schedule			
9	Writing pain medication schedule on my health board will enhance compliance.	4.42	4	.647
10	I will prefer experience of using my health board in managing my pain.	4.32	4	.727
11	It will be easy to follow if the healthcare team effectively write the pain medication schedule on my health board.	4.30	4	.747
12	My health board will be helpful in administering the pain medication.	4.33	4	.737
13	When my health board is implemented, I will be able to communicate with the nurses about my pains to help with pain management.	4.26	4	.758
14	Patient satisfaction is affected by how effectively the pain medication schedule is communicated to the patient and family members.	4.39	4	.682
15	Writing as way communicating the pain medication schedule to patient will be better than verbal communication.	4.21	4	.807
16	My health board will be a good platform to let the patients be aware of their pain medication schedule.	4.36	4	.741

Table 4. *Continued*

Item No.	Variables	Mean	Median	SD
Patient and/or family member engagement				
17	Frequent addressing of the concerns and issues of the patients and their family members increases patient satisfaction.	4.34	4	.772
18	Patient satisfaction increases with high engagement of health care members in answering the concerns of patient and/or family members.	4.32	4	.728
19	I believe that there are some other things that the patient/family might like to say or share to emphasize their desire for information to treatment, and it could be observed better if they were outlined on my health board.	4.33	4	.697
20	I think that having a patient and/or family member space in my health board to communicate with the treatment team will help raise a patient concern.	4.35	4	.696
21	I think having a patient and/or family member space in my health board will improve on nurse's quality care to the patients.	4.41	5	.664
22	I think the concerns about patient/family engagement in my health board space will be addressed immediately to allow for effective collaboration.	4.33	4	.715
23	Writing as mode of communication and answering concerns of patients and/or family members would be better than verbal communication.	4.29	4	.728
24	Answering patient's concern by writing on the whiteboard can be a practical solution to address the concerns effectively.	4.29	4	.756
Estimated date of discharge				
25	I think that writing the expected date of discharge on my health board will contribute to avoiding increasing the number of unnecessary hospital stay days.	4.20	4	.799
26	The discharge date should be made available when the patient starts making positive improvements.	4.13	4	.847
27	My health board will be effective in understanding the reason of the change in discharge date when is decide by the doctor.	4.12	4	.862
28	I think writing the patient discharge date on my health board will motivate the patients to stick on their medication schedule and treatment plans?	4.28	4	.801
29	I think that writing the expected date of discharge from the hospital on my health board contributes to speeding up activities and providing the necessary supplies to leave the scheduled date.	4.31	4	.726
30	Written mode of communication is better than verbal communication in regard to letting know the patient and/or family members about the discharge date.	4.29	4	.719
31	Presenting discharge date ahead of time by writing on my health board is adequate and effective for patients and/or family to be made aware of.	4.32	4	.759
Scheduled test/procedure				
32	I think that writing the work times of the tests or x-rays on health board helps to communicate between members of the treatment team at the appropriate time for the procedure.	4.30	4	.724
33	The patients need to know their test procedures time so that they can prepare for the processes and aid in achieving success.	4.14	4	.839
34	Change on the test procedures schedule will be communicated right on time to allow for reorganization and proper planning if written in my health board.	4.25	4	.723
35	The healthcare team should plan any medical intervention through outlining the time on my health board.	4.43	5	.639
36	I think writing the test procedures on my health board will increase collaboration between patients and the treatment team at individual levels.	4.44	5	.644
37	It is important for patients to know about their scheduled tests/ procedures significantly ahead of time.	4.37	4	.657

Table 4. *Continued*

Item No.	Variables	Mean	Median	SD
38	Scheduled procedures can be better communicated in writing rather than verbal communication.	4.26	4	.750
39	Patients can be made aware of the scheduled test ahead of time by writing on my health board.	4.31	4	.709
	Patient and/or family satisfaction			
40	I think the health board makes it easier to communicate with the treatment team	4.35	4	.679
41	I will be more satisfied if the healthcare team responses would be done through a bedside white board.	4.23	4	.768
42	I will be generally satisfied if the health care team will present information on the bedside whiteboard.	4.36	4	.636
43	I think the information on my health board will increase my experience and satisfaction.	4.31	4	.709
44	I find the information on the health board is useful.	4.35	4	.679
45	I recommend using the health board to your family and friends.	4.23	4	.768
46	I recommend using the health board in the hospitals.	4.36	4	.636

Table 5. Regression results.

Dependent variable	Independent variables	R	R ²	F value	F sig.	B	t	Sig	VIF
Satisfaction	Goal of day	.787	.619	106.9	.000	.428	8.09	.000	2.93
	Pain					.008	.160	.873	2.78
	Patient and/or family engagement					.337	6.75	.000	2.72
	Discharge date					.019	.316	.752	3.21
	Scheduled test procedure					-.029	-.543	.588	2.86

that except for patient and/or family engagement and the goal of the day, the other predictor variables had no statistically significant relationship with satisfaction. For the goal of the day, the findings indicate that a unit increase in the goal of day results in a 0.428 increase in satisfaction ($p = 0.00$). Regarding patient and/or family engagement, the findings indicate that a unit increase in patient and/or family engagement results in a statistically significant increase in satisfaction by 0.337 units ($p = 0.00$).

Findings presented in **Table 6** indicates the outcome of the Pearson correlation between study variables. **Table 6** indicates that satisfaction had a statistically significant and strong positive correlation with the goal of the day ($r = 0.741$, $p < 0.005$), pain ($r = 0.602$, $p < 0.005$), patient and/or family engagement ($r = 0.713$, $p < 0.005$), discharge date ($r = 0.607$, $p < 0.005$), and schedule test procedure ($r = 0.574$, $p < 0.005$). The goal of the day had a statistically significant and strong positive correlation with pain ($r = 0.746$, $p < 0.005$), family engagement ($r = 0.711$, $p < 0.005$), discharge date ($r = 0.695$, $p < 0.005$), and schedule test procedure ($r = 0.681$, $p < 0.005$). Pain had a statistically significant and strong positive correlation with patient and/or family engagement ($r = 0.657$, $p < 0.005$), discharge date ($r = 0.705$, $p < 0.005$), and schedule test procedure ($r = 0.688$, $p < 0.005$). Patient and/or family engagement had a statistically significant and strong positive correlation with discharge date ($r = 0.732$, $p < 0.005$), and schedule test procedure ($r = 0.694$, $p < 0.005$). Discharge date had a statistically significant and strong positive correlation with scheduled test procedure ($r = 0.760$, $p < 0.005$).

Friedman test was used to assess if there was difference in the patient satisfaction associated with the different elements of whiteboard including the goal of the day, pain, patient and/or family engagement, discharge date, scheduled test procedure (**Table 7**). Patient satisfaction was statistically significantly different for patient and/or family engagement

Table 6. Correlation.

Variables	Satisfaction	Goal of day	Pain	Patient and/or family engagement	Discharge date	Scheduled test procedure
Satisfaction	1	.741	.602	.713	.607	.574
Significance (2-tailed)		.000	.000	.000	.000	.000
Goal of the day	.741	1	.746	.711	.695	.681
Significance (2-tailed)	.000		.000	.000	.000	.000
Pain	.602	.746	1	.657	.705	.688
Significance (2-tailed)	.000	.000		.000	.000	.000
Patient and/or family engagement	.713	.711	.657	1	.732	.694
Significance (2-tailed)	.000	.000	.000		.000	.000
Discharge date	.607	.695	.705	.732	1	.760
Significance (2-tailed)	.000	.000	.000	.000		.000
Scheduled test/ procedure	.574	.681	.688	.694	.760	1
Significance (2-tailed)	.000	.000	.000	.000	.000	

Table 7. Non-parametric test (Friedman).

Variables	Mean rank	Sig
Goal of day	4.41	.000
Pain	4.33	.000
Patient and/or family engagement	4.20	.000
Discharge date	1.75	.000
Scheduled test procedure	4.45	.000
Satisfaction	1.86	.000

showed (mean rank = 4.20, $p = 0.000$), goal of the day (mean rank = 4.41, $p = 0.000$), pain (mean rank = 4.33, $p = 0.000$), discharge date (mean rank = 1.75, $p = 0.000$), and scheduled test procedure (mean rank = 4.45, $p = 0.000$).

Discussion

The findings of this study show that patients and/or family members perceived bedside whiteboards as a useful tool to improve communication with the healthcare team member and essential to delivering the treatment plan effectively.

In terms of patient and/or family member engagement with the treatment plan, the study findings showed that bedside whiteboards could help to improve the quality of nursing care, and the patient and/or family member can communicate their concerns and issues with the healthcare team effectively and thus increases patient satisfaction to care. A systematic mixed-method review conducted by Tobiano *et al.* (2018) noted that bedside whiteboards help encourage patients to contribute to their plan of care for the upcoming shift or discharge, which is essential in enabling patients' participation in the plan of care. Several studies also reported that bedside whiteboards are useful to improve patient's knowledge, involvement in decision making and help to increase the satisfaction with the communication to the hospital staff such as nurses and physicians (Pimentel *et al.*, 2018; Singh *et al.*, 2011; Goyal *et al.*, 2019). This medium of communication also reported that nurses' adherence to interventions such as pain-management-related interventions increases (Alaloul *et al.*, 2015). In addition, the study conducted by Sherman and Hilton (2014) indicated that an increase in patients and/or family engagement had a better impact on the clinical and patient outcomes, thus increasing patients' satisfaction. Our study findings indicate that bedside whiteboards provide a great opportunity for patients and/or family members to share their concerns and issues with the health providers, enabling them to engage in the care plan, thus impacting the quality of care and patient satisfaction.

The use of bedside whiteboards was perceived to increase patient awareness and compliance to the pain medication schedule, impacting patients' satisfaction, as revealed in this study. This is in concordance with the study of [Alaloul *et al.* \(2015\)](#), which noted that bedside whiteboard use would increase adherence to patients' pain management-related intervention. The use of this medium allows documenting patient up-to-date pain scores, pain medication schedules, pain management options, and pain goals. The authors found that the Hospital Consumer Assessment of Healthcare Providers and Systems (HCAHP) score related to patient satisfaction with pain management improved after intervention implementation. In the study of [Dearmon *et al.* \(2013\)](#), whiteboards were considered an exceptional innovation that could improve patients' outcomes. For instance, recording pain medication schedules in bedside whiteboards received positive feedback from patients and family members. Our study findings suggest that bedside whiteboards could help patients and family members adhere to pain medication and other related pain management.

Our study also found that bedside whiteboards increase collaboration between patients and the treatment team regarding scheduled tests/procedures. Patients and family members confer the importance of having a plan and schedule ahead of time to help them be aware of the scheduled tests/procedures to be performed. In the study of [Goyal *et al.* \(2019\)](#), both nurses and patients identified upcoming tests/procedures as important information to have on the whiteboard. However, the use of whiteboards may not be as equally useful for some patients who are unable to move due to their medical conditions. Therefore, it is suggested to enhance presentations of information to whiteboards by improving easy access/view, encouraging physicians' daily use, and avoiding medical jargon. Although there is a lack of literature about the impact of bedside whiteboard use in the communication of the scheduled test and procedure to patients, several literatures indicate that effective collaboration between the patients, family, and the health care team is indeed important to ensure that the patient sufficient information and the awareness on the scheduled test and procedures to make the decision and for the health care team to execute the scheduled test and procedures effectively ([Brandenburg *et al.*, 2015](#); [Kendall *et al.*, 2015](#)). Although this study supports the conclusions made by [Parker and Mowry \(2015\)](#) that the use of whiteboards for scheduled test procedures is associated with patient satisfaction, the study noted in regression analysis that the latter did not predict satisfaction.

Another finding of this study shows that patients and family members perceived the bedside whiteboard use encourages engagement in the goal of the day and helps in reducing readmission rate. Also, the communication between patients, their families, and the health care team will be improved, which will help them achieve their daily goals. Evidence suggests that documenting patients' goals of the day on the bedside whiteboard enhances patients' engagement in the treatment process ([Burk, 2016](#); [Ofori-Atta, 2015](#)). [Meneffee \(2014\)](#) noted that determining the patient goal of the day (GFD) and aligning the team's goals with the patient goal of the day increases patient satisfaction and patient engagement and reduces the rate of readmission. However, [Hesselink *et al.* \(2014\)](#) found that poor information exchange, poor coordination of care, and poor communication between hospital and primary care providers, and between care providers and patients during endorsement lead to patient readmissions. [Dunn \(2017\)](#) also noted that obtaining the patient goal of the day at the bedside by asking the patient what their goals were and what they needed to accomplish in the given day enhanced patient engagement and positively influenced patient satisfaction. Thus, this activity is proposed to be prioritized in setting and addressing the patient's treatment plan and meeting the goals of the day ([Burk, 2016](#); [Ofori-Atta, 2015](#)). This study also supports the conclusions made by previous researchers regarding the positive influence that goal of the day has on patient satisfaction ([Frazee, 2011](#); [Ofori-Atta *et al.*, 2015](#); [Dunn, 2017](#)). However, the outcome of this study is significant since it focused on how the use of whiteboards for the patient goal of the day influenced patient satisfaction.

Patients and their families perceived bedside whiteboards as an effective tool to improve their awareness about the scheduled discharge date. This will help speed up activities and provide the necessary supplies to leave the scheduled discharge date. [Iversen *et al.* \(2014\)](#) argued that identifying the expected date of discharge and communicating it to the patients increases the chance of no delays in accomplishing activities required for discharge, which results in no unnecessary prolonging of the length of hospital stay. [Hesselink *et al.* \(2012\)](#) carried out a study that focused on whether patients are discharged with care. The researchers concluded that the involvement of the patients and their families in preparation for discharge is important in ensuring that the patient's needs are met. [Hesselink *et al.* \(2012\)](#) noted that the patients' satisfaction with the discharge process is influenced by the level of involvement in the planning phase and whether their capabilities, needs, and preferences are taken into consideration in deciding the discharge date associated activities.

Furthermore, the findings of this study provide insights into how the use of whiteboards influences patients' and their family members' satisfaction. According to the study, satisfaction is strongly positively correlated with the five elements of whiteboards, which suggests that an increase in any of the five elements is associated with an increase in satisfaction. However, in terms of their ability to predict satisfaction, this study noted that of the five elements of the whiteboard, goal

of the day, and patient and/or family engagement significantly predict satisfaction, with an increase in any of the two elements resulting in a subsequent increase in satisfaction.

Strength and limitations

The study was conducted in six general and tertiary hospitals in Saudi Arabia, which increases the generalizability of the findings. The required sample size was achieved to generate valid and credible results. The questionnaire was validated prior to data collection and obtained a high-reliability index. This study is unique and has never been studied in Saudi Arabia. The results pertaining to five variables used in this study reflect the importance of proper communication and collaboration between patients and/or family members to the healthcare team, which will impact patients' involvement in the treatment process, clinical outcomes, and patient satisfaction.

Various limitations need to be taken into consideration when interpreting the outcome of the study. One of the limitations relates to the limited generalizability associated with the sampling of the patients using a convenient approach. The use of self-reported data also subjects the study to the possible influence of recall or reporting bias. Also, this study is a descriptive-cross sectional design that did not establish the real cause-and-effect relationship on the use of whiteboards. This design cannot analyze the impact of whiteboard use on patients and the health care team over time. A low response rate from other hospitals could not determine differences of findings between these institutions.

Conclusions

Patients and families perceive bedside whiteboards as an effective tool for communication and collaboration with the healthcare team. It makes them aware of all the necessary information and instructions for their treatment process. Whiteboards were associated with patient satisfaction through two main variables: daily goals and family engagement with the healthcare team.

Research contributions

This study provides an insight on the use of whiteboards and their implications to treatment processes and outcomes. This study revealed that patients have important concerns and issues commonly unheard and unaddressed. Whiteboards will help patients be informed and aware of the treatment process and procedures, encouraging them to adhere, comply, and collaborate with the healthcare team. Whiteboards are an innovative tool revealed to enhance communication and collaboration between patients and the healthcare team. The use of whiteboards will increase patient satisfaction to care. This study can be used as a basis for the utilization of whiteboards in hospitals in Saudi Arabia.

Implications and recommendations

The findings of this study suggest that the use of whiteboards in hospitals is important to encourage patient and/or family engagement in the treatment process/management and to effectively achieve the goal of the day, which is associated with improved patient satisfaction. Therefore, based on the study, it is recommended that the relevant healthcare authorities in Saudi Arabia consider adopting whiteboards and developing consensus through research to determine its impact on the delivery of quality patient care and satisfaction.

Direction for further research

This study will serve as a benchmark for future studies. As the study design of this study has several limitations, it is suggested to conduct experimental research to determine the real cause and effect relationship of bedside whiteboard use to patients and/or family members' communication and collaboration to the healthcare team and its impact on patient's satisfaction. Prospective studies are also suggested to reduce the possibility of generating biased results.

Closing remarks

This study provides insight into the importance of bedside whiteboards in improving communication and collaboration between patients and/or family and healthcare team, thus enhancing patient satisfaction. Although the real impact of bedside whiteboard use was not determined in this study, patients and/or family members have shown their great interest in implementing this innovative communication tool. Nevertheless, we cannot deny that communication barriers between patients and/or family members and the healthcare team still exist, which relatively impacts clinical outcomes and patient satisfaction to care.

Primarily, it suggests that the future researcher conduct an in-depth study related to the present study to determine how it impacts patient outcomes and satisfaction and implement innovative ways like bedside whiteboards to improve or solve problems in communication in the healthcare settings.

Data availability

Underlying data

Figshare: Patients and Family Members Perspectives on The Use of Bedside Whiteboard and Its Implication to Treatment Outcomes and Patient Satisfaction: A Pilot Survey in General and Tertiary Hospitals in Makkah, Saudi Arabia. <https://doi.org/10.6084/m9.figshare.16786099.v1> (Binnasser, Alshargi, and Algethami, 2021).

This project contains the following underlying data:

- Dataset.xlsx (survey questionnaire output)

Extended data

Figshare: Patients and Family Members Perspectives on The Use of Bedside Whiteboard and Its Implication to Treatment Outcomes and Patient Satisfaction: A Pilot Survey in General and Tertiary Hospitals in Makkah, Saudi Arabia. <https://doi.org/10.6084/m9.figshare.16786099.v1> (Binnasser, Alshargi, and Algethami, 2021).

This project contains the following extended data:

- A copy of the questionnaire

Data associated with the article are available under the terms of the [Creative Commons Attribution 4.0 International License](#) (CC BY).

References

- Alaloul F, Williams K, Myers J, et al.: **Impact of a script-based communication intervention on PS with pain management.** *Pain Manag. Nurs.* 2015; **16**(3): 321–327.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Reference Source](#)
- Ali M: **Communication skills 2: overcoming the barriers to effective communication.** *Nursing Times.* 2017.
[Reference Source](#)
- Amoah KMV, Anokye R, Boakye SD, et al.: **A qualitative assessment of perceived barriers to effective therapeutic communication among nurses and patients.** *BMC Nurs.* 2019 Dec; **18**(4): 4–8.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Anoosheh M, Zarkhah S, Faghihzadeh S, et al.: **Nurse-patient communication barriers in Iranian nursing.** *Int. Nurs. Rev.* 2009; **56**(2): 243–249.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Binnasser A, Alshargi O, Algethami M: **Patients and Family Members Perspectives on The Use of Bedside Whiteboard and Its Implication to Treatment Outcomes and Patient Satisfaction: A Pilot Survey in General and Tertiary Hospitals in Makkah, Saudi Arabia.** figshare. Dataset. 2021.
[Publisher Full Text](#)
- Brandenburg L, Gabow P, Steele G, et al.: **Innovation and best practices in health care scheduling.** *NAM Perspectives.* 2015; **5**.
[Publisher Full Text](#) | [Reference Source](#)
- Burk K: **Improving Communication in the Clinical Environment Through Bedside Shift Report (BSR): A Quality Improvement Project.** 2016.
[Reference Source](#)
- Dearmon V, Roussel L, Buckner EB, et al.: **Transforming Care at the Bedside (TCAB): Enhancing direct care and value-added care.** *J. Nurs. Manag.* 2013; **21**(4): 668–678.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Dunn AS: **The impact of bedside interdisciplinary rounds on length of stay and complications.** *J. Hosp. Med.* 2017; **12**(3): 137–142.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Reference Source](#)
- Frazer S: **Goal of the day: Initiating goal of the day to improve patient- and family-centered care.** *Dimens. Crit. Care Nurs.* 2011; **30**(6): 326–330.
[Publisher Full Text](#) | [Reference Source](#)
- Gonzalez-Shalaby MSN: **Use of the Patient Whiteboard to Improve Communication of Pain Medication Schedule.** 2016.
[Reference Source](#)
- Goyal AA, Tur K, Mann J: **Do bedside visual tools improve patient and caregiver satisfaction? A systematic review of the literature.** *J. Hosp. Med.* 2017; **12**: 930–936.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Goyal A, Glanzman H, Quinn M, et al.: **Do bedside whiteboards enhance communication in hospitals? An exploratory multimethod study of patient and nurse perspectives.** *BMJ Qual. Saf.* 2019.
[Reference Source](#)
- Hesselink G, Flink M, Olsson M, et al.: **Are patients discharged with care? A qualitative study of perceptions and experiences of patients, family members and care providers.** *BMJ Qual. Saf.* 2012; **21**(Suppl 1): i39–i49.
[Publisher Full Text](#) | [Reference Source](#)
- Iversen C, Johansson L, Sandén L, et al.: 2014, November. **Increasing patient accessibility to a surgery department through operations management principles.** *The 6th Swedish Production Symposium.*
[Reference Source](#)
- Karn C: **The use of personalized whiteboards in the inpatient acute care setting and their effect on patient and nurses perception of communication.** 2016.
[Reference Source](#)
- Kendall L, Mishra SR, Pollack A, et al.: **Making background work visible: opportunities to address patient information needs in the hospital.** *AMIA Annual Symposium proceedings.* 2015; (Vol. 2015, p. 1957). American Medical Informatics Association.
[Reference Source](#)
- Kwame A, Petrucci PM: **A literature-based study of patient-centered care and communication in nurse-patient interactions: barriers, facilitators, and the way forward.** *BMC Nurs.* 2021; **20**(1): 158.
[PubMed Abstract](#) | [Publisher Full Text](#)
- McCabe C: **Nurse-patient communication: an exploration of patients' experiences.** *J. Clin. Nurs.* 2004; **13**(1): 41–49.
[PubMed Abstract](#) | [Publisher Full Text](#)
- Menefee KS: **The Menefee model for patient-focused interdisciplinary team collaboration.** *JONA: The Journal of Nursing Administration.* 2014; **44**(11): 598–605.
[PubMed Abstract](#) | [Publisher Full Text](#) | [Reference Source](#)

Ministry of Health (MOH): 2018.

[Reference Source](#)

Ofori-Atta J, Binienda M, Chalupka S: **Bedside shift report: Implications for patient safety and quality of care.** *Nursing*. 2019. 2015; **45**(8): 1–4.

[Publisher Full Text](#) | [Reference Source](#)

Parker ML, Mowry JL: **Impact of a Student and Faculty Collaboration on PS with Pain Management.** 2015.

[Reference Source](#)

Pimentel VM, Sun M, Bernstein PS, *et al.*: **Whiteboard Use in Labor and Delivery: A Tool to Improve Patient Knowledge of the Name of the Delivery Provider and Satisfaction with Care.** *Matern. Child Health J.* 2018; **22**(4): 565–570.

[PubMed Abstract](#) | [Publisher Full Text](#)

Sehgal NL, Green A, Vidyarthi AR, *et al.*: **Patient whiteboards as a communication tool in the hospital setting: a survey of practices and recommendations.** *J. Hosp. Med.* 2010; **5**(4): 234–239.

[PubMed Abstract](#) | [Publisher Full Text](#)

Sherman RO, Hilton N: **The patient engagement imperative.** *Am. Nurse Today*. 2014; **9**(2): 1–4.

[Reference Source](#)

Singh S, Fletcher KE, Pandl GJ, *et al.*: **It's the writing on the wall: whiteboards improve in patient satisfaction with provider communication.** *Am. J. Med. Qual.* 2011; **26**(2): 127–131.

[PubMed Abstract](#) | [Publisher Full Text](#) | [Reference Source](#)

Tan M, Evans KH, Braddock CH, *et al.*: **Patient whiteboards to improve patient-centred care in the hospital.** *Postgrad. Med. J.* 2013; **89**(1056): 604–609.

[PubMed Abstract](#) | [Publisher Full Text](#) | [Reference Source](#)

Tse Y, Miller-Grossett C, Stout J, *et al.*: **G208 (P) Improving communication of care plans with patients and carers using whiteboards.** *Arch. Dis. Child.* 2014; **99**(Suppl 1): A100–A100.

[Publisher Full Text](#) | [Reference Source](#)

Vuković M, Gvozdenović BS, Stamatović-Gajić B, *et al.*: **Development and evaluation of the nurse quality of communication with patient questionnaire.** *Srp. Arh. Celok. Lek.* 2010; **138**(1–2): 79–84.

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