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ORIGINAL ARTICLE

Mental Health Status Does Not Affect Patient Satisfaction After Knee Replacement

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ABSTRACT

AIM: To determine whether peri-operative mental health scores are associated with patient satisfaction after total knee arthroplasty (TKA).

METHODS: We conducted a retrospective review of 205 primary TKAs to determine whether the Short Form-12 Mental Component Score (SF-12 MCS) is associated with Press Ganey satisfaction. Univariate logistic regression was used to test for an association between MCS and the likelihood of a 5-star rating for each question.

RESULTS: Patients with low preoperative and postoperative MCS were less likely to give a 5-star rating for provider and staff communication, friendliness, and courteousness but had no association with satisfaction with overall care. A change in MCS in patients with a low preoperative MCS was associated with 5-star satisfaction with appointment scheduling.

CONCLUSION: Patient mental health status is minimally associated with patient satisfaction. Thus, poor preoperative mental health status should not be a relative contraindication to TKA.

Key words: Mental health; Patient satisfaction; Total knee arthroplasty

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INTRODUCTION

Patient satisfaction is a hospital-based business-oriented surrogate for quality. Previous studies show that patient satisfaction is associated with clinical outcomes such as symptom and pain relief as well as interpersonal connection, communication, and perceived competence[1-5]. However, psychological factors such as depression and unmet expectations are associated with lower patient satisfaction following spine surgery and total knee arthroplasty (TKA)[1-6]. Currently, there is a paucity of literature describing the relationship between mental health status and patient satisfaction, while a clear connection exists between patient mental health and functional outcomes after orthopaedic surgery. Even with effective treatment of end-stage arthritis with TKA, patients with lower mental health status and pain catastrophizing are more likely to have worse pain and stiffness postoperatively[7,8]. Given that mental health status may be a modifiable risk factor for patient outcomes, we wanted to investigate the relationship between patient mental health status and patient satisfaction following TKA. With a better understanding of the impact of mental health on patient satisfaction, physicians may

be better able to optimize their patients pre-operatively to impriove patient outcomes and satisfaction.

METHODS

We conducted a retrospective review of patients who underwent primary TKA at Stanford Hospital and Clinics between June 2008 and October 2014. Patients were operated on by one of three fellowship-trained total joint arthroplasty surgeons (JIH, SBG, WJM). Baseline and one-year postoperative SF-12 (Short Form-12) Mental Components Scores (MCS) and Press Ganey Patient Satisfaction Scores were collected[9]. A total of 205 patients were included in the analysis. The MCS is a validated form that assesses general mental and physical health and is a sensitive and specific tool for depression screening[9]. Patients were stratified according to preoperative MCS. A low MSC was below 50 points while a high MCS was above 50 points as previously described by Ayers et al[10]. Eighty-five (41%) patients had a low preoperative MCS and 120 (59%) patients had a high preoperative MCS. Press Ganey Satisfaction Scores were measured on an ordinal 5-star rating scale, and 37 questions were examined (Table 1). We evaluated the 5-star ratings as a dichotomous variable (receiving a 5-star rating versus not receiving a 5-star rating). Frequency of 5-star ratings for each Press Ganey question is reported

Table 1 Press Ganey Questions Evaluated.

Overall Assessment
1. Overall rating of care received during your visit
2. Your understanding of who to call for help after your visit
3. How well staff worked together to care for you
4. Likelihood of your recommending our practice to others
5. Overall cheerfulness of our practice
6. Extent to which the main reason for this visit was addressed to your satisfaction
Care Provider
1. Friendliness/courtesy of the care provider
2. Opportunity physician gave you to explain the reasons for your visit
3. Amount of time the care provider spent with you
4. Likelihood of your recommending this care provider to others
5. Concern the care provider showed for your questions or worries
6. Instructions the care provider gave you about follow-up care (if any)
7. Explanations the care provider gave you about your problem or condition
8. Your confidence in this care provider
9. Care provider's efforts to include you in decisions about your treatment
10. Provider's explanation of what to do if problems or symptoms continued, got worse or came back
11. Degree to which care provider talked with you using words you could understand
12. Degree to which the care provider treated you with respect and dignity
Moving Through Your Visit
1. Comfort and pleasantness of the exam room
2. Waiting time in exam room before being seen by the care provider
3. Comfort and pleasantness of the waiting area
4. Speed of the registration process
5. Friendliness/courtesy of the office staff
6. Length of wait before going to an exam room
Access
1. Our promptness in returning your phone calls
2. Our helpfulness on the telephone
3. Courtesy of staff in the registration area
4. Ease of scheduling your appointment
5. Courtesy of person who scheduled your appointment
6. Convenience of our office hours
7. Ability of getting an appointment for when you wanted
Personal Issues
1. Cleanliness of our practice
2. Our sensitivity to your needs
3. Our concern for your privacy
Lab Tests
1. Timeliness of receiving tests results
Nurse/Assistant
1. Friendliness/courtesy of the nurse/assistant
2. Concern the nurse/assistant showed for your problem

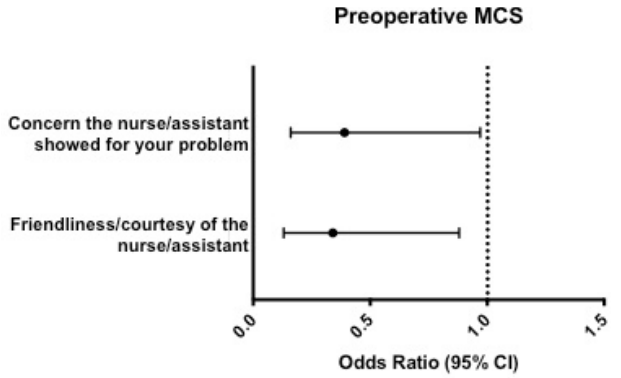

Figure 1 Low preoperative MCS was associated with satisfaction with the nurse/assistant. Patients with a low preoperative MCS were less likely to give a 5-star rating for "friendliness/courtesy of the nurse/assistant" (OR 0.34, 95% CI, 0.13-0.88, $p = 0.027$) and for "concern the nurse/assistant showed for your problem" (OR 0.39, 95% CI, 0.16-0.97, $p = 0.042$).

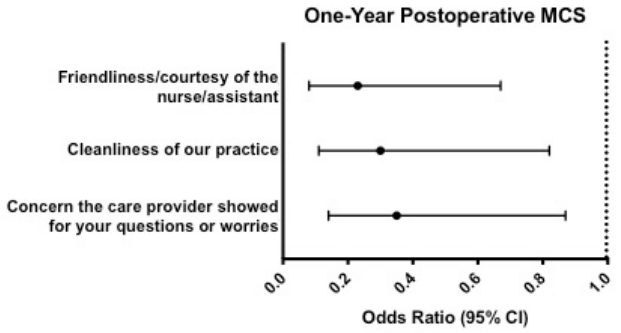

Figure 2 One-year postoperative MCS was associated with 3 Press Ganey questions. Patients with a low one-year postoperative MCS were less likely to give a top rating for "concern the care provider showed for your question or worries" (OR 0.348, 95% CI, 0.138-0.873, $p = 0.0245$), "cleanliness of our practice" (OR 0.30, 95% CI, 0.11-0.82, $p = 0.018$), and "friendliness/courtesy of the nurse/assistant" (OR 0.23, 95% CI, 0.08-0.67, $p = 0.008$).

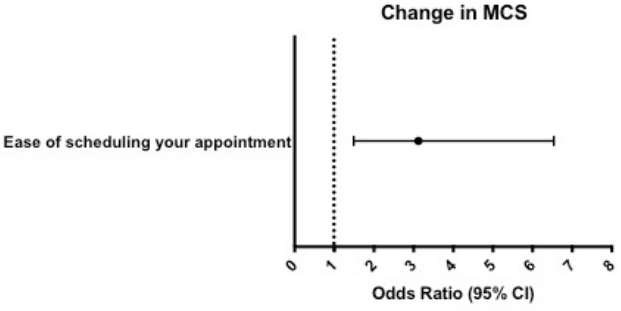

Figure 3 Change in MCS in patients with low preoperative MCS was associated with satisfaction with appointment scheduling. Patients who had a low preoperative MCS and had a change in their MCS pre- and postoperatively were over three times more likely to give a 5-star rating for "ease of scheduling your appointment" (OR 3.12, 95% CI, 1.49-3.12, $p = 0.003$).

in Table 2.

Univariate logistic regression analyses were used to test the associations between preoperative MCS, one-year postoperative MCS, and change in MCS with the likelihood of a 5-star rating (dichotomous) for Press Ganey satisfaction questions (Table 3). Statistical significance was set at 0.05. Statistical analyses were conducted using R Statistical Software[11].

RESULTS

The mean preo-perative MCS for low MCS patients was 39.1 ± 8.6 points, while high MCS patients had a mean pre-operative MCS of 60.01 ± 6.0 points. One year post-operatively, low MCS patients had lower MCS scores compared to hi-gh MCS patients with mean scores of 49.7 ± 10.7 points and 56.6 ± 6.8 points, respectively.

Patients with a low MCS were less likely to give a 5-star rating for "friendliness/courtesy of the nurse/assistant" (odds ratio, OR 0.34, 95% confidence interval, CI 0.13-0.88, p = 0.027) and for "concern the nurse/assistant showed for your problem" (OR 0.39, 95% CI 0.16-0.97, p = 0.042, Figure 1). Moreover, patients with a low one-year post-operative MCS were less likely to give a top rating for "concern

Table 2 Frequency of 5-Star Ratings.

	5-Star Rating Frequency (%)	Not 5-Star Rating Frequency (%)
Overall Assessment		
1. Overall rating of care received during your visit	13 (65)	7 (35)
2. Your understanding of who to call for help after your visit	10 (56)	8 (44)
3. How well staff worked together to care for you	19 (44)	24 (56)
4. Likelihood of your recommending our practice to others	120 (80)	30 (20)
5. Overall cheerfulness of our practice	12 (60)	8 (40)
6. Extent to which the main reason for this visit was addressed to your satisfaction	15 (68)	7 (32)
Care Provider		
1. Friendliness/courtesy of the care provider	130 (83)	27 (17)
2. Opportunity physician gave you to explain the reasons for your visit	10 (56)	8 (44)
3. Amount of time the care provider spent with you	96 (65)	51 (35)
4. Likelihood of your recommending this care provider to others	130 (83)	27 (17)
5. Concern the care provider showed for your questions or worries	115 (74)	40 (26)
6. Instructions the care provider gave you about follow-up care (if any)	95 (70)	41 (30)
7. Explanations the care provider gave you about your problem or condition	120 (77)	35 (23)
8. Your confidence in this care provider	116 (77)	35 (23)
9. Care provider's efforts to include you in decisions about your treatment	102 (69)	45 (31)
10. Provider's explanation of what to do if problems or symptoms continued, got worse or came back	11 (79)	3 (21)
11. Degree to which care provider talked with you using words you could understand	117 (77)	35 (23)
12. Degree to which the care provider treated you with respect and dignity	16 (80)	4 (20)
Moving Through Your Visit		
1. Comfort and pleasantness of the exam room	13 (59)	9 (41)
2. Waiting time in exam room before being seen by the care provider	11 (41)	16 (59)
3. Comfort and pleasantness of the waiting area	17 (68)	8 (32)
4. Speed of the registration process	13 (62)	8 (38)
5. Friendliness/courtesy of the office staff	12 (63)	7 (37)
6. Length of wait before going to an exam room	15 (58)	7 (32)
Access		
1. Our promptness in returning your phone calls	5 (29)	12 (71)
2. Our helpfulness on the telephone	11 (52)	10 (48)
3. Courtesy of staff in the registration area	114 (76)	36 (24)
4. Ease of scheduling your appointment	86 (60)	58 (40)
5. Courtesy of person who scheduled your appointment	108 (71)	45 (29)
6. Convenience of our office hours	95 (64)	54 (36)
7. Ability of getting an appointment for when you wanted	80 (53)	71 (47)
Personal Issues		
1. Cleanliness of our practice	116 (79)	30 (21)
2. Our sensitivity to your needs	101(70)	43 (30)
3. Our concern for your privacy	107 (72)	41 (28)
Lab Tests		
1. Timeliness of receiving tests results	8 (89)	1 (11)
Nurse/Assistant		
1. Friendliness/courtesy of the nurse/assistant	120 (82)	27 (18)
2. Concern the nurse/assistant showed for your problem	111 (78)	32 (22)

the care provider showed for your question or worries" (OR 0.348, 95% CI 0.138-0.873, p = 0.025), "cleanliness of our practice" (OR 0.30, 95% CI 0.11-0.82, p = 0.018), and "friendliness/courtesy of the nurse/assistant" (OR 0.23, 95% CI 0.08-0.67, p = 0.008, Figure 2). Patients who had a low pre-operative MCS and had a change in their MCS pre- and post-operatively were over three times more likely to give a 5-star rating for "ease of scheduling your appointment" (OR 3.12, 95% CI 1.49-3.12, p = 0.003, Figure 3).

DISCUSSION

Patient satisfaction is a complex entity that is affected by various factors. Patient satisfaction is inherently tied to expectation, interpersonal connection, communication, empathy, and perceived competence[1-5]. In this study, we explored the relationship between patient mental health status and patient satisfaction following TKA. We found that patients with low pre-operative MCS were less likely

Table 3 Odds and Confidence Intervals of Preoperative, 1-Year Postoperative, and Change in MCS of the Likelihood of a 5-Star Rating.

	Pre-operative	p	Post-operative	p	Change	p
Overall Assessment						
1. Overall rating of care received during your visit	1.58 (0.21-12.00)	0.661	0.47 (0.05-4.92)	0.531	7.00 (0.65-75.74)	0.109
2. Your understanding of who to call for help after your visit	2.00 (0.26-15.38)	0.505	0.71 (0.10-5.12)	0.738	1.67 (0.25-11.07)	0.597
3. How well staff worked together to care for you	0.27 (0.07-1.04)	0.057	1.87 (0.36-9.60)	0.455	1.46 (0.65-3.24)	0.555
4. Likelihood of your recommending our practice to others	0.75 (0.33-1.71)	0.493	0.58 (0.23-1.49)	0.259	1.83 (0.76-4.46)	0.181
5. Overall cheerfulness of our practice	1.19 (0.19-7.46)	0.852	0.19 (0.005-7.37)	0.37	2.14 (0.30-15.36)	0.448
6. Extent to which the main reason for this visit was addressed to your satisfaction	0.54 (0.23-1.25)	0.152	0.73 (0.31-1.70)	0.462	5.25 (0.50-54.91)	0.166
Care Provider						
1. Friendliness/courtesy of the care provider	0.90 (0.51-1.59)	0.713	1.11 (0.54-2.31)	0.764	1.22 (0.70-2.13)	0.484
2. Opportunity physician gave you to explain the reasons for your visit	1.53 (0.14-17.15)	0.729	0.14 (0.001-16.33)	0.414	1.93 (0.20-18.44)	0.568
3. Amount of time the care provider spent with you	0.66 (0.31-1.40)	0.277	0.82 (0.33-2.05)	0.671	1.82 (0.86-3.86)	0.118
4. Likelihood of your recommending this care provider to others	0.95 (0.40-2.30)	0.914	0.93 (0.31-2.80)	0.895	1.89 (0.77-4.66)	0.166
5. Concern the care provider showed for your questions or worries	0.93 (0.44-2.00)	0.855	0.35 (0.14-0.87),	0.025	1.46 (0.69-3.11)	0.322
6. Instructions the care provider gave you about follow-up care (if any)	0.54 (0.23-1.25)	0.152	0.73 (0.31-1.70)	0.462	1.44 (0.66-3.12)	0.36
7. Explanations the care provider gave you about your problem or condition	0.83 (0.37-1.82)	0.635	0.77 (0.28-2.11)	0.614	1.79 (0.80-3.97)	0.155
8. Your confidence in this care provider	0.90 (0.39-2.07)	0.796	0.59 (0.22-1.61)	0.306	1.46 (0.63-3.43)	0.38
9. Care provider's efforts to include you in decisions about your treatment	0.76 (0.35-1.66)	0.495	0.52 (0.21-1.27)	0.151	1.31 (0.61-2.81)	0.485
10. Provider's explanation of what to do if problems or symptoms continued, got worse or came back **	N/A		N/A		N/A	
11. Degree to which care provider talked with you using words you could understand	0.45 (0.20-1.02)	0.055	0.53 (0.20-1.41)	0.203	2.04 (0.84-4.94)	0.116
12. Degree to which the care provider treated you with respect and dignity	0.05 (0.001-4.75)	0.198	0.46 (0.01-21.21)	0.689	N/A***	
Moving Through Your Visit						
1. Comfort and pleasantness of the exam room	0.76 (0.41-1.38)	0.361	1.29 (0.61-2.73)	0.499	0.96 (0.55-1.68)	0.893
2. Waiting time in exam room before being seen by the care provider	2.05 (0.51-8.32)	0.315	0.85 (0.14-5.33)	0.865	1.96 (0.48-7.99)	0.346
3. Comfort and pleasantness of the waiting area	0.18 (0.02-1.72)	0.135	0.87 (0.14-5.36)	0.876	2.95 (0.39-22.25)	0.294
4. Speed of the registration process	0.78 (0.09-7.08)	0.822	N/A**		1.25 (0.12-13.01)	0.85
5. Friendliness/courtesy of the office staff	1.33 (0.20-8.71)	0.764	1.24 (0.16-9.54)	0.83	4.29 (0.39-47.63)	0.236
6. Length of wait before going to an exam room	0.67 (0.11-3.93)	0.654	1.50 (0.25-8.84)	0.654	1.00 (0.20-5.07)	1
Access						
1. Our promptness in returning your phone calls	4.50 (0.49-41.25)	0.183	0.75 (0.06-9.62)	0.825	0.50 (0.04-6.08)	0.587
2. Our helpfulness on the telephone	0.81 (0.42-1.54)	0.515	0.71 (0.32-1.56)	0.388	1.26 (0.69-2.29)	0.448
3. Courtesy of staff in the registration area	0.90 (0.48-1.70)	0.751	1.76 (0.85-3.66)	0.131	2.53 (0.96-5.79)	0.06
4. Ease of scheduling your appointment	0.92 (0.44-1.92)	0.823	1.75 (0.61-5.03)	0.302	3.12 (1.49-6.54)	0.003
5. Courtesy of person who scheduled your appointment	0.70 (0.33-1.48)	0.354	0.49 (0.20-1.20)	0.117	1.27 (0.60-2.68)	0.526
6. Convenience of our office hours	0.75 (0.34-1.64)	0.471	1.12 (0.44-2.87)	0.811	2.03 (0.93-4.44)	0.076
7. Ability of getting an appointment for when you wanted	0.77 (0.39-1.52)	0.446	0.75 (0.32-1.75)	0.503	1.90 (0.97-3.72)	0.06
Personal Issues						
1. Cleanliness of our practice	0.50 (0.21-1.20)	0.123	0.30 (0.11-0.82)	0.018	1.04 (0.44-2.66)	0.926
2. Our sensitivity to your needs***	N/A		N/A		N/A	
3. Our concern for your privacy	0.65 (0.29-1.45)	0.294	0.73 (0.28-1.89)	0.518	1.70 (0.74-3.91)	0.216
Lab Tests						
1. Timeliness of receiving tests results**	N/A		N/A		N/A	
Nurse/Assistant						
1. Friendliness/courtesy of the nurse/assistant	0.34 (0.13-0.88)	0.027	0.23 (0.08-0.67)	0.008	2.25 (0.81-6.29)	0.12
2. Concern the nurse/assistant showed for your problem	0.39 (0.16-0.97)	0.042	0.43 (0.16-1.16)	0.096	1.60 (0.65-3.93)	0.31

Bold denotes statistical significance $p < 0.05$, *High MCS was used as the reference value for preoperative and 1-year postoperative MCS, **Too few responses to be analyzed, ***Model did not converge.

to give a 5-star rating for provider, nurse, staff communication, friendliness, and courteousness. These findings suggest that mental health status is associated with satisfaction via perceived communication and interpersonal connection, characteristics that consistently drive patient satisfaction. Additionally, patients who initially had a low MCS and then had a change in their MCS post-operatively were 3 times more likely to give a 5-star rating for ease of scheduling their appointment. Perhaps patients who feel that they have increased access to their provider have greater improvement in their mental health.

Our results also highlight that patient satisfaction is not necessarily a direct correlate for functional or pain outcomes. Although psychological factors such as depression, low mental health score, and pain catastrophizing are associated with worse patient-reported outcomes following TKA, we did not similarly find that low preoperative MCS was associated with lower patient satisfaction in overall rating of care[7,12,13]. Thus, providers should not view low pre-operative MCS as a relative contraindication to TKA in the context of patient satisfaction. These findings suggest that the pain of end-stage osteoarthritis may contribute to depression in patients undergoing TKA. Moreover, it is worth noting that patient satisfaction, though important, is not the same as patient-centered care, a concept that is more deeply explored by Kupfer and Bond[14].

Mental health is a dynamic condition that is influenced by a variety of factors. Horst *et al.* showed that mental health status improved more in patients with low preoperative mental health scores than those with higher preoperative mental health scores[15]. Similarly, others describe larger improvements in the mental health components of the SF-36 in depressed patients compared to those who were not depressed preoperatively[16]. These findings suggest that mental health status may be tied to the disability of end-stage arthritis requiring TKA, and thus, offering TKA to such patients may improve their mental health in addition to their pain and functional status. Others suggest treating psychological disease as a comorbidity to be optimized prior to surgery similar to what is done with diabetic patients. Peri-operative use of selective serotonin reuptake inhibitors in depressed and pain-catastrophizing patients is associated with reduced risk of all cause TKA revision, TKA aseptic revisions, postoperative pain, and postoperative depression[17,18].

Our study has several limitations. We studied mental health status of patients at a single institution using one mental health metric, the MCS. It is clear that mental health status is a complex entity with various contributing factors, but we chose to focus on MCS as a validated score that captures general mental and physical health. Our study has the potential for selection bias as (1) we only included patients who completed both pre- and post-operative surveys and there may be a difference in how many low MCS versus high MCS patients who completed both surveys, and (2) patients with low MCS may have been excluded from surgery from surgeon preoperative risk assessment. However, despite these limitations, our findings are reassuring that preoperative mental health status should not necessarily be a contraindication to TKA.

As the impact of patient mental health status on patient satisfaction and TKA is not well understood, future studies are crucial for gaining actionable insights. Specifically, further work can be done to identify the factors that contribute to lower mental health status in patients seeking TKA. Pre-operative mental health and psychosocial interventions may be useful in improving patient outcomes and satisfaction e.g. treating patients with known psychological disease, enhancing patient activation, increasing patient self-efficacy[17-21]. Similarly, providers should emphasize patient-centered communication and realistic expectations: in a study of patient satisfaction in 1,703 primary TKAs, the strongest predictor of patient dissatisfaction was unmet expectations (10-fold risk)[1]. Together, our findings show that mental health status should not be considered a relative contraindication for TKA. Future work is necessary to elucidate whether preoperative interventions in addition to TKA itself can further improve patient outcomes and satisfaction.

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