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# Predictors of Physical Therapy Non-Treatment Among Patients Scheduled for Treatment Two Times a Day in the Acute Hospital

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PREDICTORS OF PHYSICAL THERAPY NON-TREATMENT AMONG PATIENTS  
SCHEDULED FOR TREATMENT TWO TIMES A DAY IN THE ACUTE HOSPITAL

By

Sara Bookout

Kyle Ozaki

A doctoral project submitted in partial fulfillment

of the requirements for the

Doctor of Physical Therapy

Department of Physical Therapy  
School of Allied Health Sciences  
Division of Health Sciences  
The Graduate College

University of Nevada, Las Vegas

May 2017

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## **Doctoral Project Approval**

The Graduate College  
The University Of Nevada, Las Vegas

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This doctoral project prepared by

**Sara Bookout and Kyle Ozaki**

Entitled

**Predictors of Physical Therapy Non-Treatment Among patients scheduled for treatment two times a day in the Acute Hospital**

is approved in partial fulfillment of the requirements for the degree of

**Doctor of Physical Therapy**

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## **ABSTRACT**

**Background and Purpose:** Consistent participation in physical therapy treatment is the key to the success of any physical therapy treatment program. Scheduled therapy sessions that do not result in treatment (non-treatment) may cause longer hospital stays and/or poor outcomes. A better understanding of the factors affecting non-treatment could allow proper adjustments to prevent non-treatment by hospital administration, improve patient-therapist interaction, and may result in improved care, greater patient satisfaction, and lower healthcare costs. The purpose of this study was to investigate characteristics of patients that affect physical therapy non-treatment events for patients scheduled for therapy twice a day (BID) in an inpatient hospital setting.

**Subjects:** The subjects for this study were all patients scheduled to receive physical therapy BID during their hospital stay. Data was collected from a 450 bed hospital located in a metropolitan area of the Southwest United States. Data from 367 patients who were scheduled for physical therapy treatment BID were collected retrospectively from the medical record during the study period. There were 168 males and 199 females. A total of 810 scheduled BID treatment sessions were analyzed.

**Methods:** The dependent variable was a dichotomous Yes or No to indicate if treatment occurred or did not occur giving 4 possible outcomes on a day of BID scheduled therapy: yes/yes, yes/no, no/yes, and no/no. Demographic patient information such as age, gender, diagnosis, and scheduled treatment day was also given to the research team for analysis. Patient diagnoses were grouped into 1 of 13 categories: Cardiovascular, Pulmonary, Neurological, Gastrointestinal, Musculoskeletal, Cancer, Integumentary, Genitourinary/Renal, Infections Disease, Obstetrics and Gynecology (OBGYN), Neonatal intensive care unit (NICU), Endocrine, or Other/Unknown. Ages of patients ranged from newborn children seen in the NICU to 97 years of

age. Scheduled treatment day included the 7 days of the week. Descriptive and inferential statistics were performed. Chi-square analyses were performed to assess which patient characteristics including treatment day, gender, and diagnosis were associated with a change in BID treatment occurrences. One-way ANOVA and post-hoc paired t-tests were utilized to compare patient age in the 4 outcome groups.

**Results:** Gender, diagnosis, day of the week, and age all influence non-treatment occurrence in the acute care setting for patients scheduled for BID therapy ( $p < 0.003$ ). Among females, 84% of scheduled sessions resulted in a yes/yes combination while only 64% yes/yes occurred for males ( $p < 0.000$ ). No/no events are at their highest proportions on Sunday 27.8% ( $p < 0.000$ ) and Saturday 23.5% ( $p < 0.002$ ). Tuesday and Thursday had the lowest occurrence of non-treatment at 4.2% of scheduled visits ( $p < 0.001$ ). Musculoskeletal diagnosis has the highest yes/yes outcome ( $p < 0.000$ ). The average age of patients that had a no/no outcome is 55.42 years old, and the average age that had a yes/yes outcome is 63.89 years old ( $p < 0.002$ )

**Discussion:** Gender, age, diagnosis and day of the week of treatment all appear to play a role in non-treatment in the acute hospital setting. Specifically, females have a lower occurrence of no/no treatment. Patients with musculoskeletal diagnosis has the highest occurrence of yes/yes treatment. Saturday and Sunday have the highest no/no treatment occurrence and Tuesday and Thursday have the lowest occurrence of non-treatment. It may be possible for hospitals to minimize the incidence of non-treatment, allowing patients to receive the physical therapy they need. In the future, other hospitals may use this information to reduce their BID non-treatment rates. Further studies should investigate a more inclusive population of patients in both BID scheduled treatment and those scheduled for one physical therapy treatment in order to explore trends that can potentially lead to missed treatment.

## **ACKNOWLEDGEMENTS**

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## **INTRODUCTION**

Physical therapy is provided in the acute hospital to patients who can benefit from it while they receive other medical care. Research supports the benefits of physical therapy for appropriate patients in the acute hospital setting.<sup>1-8</sup> The average length of stay for patients in the acute hospital is 4.6 days at an average cost of \$9,140 per patient or \$1,987 per day<sup>9</sup>. Health care costs can dramatically decrease if patients receive physical therapy to avoid new or worsening pathologies such as functional weakness, blood clots, and pneumonia.<sup>10-12</sup> Studies have also shown physical therapy may reduce hospital length of stay when patients have diagnosis that are more critical and when rehabilitation begins early, resulting in lower healthcare costs.<sup>13-21</sup> When evaluating the effects of exercise for acutely hospitalized elderly patients, authors of a Cochrane review concluded that patients will have a decreased length of stay and this decrease would reduce their cost of care by \$278.65 per patient per day.<sup>17</sup>

Hospitals have implemented early mobilization in the intensive care unit (ICU) by increasing the number of physical therapists to assist patients with exercise and mobility. These changes have improved patient's functional mobility while decreasing patient's length of stay in both the ICU and hospital as a whole.<sup>3,16</sup> Research also demonstrates that when patients leave the hospital following treatment from a physical therapist they have better functional ability.<sup>5,22</sup>

According to a study done in an acute rehabilitation hospital, poor participation in physical therapy was associated with lower Functional Independent Measures (FIM) scores, indicating that the more regularly the patient participates in therapy, the more independent they become.<sup>5</sup> In another study, when comparing 2 groups (control and intervention) in the ICU, the intervention group demonstrated that patients who were mechanically ventilated participating in

physical therapy were more likely to return to a self-sufficient status at hospital discharge and returned to a less restrictive environment.<sup>22</sup> There are clear benefits from physical therapy provided to patients in the acute care setting, but in order for these patients to receive benefits, physical therapy must occur.

Scheduled therapy sessions that do not result in treatment can be referred to as non-treatment. Physical therapy departments in three acute care hospitals were reported to have non-treatment rates of 26.5%, 15.6%, and 15.9%; however, the reasons for these non-treatment events were not studied.<sup>23</sup> Another study reported the documented reasons for non-treatment in an acute care hospital.<sup>24</sup> The therapists documented reasons, included patient condition (too sick for therapy), patient refusals, patient unavailable (with other health care providers), no physical therapist available, patient discharge (D/C), and death. Later, Young et al. found the day of the week on which therapy was scheduled and patient diagnosis affect the risk for non-treatment.<sup>24</sup> Specifically, they reported higher non-treatment rates on Saturday and Sunday. While these studies do begin to describe the phenomenon of non-treatment, they do not fully explain why scheduled physical therapy sessions result in non-treatment.

BID (*bis in die*, two times a day) treatment is planned when there is potential for increased rehabilitation to have positive impact or when less therapy is thought to increase risk for harms. According to Lensenn et al., more than one physical therapy session per day is provided in order to improve healing times and increase functional gains.<sup>25</sup> Lensenn et al. explains that for instances of musculoskeletal conditions such as total knee arthroplasty (total knee replacement/TKA), patients are seen for BID treatment in order to regain functional range of motion, transfer independently, and decrease flexion contractures.<sup>25</sup> By utilizing therapy twice

in one day, it allows time for patients to rest between sessions so they benefit from therapy without fatigue.

The relationship between contributing factors and non-treatment rates of therapy scheduled BID has not yet been explored in the inpatient acute hospital. When hospital administrators become aware of the factors driving non-treatment, scheduling and staffing can be adjusted to help reduce the occurrence. Therefore, the purpose of this study was to explore non-treatment rates of physical therapy sessions scheduled BID and explore the characteristics of patients (i.e., age, gender, diagnosis, and treatment day) which may affect non-treatment events when physical therapy is scheduled for BID treatment sessions.

## **METHODS**

### **Study Design**

This study was a retrospective analysis of physical therapist documentation of all patients scheduled for BID physical therapy in an acute care hospital in the Southwestern region of the United States. The primary aim of the study was to determine what patient characteristics effect non-treatment rates for physical therapy sessions scheduled BID.

**Hypotheses 1A:** Diagnosis of the patient will effect non-treatment rates of BID physical therapy treatment session.

**Hypothesis 1B:** Gender will influence non-treatment rates for BID physical therapy treatment sessions.

**Hypothesis 1C:** An increase in patient age will increase rates for non-treatment events of physical therapy scheduled BID.

**Hypothesis 1D:** Patients who are scheduled for weekend BID treatment will have increased non-treatment rates.

## **Facility and Subjects**

The subjects were all patients scheduled for BID physical therapy in the acute care hospital during a 6 month period. Inclusion criteria were all patients admitted to the acute care hospital and scheduled for at least 2 days of BID physical therapy sessions. Sessions scheduled with a physical therapist assistant or physical therapy aide were not included. Exclusion criteria included all patients not scheduled for BID physical therapy sessions. Data was collected retrospectively from charting performed by physical therapists. The physical therapy staff at this hospital included 8 full-time and 16 per diem therapists. Monday through Friday, 6 physical therapists were scheduled, but during the weekends, staffing hours for physical therapists were reduced by 20-30% or approximately 1-2 physical therapists.

In order to determine patient assignments to a physical therapist, one lead therapist arrived before the start of every shift to organize and distribute patients. Throughout the day an electronic notification system from each nursing unit referred new patients to the physical therapy department. An average of 8 patients were seen daily by each therapist which included both evaluation and treatment sessions. An initial evaluation was typically the first encounter between physical therapist and patient and it was when diagnosis, prognosis and plan of care were determined. Treatment sessions included when a patient was seen by a physical therapist to carry out the plan of care.

A paper 'card' system was utilized by physical therapists at this hospital for patient tracking within their department. The cards were used for note taking about patients and included demographic and evaluation information such as patient diagnosis and goals. A brief notation of daily care was provided on the back of the card. Physical therapists were encouraged to keep these cards updated to increase communication between therapists. These cards were not part of

the medical record. The hospital's risk management department would not allow access to the electronic medical record for the study but determined access to the physical therapy tracking cards would be allowed. The cards were the source of data utilized for this study.

Data on patients (gender, age, medical diagnosis, and day of the week treatment was scheduled) were collected retrospectively from the cards. Data from the cards were entered into a spreadsheet. Detailed methods for this data extraction have previously been described.<sup>26,27</sup>

If there was any debate about categorizing a patient with a certain characteristic (i.e. diagnosis), the lead therapist and principle investigator (PI) were consulted. For example, when a complex diagnosis arose that spanned more than one category, the diagnosis which appeared to be the primary reason for the hospitalization was deemed for use in this study. If one diagnosis could not be confidently decided on, the diagnosis would be categorized as "other/unknown". The PI met with the lead physical therapist to discuss organization and interpretation of the card system including medical abbreviations, plan of care and provision of care, and diagnosis.<sup>26,27</sup>

Data included information for the attempted physical therapy sessions for both the first and second attempted physical therapy session in the same day indicating whether or not the patient received treatment. The documented reason (i.e. patient refusal, medical condition, scheduling conflict, insufficient staff, already discharged, and/or death) for non-treatment was documented by the physical therapist. When there was documentation that did not clearly indicate the reasons for non-treatment, the category was marked "unknown".

## Data Analysis

The non-treatment rate was the dependent variable. The patient and hospital characteristics of gender, age, diagnosis and day of the week were the independent variables. Descriptive statistics include rates of BID non-treatment for all patients and different groups of the patients, calculated by dividing the number of non-treatment events by the total number of scheduled events. All data was analyzed using statistical analysis software (SPSS Version 23). The first visit of physical therapy was not considered in the analysis due to the fact that most first sessions will result in treatment (i.e. if an initial evaluation for a patient does not occur, it is typically not documented as non-treatment).

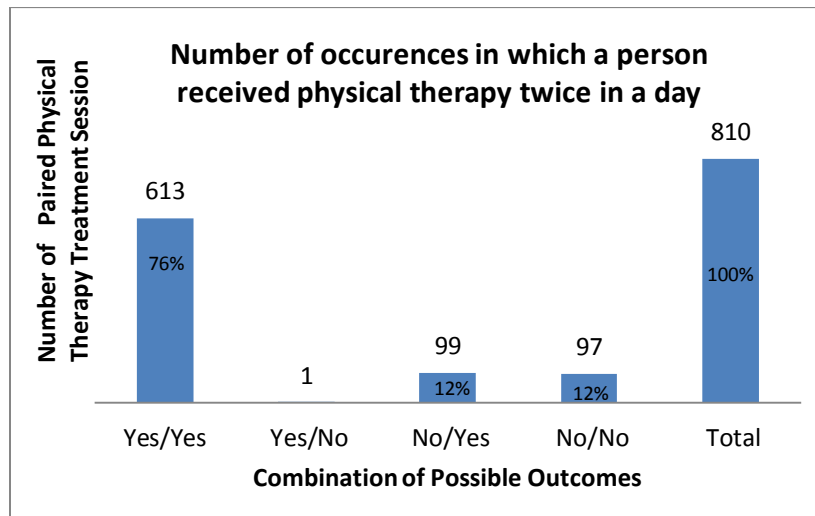
Descriptive analyses were performed in order to describe patient demographics. The alpha level for all statistical analyses was set a priori at  $\alpha=0.05$ . A set of chi-square tests were then used to explore association between nominal characteristics (gender, diagnosis, and day of the week) and non-treatment. Post hoc analysis was performed by converting adjusted residual values from the chi-square analysis, to P values, to explore the differences amongst the characteristics effecting non-treatment occurrence. A one-way ANOVA was conducted for age (continuous data) followed by a post hoc analysis with Bonferroni corrections.



## **RESULTS**

### *Demographics*

A total of 810 scheduled BID physical therapy sessions were analyzed coming from 367 patients. Of the 810 scheduled treatment sessions, 168 were male and 199 were female. The dependent variable was a dichotomous Yes or No to indicate if treatment occurred or did not occur giving 4 possible outcomes on a day of BID scheduled therapy: yes/yes, yes/no, no/yes, and no/no. Patients diagnoses were grouped into 1 of 13 diagnoses categories: Cardiovascular, Pulmonary, Neurological, Gastrointestinal, Musculoskeletal, Cancer, Integumentary, Genitourinary/Renal, Infections Disease, OBGYN (obstetrics/gynecology), NICU (neonatal intensive care unit), Endocrine, or Other/Unknown (**Figure 2**). Ages of patients ranged from newborn children seen in the NICU to 97 years of age, the average age of male patients was 68.4 years and the average age of female patients was 68.3 years.



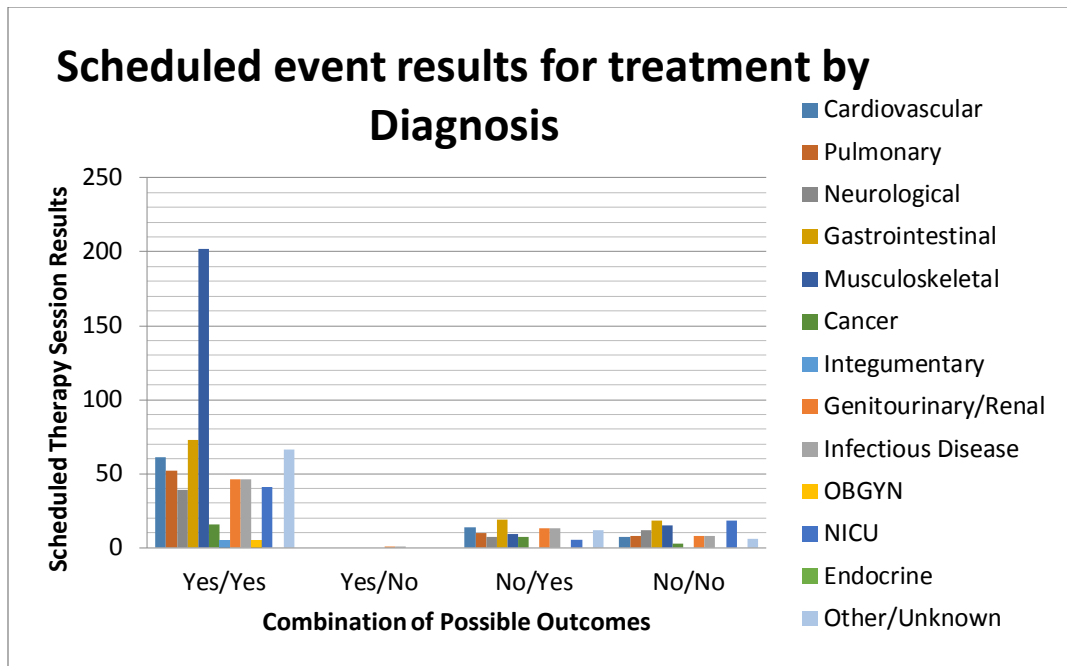
**Figure 1** Number of BID physical therapy treatment session outcomes.

When scheduled for BID physical therapy 76% of patients received treatment in both of the sessions. Patients that experienced non-treatment in the first of a BID pair of sessions were equally likely to have or not have therapy in the second session (no/yes and no/no = 12%). This

means that when non-treatment occurred in the first scheduled session, a “no”, there was a 50% chance that non-treatment would happen again in the second scheduled session.

### *Diagnosis*

A Chi-square analysis was performed to examine the relationship between a patient’s diagnosis and BID treatment outcomes [ $X^2$  (33, N=810) =78.83,  $p < 0.001$  (two-tailed)] and a significant association was found. Through post hoc analysis a significantly higher number of yes/yes occurrences were observed for those patients who were treated for a musculoskeletal disorder when compared to patients with all other diagnoses ( $p < 0.000$ ), Bonferroni adjusted  $p$  value  $< 0.001$ ). Patients with musculoskeletal diagnosis had 202 yes/yes outcomes, 0 yes/no, 9 no/yes, and only 15 with no/no outcomes. Of the patients who were scheduled for BID physical therapy treatment, patients with musculoskeletal diagnosis made up 33% of the yes/yes events which was higher than the other diagnoses. Patients with musculoskeletal diagnosis (9.1%) also demonstrated significantly fewer no/yes events ( $p < 0.000$ ) when compared to all other diagnoses **(Figure 2)**.

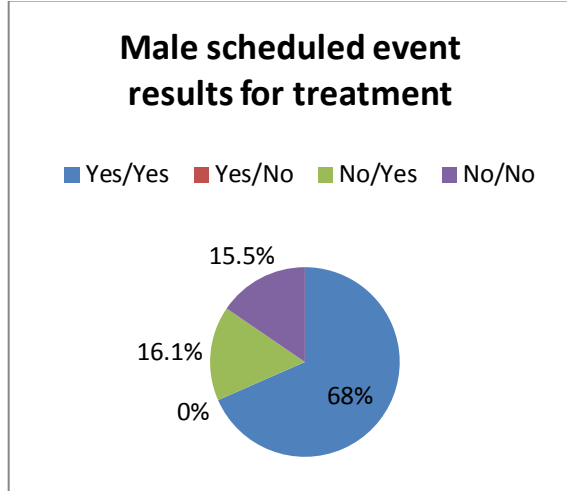


**Figure 2** BID treatment frequency based upon diagnosis

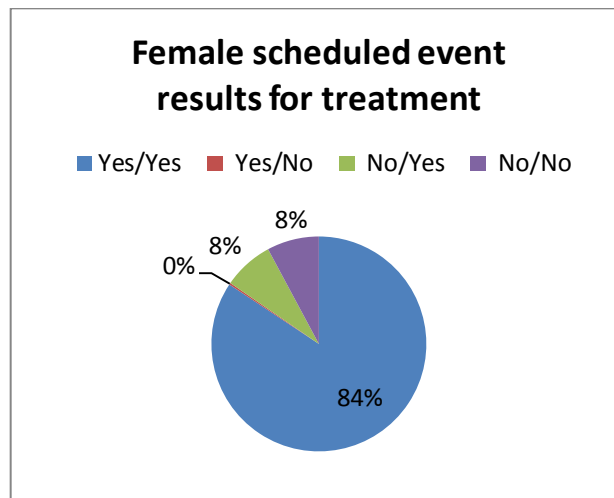
Patients with Genitourinary/Renal diagnosis had significantly more yes/no events ( $p < 0.000$ ) than patients with any other diagnoses. Of all the scheduled BID treatment sessions that resulted in a no/no event, 18.6% were among patients in the NICU. NICU patients demonstrated a significantly higher rate of no/no treatments ( $p < 0.000$ ) when compared patient with all other diagnoses.

### *Gender*

Of scheduled sessions, 301 males and 312 females resulted in yes/yes treatment, and only 1 female and 0 males had a scheduled session resulting in yes/no outcome. Non-treatment rates for BID scheduled physical therapy (no/no and no/yes) sessions were almost double for males compared to females. Male patients had no/no occurrence of 15.5% and no/yes of 16.1% (**Figure 3**) while their female counterparts only experienced 8% in both these categories for non-treatment (**Figure 4**).



**Figure 3** Physical Therapy BID treatment outcomes for male patients



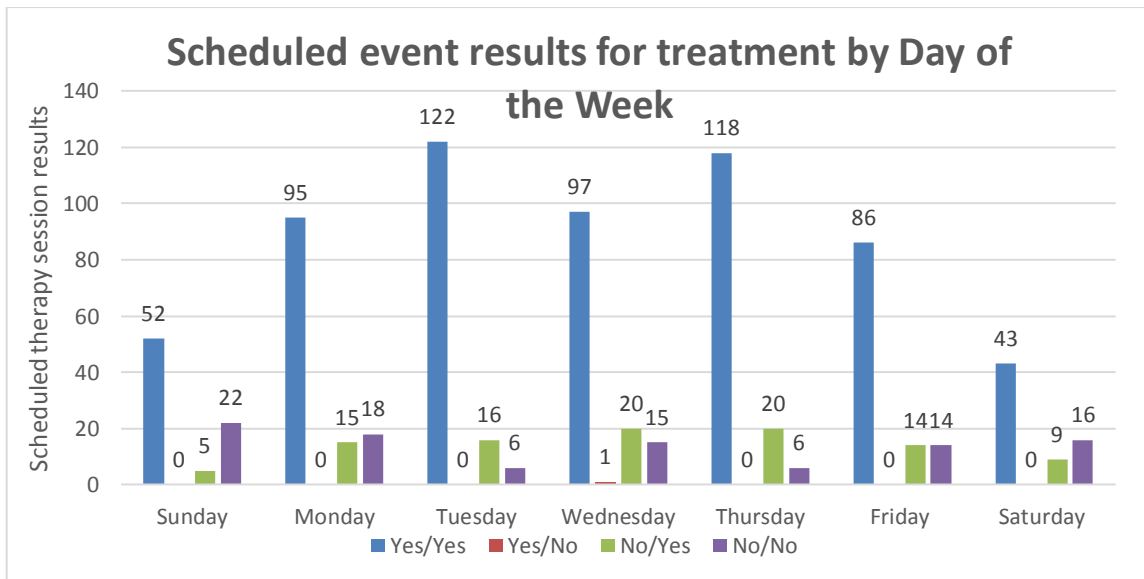
**Figure 4** Physical Therapy BID treatment outcomes for female patients

Chi square analysis was utilized to see if there was a relationship between a patient's gender and BID treatment frequency [ $\chi^2 (3, N=810) = 29.73, p < 0.001$  (two-tailed)] and we found a significant association ( $p=0.000$ ). Post hoc analysis was conducted with a Bonferonni corrected alpha-value of  $<0.007$ . There was a significant association between yes/yes ( $p=0.000$ ), no/yes

(p=0.000), no/no (p=0.001) demonstrating that females were more likely to have low non-treatment rates when compared to males (**Figure 4**).

*Day of the Week*

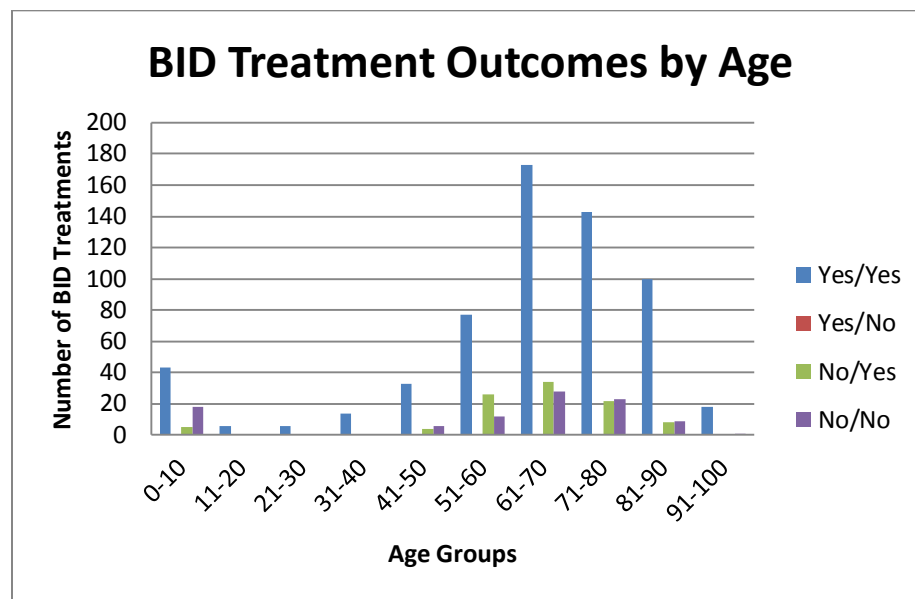
Chi square analysis was utilized to examine the relationship between day of the week and non-treatment frequencies [ $X^2 (18, N=810) = 53.03, p < 0.001$  (two-tailed)] and a significant relationship was found. Post hoc analysis was run with Bonferonni corrected p value of  $p < 0.002$ . A significant association was demonstrated for Tuesday (p=0.001), Thursday (p=0.001), Saturday (p=0.002), and Sunday (p=0.000), meaning patients who are scheduled during the week have lower non-treatment rates than those scheduled on the weekend. Tuesday and Thursday had the lowest rate of non-treatment no/no combinations, 4.2% for both Tuesday and Thursday. Our data shows 23.5% of treatment occurring on Saturday and 27.8% of treatment occurring on Sunday resulted in no/no outcome (**Figure 5**).



**Figure 5** Physical Therapy BID treatment based on day of the week

## Age

Conducting a one-way ANOVA, revealed a statistically significant difference in age ( $F=5.993$ ;  $df = 2, 806$ ;  $p < 0.003$ ) among the 4 non-treatment groups (yes/yes, yes/no, no/yes, no/no). Post hoc testing revealed a significant difference in the age of patients from the yes/yes and no/no groups ( $p=0.002$ ) as well as between the no/yes and no/no groups ( $p=0.046$ ). The mean age of patients in the yes/yes group was 63.89 years ( $SD= 22.089$ ). The mean age for patients in the no/yes group was 63.21years old ( $SD= 17.794$ ) and 55.42 years ( $SD=28.021$ ) for patients in the no/no group (**Figure 6**).



**Figure 6** BID treatment outcomes by age

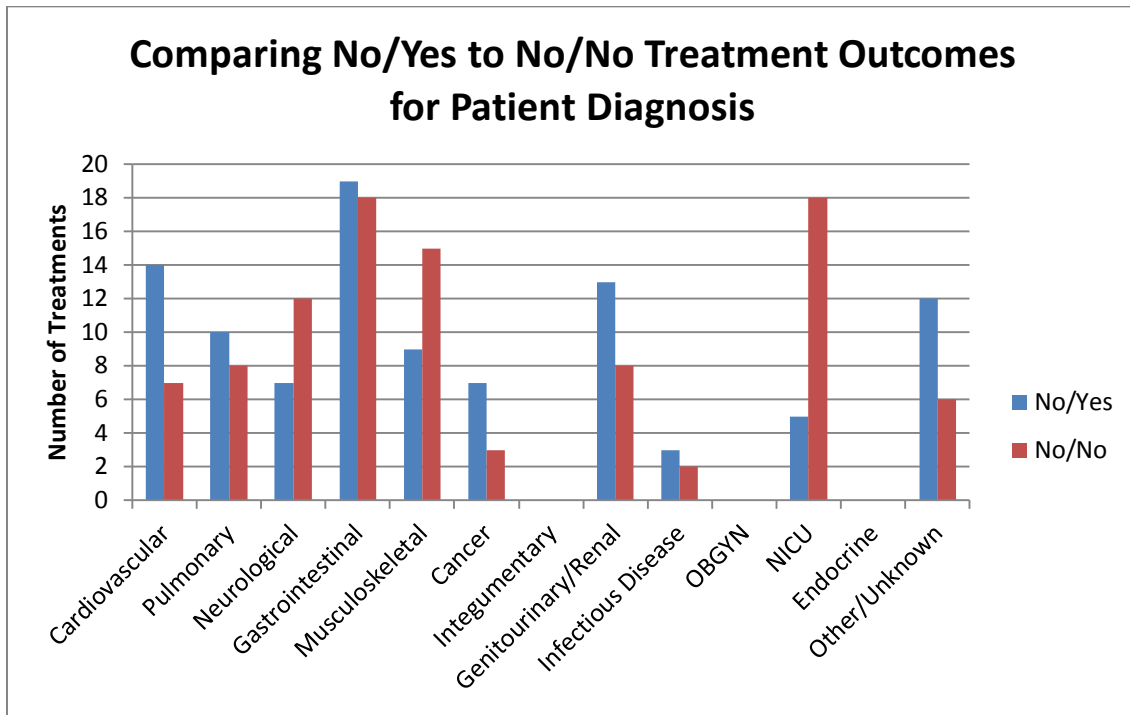
## Other Findings

After analyzing the descriptive statistics, an interesting finding was revealed in the no/yes and no/no groups (**Figure 1**). Among these 2 groups 12% of patients were in the no/no group and 12% were in the no/yes group. This phenomenon of 50% having treatment and 50% having non-treatment for the 2<sup>nd</sup> session following a no was further explored. We wanted to see if there were

patient characteristics that influence the second session outcome when the first scheduled session was non-treatment.

### Diagnosis

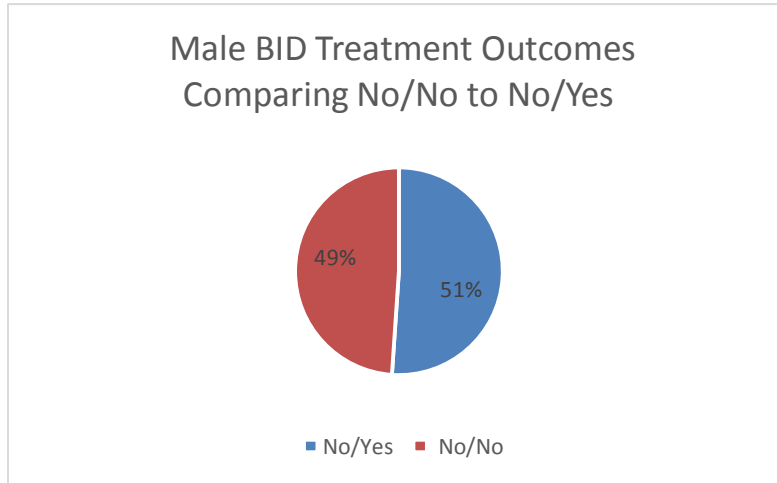
Chi square analysis was used to determine the relationship between diagnosis and no/no and no/yes frequencies [ $\chi^2 (9, N=196) = 17.72, p = 0.039$  (two-tailed)] and a significant association was found. Through post hoc analysis, with a Bonferroni correction of the p value set to  $p < 0.000$ , patients in the NICU demonstrated a significant association with higher non-treatment rates of no/no outcome when compared to no/yes outcomes ( $p = 0.003$ ). If a patient was in the NICU, they were more likely to experience no/no non-treatment.



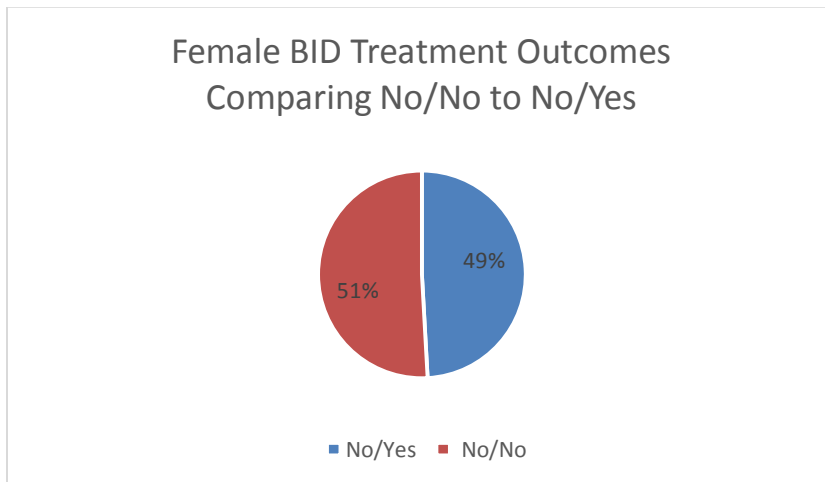
**Figure 7** BID treatment outcomes for patient diagnosis comparing No/No to No/Yes

*Gender*

Through chi square analysis, no significant association was found between gender and the no/no and no/yes groups [ $X^2(1, N=196) = 0.06, p = 0.804$  (two-tailed)].



**Figure 8** BID treatment outcomes for male patients comparing No/No to No/Yes

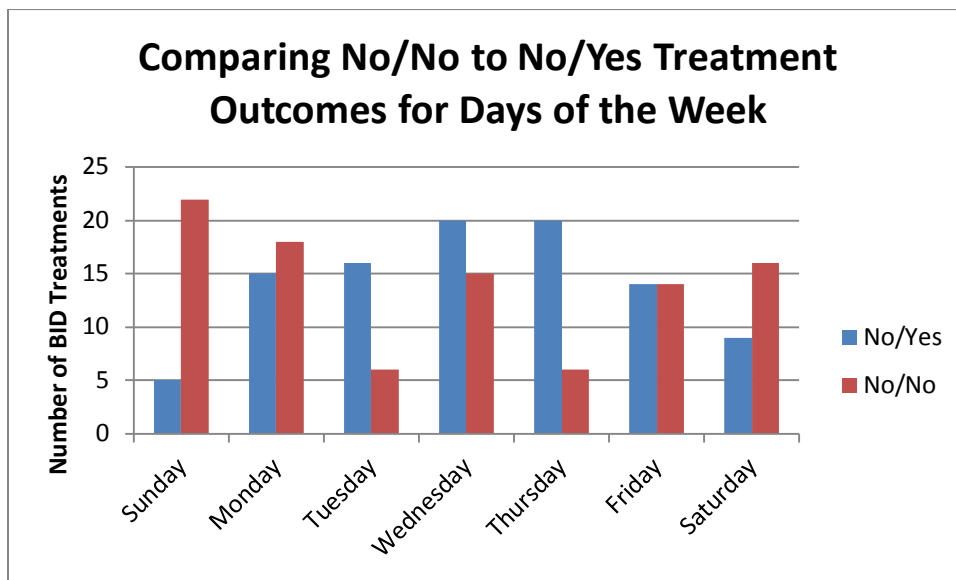


**Figure 9** BID treatment outcomes for female patients comparing No/No to No/Yes



### Day of the Week

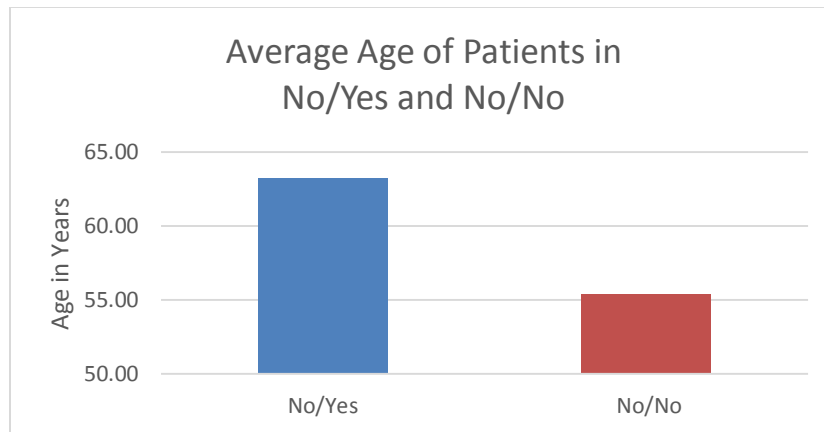
There was a significant association between day of the week and no/yes and no/no groups [ $\chi^2(6, N=196) = 25.72, p < 0.001$  (two-tailed)], ( $p=0.000$ ). In order to confirm where the differences occurred between groups, post hoc analysis was run with a Bonferroni correction to the p value of  $p < 0.004$ . If the first session of physical therapy occurs on a Sunday and results in non-treatment, it is more likely that the second session will result in non-treatment. On Sunday, 81.48% of treatment sessions result in no/no outcomes. There was no other significant association amongst the days of the week, but Thursday was trending ( $p=0.004$ ) (**Figure 10**).



**Figure 10** BID treatment outcomes by day of the week comparing No/No to No/Yes

### Age

Using a t-test, a significant difference was found between the age of patients in the no/no group compared to those in the no/yes group [ $t(194)=2.328, p=0.000$ ]. The average age of patients in the no/yes group was 63.21 (SD=17.794), and was 55.42 years old (SD= 28.021) in the no/no group (**Figure 11**).



**Figure 11** Average age of patients for BID treatment outcomes comparing No/No to No/Yes

*Results with exclusion of NICU*

When patients from the NICU were removed from analysis (N=64), there was no statistically significant difference in age among the 4 non-treatment groups, yes/yes, yes/no, no/yes, no/no) using one-way ANOVA ( $p=0.685$ ). When the patients seen in the NICU were removed, results remained significant for diagnosis, gender, and day of the week when comparing non-treatment rates among patients in these groups. This was again determined using Chi square analysis to examine the relationship between diagnosis and non-treatment occurrence and a significant association was found ( $p=0.001$ ). After post hoc analysis using a Bonferroni  $p$  value adjusted to  $p<0.001$ , patients with a musculoskeletal diagnosis still had significantly ( $p=0.000$ ) higher numbers of scheduled treatment resulting in yes/yes. Chi square analysis was also used to examine the relationship between gender and non-treatment occurrence and there was a significant association ( $p=0.000$ ). Again, males were more likely to experience non-treatment than females. Chi square analysis was used to examine the relationship between day of the week and non-treatment occurrence and a significant association was found ( $p=0.024$ ). After

post hoc analysis, with Bonferroni adjusted p value  $<0.001$ , the number of no/no events on Sunday was trending toward significance ( $p=0.002$ ) but no significant association between day and outcome group was seen for Tuesday, Thursday or Saturday.

## **DISCUSSION**

This study aimed to determine whether or not patient and hospital characteristics are associated with increased non-treatment rates in the acute hospital setting for BID scheduled physical therapy sessions. The results demonstrate that all characteristics of gender, diagnosis, age, and day of the week have an association with whether or not a patient receives physical therapy for BID scheduled treatment sessions. Age demonstrated a significant difference in non-treatment occurrence, however when NICU patients were removed from the data set, age was no longer significant. These results are consistent with previous literature on the subject when compared to non-treatment rates of QID (once a day) physical therapy scheduled sessions.<sup>26,27</sup> Reasons for non-treatment rates in the acute care setting also remain the same for BID as QID including patient condition (too sick for therapy), patient refusals, patient unavailable (with other health care providers), no physical therapist available, patient discharge (D/C), and death.<sup>26,27</sup>

New findings from this research include gender differences in treatment outcomes. Males have a higher occurrence of no/no outcome compared to females. These results could be a reflection of personality differences between genders. According to a meta-analysis performed on gender personality differences, females were found to be more “extraverted and nurturing”, and the study describes males as being “more assertive and having more self-esteem” than females.<sup>28</sup> These personality traits could be associated with participation in physical therapy but other explanations may also exist and these explanations were not studied in this work.

At the hospital investigated in this study, a protocol exists that helps to educate its patients on expectations for physical therapy with musculoskeletal conditions especially when there is a planned surgery. Prior to orthopedic surgery, patients are educated on the rehabilitation process and are made aware that physical therapy will occur BID. When a patient knows what to

expect and anticipates physical therapy BID, non-treatment rates may decrease. In the future, research should be conducted to see if education and explanation of BID treatment sessions for other diagnoses would decrease non-treatment rates. Another finding for diagnosis demonstrated patients with Genitourinary/Renal diagnosis had significantly more yes/no events ( $p < 0.000$ ) than patients with any other diagnoses, however this was due to the fact that only 1 patient had 1 occurrence of yes/no BID outcome and this patient had a Genitourinary/Renal diagnosis

Prior to data analysis, we hypothesized that an increase in age would increase non-treatment occurrence. However, our analysis revealed that the mean age for experiencing a no/no outcome was 55.42 years ( $SD = 28.021$ ). One of the reasons this number was lower than expected is likely due to the inclusion of patients from the NICU in the no/no BID treatment group. The NICU includes patients who are all under the age of 1 year old. Patients from the NICU experienced the highest occurrence of no/no treatment outcomes. This population's low age reduced the age mean of patients experiencing no/no outcomes. After seeing this pattern in the data, patients from the NICU were removed and the analysis was performed again. With these patients removed, age was no longer significantly different among groups of non-treatment outcomes (e.g., yes/yes, no/no).

Weekends had the largest proportion of no/no outcomes. This was not surprising as a common concern of most hospitals is understaffing on weekends. This hospital in particular experiences 20-30% reduction in physical therapists on Saturdays and Sundays.<sup>26,27</sup> When there are fewer therapists, there will be fewer therapy sessions. Tuesday and Thursday demonstrated decreased occurrence of non-treatment events. Just as weekends experience decreased staffing, Tuesday and Thursday experience full staffing of physical therapists and therefore reflect increase treatment occurrence of BID scheduled sessions.

Diagnosis in this instance is interesting. Diagnosis of patients who are in the NICU have a significant association with increased non-treatment rates for the second session. In this setting, if a treatment results in non-treatment for the first scheduled session, it is due to a patient's current condition. In the NICU, when a non-treatment occurs for the first session, it is most likely a second session will too result in non-treatment because the patient's condition is not likely to change within the same day.

Day of the week, too, reflected that treatment scheduled on a Sunday would most likely result in non-treatment if the first session resulted in a non-treatment. Although not a significant association Thursday was trending toward a similar phenomenon but in the other direction. If a patient was scheduled for therapy on a Sunday and it resulted in non-treatment, it was not likely the second session would result in treatment. However, if the first session for physical therapy resulted in non-treatment on a Thursday, it was more likely the second session would result in treatment. The most likely explanation for this finding is increased staffing during the week. When more physical therapists are available, more patients will be treated. On the weekends, there is a 20-30% reduction in staffing and this leads to increased non-treatment occurrence.

#### *Data without NICU patients*

Due to the fact that patients who are labeled as NICU for diagnosis do not have the ability to refuse nor accept physical therapy treatment, patients from this group were removed so data could be reexamined. Without the NICU patients present in the data, diagnosis, gender, and day of the week were still significant but age was no longer significant. A Musculoskeletal diagnosis still demonstrated an increased association with yes/yes treatment occurrence and a decreased significant association with no/yes treatment occurrence. Males demonstrated a significant association with higher occurrence of non-treatment compared to females. All 3 of

these characteristics of diagnosis, genders and day of the week demonstrated this significance, most likely due to the reasons aforementioned in this section. Day of the week also demonstrated a significant association with higher non-treatment occurrence. This time, without the NICU, Sunday was only trending towards significance for increased no/no treatment outcomes. This tells us that patients on the NICU are more likely to experience non-treatment events than patients with other diagnoses.

### *Limitations*

Due to patient data retrieved from a single 430 bed metropolitan hospital in the south west United States, generalizability is limited to similar populations and may not reflect other hospitals or other patient populations. Another limitation to this study includes a disproportionately large number of patients with a musculoskeletal diagnosis compared to patients with all other diagnoses who are scheduled for BID physical therapy treatment. Our data reflects increased compliance by patients with musculoskeletal diagnosis. This diagnosis was associated with a decreased non-treatment occurrence as it is expected that patients with an orthopedic injury will be educated prior to surgery to expect physical therapy BID at this hospital. A possible explanation may be that these patients are not as likely to decline treatment as a patient with an alternative diagnosis who is not expecting physical therapy BID.. It may be an opportunity to increase participation in patients with other diagnosis by setting an expectation for BID physical therapy early in hospitalization.

The hospital's risk management department would not allow access to the electronic medical record for this study to retrieve patient data. As a result, the card system utilized by the physical therapists was utilized for data analysis. This could possibly create inaccuracy as therapists are not held accountable for this documentation and it is not overseen by any hospital administration. It is possible that this form of documentation was not as accurate for characteristics such as reason for not being seen. The cards system is a personal practice to implement better communication amongst the therapists.



## CONCLUSION

Gender, age, diagnosis and day of the week of treatment all appear to play a role in non-treatment in the acute hospital setting when examining all ages included in this hospital. Females are more likely to have treatment whereas males have higher instances of non-treatment. It would seem that older patients are more likely to have non-treatment occur; it is patients in the NICU who are in jeopardy of non-treatment. Musculoskeletal diagnosis was associated with the highest rate of successful treatment occurrence over any other diagnosis. Weekends were associated with the highest occurrence of non-treatment when compared to Tuesdays and Thursdays, which had the lowest occurrence. Future research needs to be conducted in other hospitals with different populations outside the Southwest United States. In the future, a larger population should be utilized and include both patients who are scheduled for treatment BID and once a day. By identifying the characteristics of patients that demonstrate higher non-treatment rates, we hope to lower the occurrence of patients going untreated.

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- UNLV Physical Therapy Graduate School Class of 2013 Thesis Presentations. May 2015 and May 2016.
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