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A Correlation Between GPA and Physical Therapy Treatment Compliance

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Honors Project

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## **Introduction**

This study sought to find a relationship between students' university grade point average and physical therapy treatment compliance. Compliance with the exercise regimen set by a physical therapist is crucial to a patient's timely recovery. This often includes a home exercise program consisting of several different exercises to be completed outside of the clinic. As the study "Home based exercise programme for knee pain and knee osteoarthritis: randomised controlled trial" showed, following a home exercise program for 24 months significantly reduced knee pain and improved function and strength. Patients who adhered more closely to the provided regimen had more significant improvements compared to those who did not complete the program as often as instructed. This study showed how important compliance is to a full recovery.

There are many factors that can affect how compliant a patient is to medical treatment in general. Hinkin, Hardy, Mason, et al. found that age played a major role as older patients were three times more likely to comply with their antiretroviral drug treatment than younger patients. Another aspect that has been addressed in literature is how motivation affects compliance. Friedrich, Gittler, Halberstadt, Cermak, and Heiller investigated how a motivation program affected the compliance of patients receiving physical therapy. They found that patients who were enrolled in the motivation program attended more of their treatment sessions and had better physical outcomes after treatment. This program seemed to help short-term compliance, but there were no differences between the groups with regard to long-term compliance.

The research by Forkan, Pumper, Smyth, Wirkkala, Ciol, and Shumway-Cook contradicts this finding. They found that it was not the number of motivators a patient had, but rather the number of barriers a patient faced that could predict how compliant he or she would be. Sluijs, Kok, and van der Zee expand upon this in their study in which they found three main predictors for physical therapy treatment compliance. These were the effect of barriers on the patient, lack of positive feedback, and

the degree of helplessness felt by of the patient. Byerly, Worrell, Gahimer, and Domholdt agreed that self-motivation could not be used as a good predictor for compliance. Pain and support from others, on the other hand, had significant influence on an athlete's compliance. Support from others had a positive correlation with adherence. Pain had a negative relationship with compliance, as the more pain participants were in, the less compliant they were.

A great deal of research has been done to discover what can influence a college student's GPA. While motivation may not be a good predictor for medical compliance, Robbins, Lauver, Le, Davis, Langley, and Carlstrom found that achievement motivation and self-efficacy could strongly impact a student's GPA. Sleep schedules can also play a major role in a student's academic achievement. Hershner and Chervin pointed out that students who get more than 9 hours of sleep per night had an average GPA of 3.24, while those who received less than 6 hours per night had an average GPA of 2.74. Trockel, Barnes, and Egget further stressed the importance of sleep because out of the 12 variables they considered, sleep had the largest effect on GPA. Later wake up times and going to bed later were associated with lower GPAs. Working or volunteering long hours were also predictors for low GPAs. Some variables that increased GPA included studying spiritual material, using a planner, eating breakfast, and strength training.

Pritchard and Wilson added to the list of factors that can influence GPA when they studied emotional and social health and how they related to GPA. As far as emotional health is concerned, perfectionism and stress had particularly noticeable negative effects. Social health also played an important role, with factors like membership in an academic honors organization and frequency of alcohol consumption being the biggest positive and negative contributors, respectively. However, Paschall and Freisthler would disagree with the point about alcohol consumption as they found no significant correlation between heavy drinking, alcohol-related problems, or drinking opportunities and college GPA.

Economics can also impact a student's GPA. Hamilton examined the relationship between parents paying for college and the student's grades. She found that that students with parents who funded their education were more likely to graduate from college, but had lower GPAs than students who paid for their own schooling.

One of the few studies that looks at injury and GPA in college students comes from Freedman, Glasgow, Glasgow, and Bernstein. After examining student athletes who tore their anterior cruciate ligaments, they assessed how the injury affected their GPAs and how the timing of their reconstructive surgery influenced them. Students who had their surgeries during the school semester were far less satisfied with their surgery timing than those who elected to wait until a break from school. More students who had surgery during the semester failed classes, received incompletes, missed exams, and missed days of school than those who had surgery over break. Overall a significant drop in GPA was found in the student athletes who were injured compared to their peers.

While other researchers have shown how important compliance is and have investigated factors that affect compliance and GPA separately, no one has studied how GPA and physical therapy treatment compliance are related. We investigated how these two factors interacted and were influenced by other aspects in a population that had not received much attention in literature regarding treatment compliance.

## **Methods**

This study was a cross sectional survey that used a source population of undergraduate and graduate students at Bowling Green State University in the fall 2016 semester. In order to select a representative sample from this population, we set strict inclusion and exclusion criteria. To qualify for the study, participants must have received physical therapy within the past three years and be enrolled at Bowling Green State University. Once we obtained the email list for all BGSU students from the Office of Institutional Research, we sent out an invitation to 5000 students through Qualtrics that outlined the

criteria for the study. This email also contained a link to the survey so that students who were interested could access it directly. Those who wished to participate in the study electronically indicated their consent at the end of the survey by submitting it. The data collection method for this study was a questionnaire created using Qualtrics Online Survey Software. We asked for some basic demographic information such as age, gender, major, and GPA. There were also questions about different physical therapy factors, such as how long they received treatment, how long they were limited from activities, and why they stopped going to physical therapy, and factors that can affect GPA, including sleep, stress, diet, and on campus involvement. The data were analyzed using correlations and means as key statistical measures.

## **Results**

One hundred and five surveys were completed which gave us a response rate of 2.1%. However, not all participants answered each question, so the sample size varied by question. As seen in Table 1, most of the participants were either 21 years old or 25 years or older. Seventy-five percent of participants were female and approximately two-thirds of the sample do not have long term career plans in a health-care field.

In Table 2, the data collected regarding the factors known to affect GPA are presented. Most of the sample gets 6-7 hours of sleep, feels stressed at least half the days of the week, and is involved in two or fewer organizations. We also had students rank their diets on a scale of 1-5, 1 being the worst and 5 being the best, and over half of the participants ranked their diets as a 3. Below, in Table 3, are the data gathered regarding physical therapy home exercise compliance. The participants were asked how many times per week they were asked to complete a home exercise program (HEP) and how many times they actually completed it. Next, they were asked for how many weeks they were prescribed a HEP and how many weeks they actually performed it.

Characteristic	%	n
Age	100	101
<18	1.0	1
18	0	0
19	1.0	1
20	1.0	2
21	26.7	27
22	15.8	16
23	8.9	9
24	4.0	4
25+	40.6	41
Gender	100	100
Male	24.0	24
Female	75.0	75
Other	1.0	1
Career in Health	100	101
Yes	33.7	34
No	66.3	67

Table 1: Demographic characteristics of sample

Factor	%	n
Hours of Sleep	100	105
0-1	0.0	0
2-3	0.0	0
4-5	10.5	11
6-7	65.7	69
8-9	22.9	24
10+	1.0	1
Days Stressed	100	105
0-1	10.5	11
2-3	29.5	31
4-5	35.2	37
6-7	24.8	26
Organizations	100	105
0	26.7	28
1	36.2	38
2	21.9	23
3	10.5	11
4	1.9	2
5+	2.9	3

Table 2: Factors that affect GPA

	%	n		%	n
Asked to complete HEP	100	81	Completed HEP	100	79
1 time per wk	0	0	1 time per wk	16.5	13
2 times per wk	6.2	5	2 times per wk	15.2	12
3 times per wk	27.2	22	3 times per wk	25.3	20
4 times per wk	7.4	6	4 times per wk	16.5	13
5 times per wk	17.3	14	5 times per wk	16.5	13
6 times per wk	1.2	1	6 times per wk	2.5	2
7 times per wk	40.7	33	7 times per wk	7.6	6
Asked to complete HEP	100	83	Completed HEP	100	82
1-2 wks	10.8	9	1-2 wks	26.8	22
3-4 wks	24.1	20	3-4 wks	26.8	22
5-6 wks	20.5	17	5-6 wks	17.1	14
7-8 wks	10.8	9	7-8 wks	12.2	10
9-10 wks	2.4	2	9-10 wks	2.4	2
11+ wks	31.3	26	11+ wks	14.6	12

Table 3: Reported prescription and participation in home exercise program (HEP)

To see how compliant our subjects were, we calculated ratios. The completion days ratio is the ratio of how many times per week participants were asked to complete their HEPs and how many days per week they actually did it. Similarly, the completion weeks ratio is the ratio of number of weeks they were prescribed HEPs and how many weeks they actually performed the exercises. We used these percentages, as well as data from the factors known to affect GPA, to look for possible correlations with GPA. These data can be found in Table 4, with all of these factors compared to GPA. Seventy-two percent of our sample had a GPA between 4.0 and 3.5. Only 20% had a GPA between 3.49 and 3.0, 4% between 2.99 and 2.5, 3% between 2.49 and 2.0, and 1% with a 1.99 GPA or lower. After running the correlations, we found that none of them are significant. However, because the sample size was so small and most of the sample had a GPA between 3.5 and 4.0, there is very little variance which makes it difficult to find strong correlations. A very slight correlation of .1483 was found between the number of organizations a student is involved in and his or her GPA. If this study were to be done on a larger scale, that would be one aspect to which one should pay close attention.

	Hours of Sleep	Days Stressed	Organizations	Diet	Completion Days	Completion Weeks
GPA	0.0593	0.0195	0.1483	-0.0686	0.0475	-0.0537

*Table 4: Correlation of GPA with factors known to affect GPA and completion ratios*

Since we discovered no strong correlations, we decided to look at the means of different factors by GPA. These are displayed in Table 5. From this data, we found that people with GPAs between 3.5 and 4.0 were in more organizations than those with lower GPAs, especially those with GPAs under 3.0. Sleep seems to have had a mild impact on GPA, but no other factors that are known to effect GPA played a significant role in these subjects. It is apparent that the participants were more likely to do their HEPs for the right number of weeks (average 80% completion) than the right number of days per week (average 67% completion). Also, students with higher GPAs had higher means of completion in one week, but did their exercises for fewer weeks than their peers.



	Hours of Sleep	Days Stressed	Organizations	Diet	Completion Days	Completion Weeks
GPA 4.0-3.5	6.806	4.028	1.417	3.097	0.680	0.772
GPA lower than 3.5	6.589	4.214	1.143	3.107	0.638	0.892
GPA 3.5-3.0	6.632	4.079	1.368	3.053	0.617	0.931

Table 5: Means based on GPA

**Discussion**

Home exercise programs are very important to the timely recovery of a patient, which is why 84.69% of our sample said that they were given a HEP. Recovery time can be especially important to student athletes. Sixty-eight and a half percent of our participants were athletes in high school and 24.27% of our participants continued to be college athletes. These relatively high percentages may be due to several different influences. The fact that athletes are more likely to be seen by a trainer or therapist immediately following an injury may lead to more recommendations for physical therapy. These students also usually lead a more active life which would lead to a higher chance of injury that would require therapy. Additionally, these students usually want to get back to their sports as quickly as possible so they will go to physical therapy to facilitate their healing.

We were somewhat surprised to see that 25.74% of our participants only went to physical therapy for 1-2 weeks and 37% only went once a week. This could be due to the location where the individual went to therapy. Many hospitals have many patients so they will only see each patient once a week for a week or two. Private practices usually are able to spend more time with each patient and can treat them more often and for longer periods of time. Insurance coverage could be another reason to have fewer visits (11.11% of our participants said that they stopped going to therapy because they ran out of insurance coverage). Some people only are allowed a few physical therapy visits a year with their coverage and some have high copays. People may space out their visits more or come for fewer weeks to save visits and money. Age and complexity of case are two other factors that may affect the

frequency of visits. Younger patients heal faster so they may require fewer visits and a patient who had surgery will require more visits more frequently than someone who just had an ankle sprain.

Our participants were more likely to complete their HEP for the prescribed number of weeks than to complete it the suggested number of times per week. This may be because people get caught up in other responsibilities or do not think they have time to complete their HEP each day that they are supposed to. They also may think that the amount of days they actually complete it is “good enough”. We also found that individuals with higher GPAs did their exercises more often in a week but for fewer weeks. These high-achieving individuals may know how important their HEPs are so they are good about following them at first, but then as they see progress they think they are better so they do not need to follow the direction of the therapist anymore. Just because these students are motivated to get good grades, does not mean they will be motivated always to do their exercises. As can be seen in the introduction, motivation is a good predictor for GPA but not compliance.

It was interesting to see that people with higher GPAs tended to be in more organizations. This could be because these people are more motivated and therefore get good grades and want to be involved. Other possibilities include that people who are more connected to the university get better grades or that these individuals are forced to have better time management skills.

This study had several limitations, the largest being the use of Qualtrics Online Survey Software. Due to email license restrictions, we were only able to send out 5000 emails when we had access to 16,649 email addresses. If we would have been able to send out all the surveys it possibly could have dramatically increased our sample size and helped us to draw better conclusions from our data. There are also a few other questions we should have included in the survey that would have helped us to get a better idea about the individuals and how their compliance related to their GPA. These questions include what kind of injury they had, what type of facility they went to for physical therapy, and for their specific GPA instead of having them select the range that includes their GPA. In addition, since the

individuals in our sample were graduate or undergraduate students in college, we are unable to generalize conclusions to high school students. We would also not be able to study compliance in younger students in elementary or middle school using GPAs because most of those schools do not assign GPAs. Another measure would be necessary to find a relationship between a young student's academic performance and their physical therapy treatment compliance.

With more studies similar to this one, a better correlation between GPA and physical therapy treatment compliance could possibly be found. This would be able to be used as a way for physical therapists to better understand their patients and to help them tailor therapy to young patients. With this tailored therapy, patients may be able to return to pain free activities of daily living faster, have a greater improvement in range of motion, and improved outcomes from medical treatment overall. In the long run, this study opens opportunities for investigation into how well different approaches to physical therapy work for students with different GPAs.

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