Investigating the Interaction of Daily Steps and BMI on Stress Over Time

Report and Analysis

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In this dataset, we looked at a 42-month period to analyze how a patient's physical activity (measured by daily steps) and body composition (BMI) might affect their stress levels over time.

A multiple linear regression model was used to determine if there was a significant interaction between daily steps and BMI in predicting stress levels.

Hypothesis:
Null Hypothesis (H_0):
There is no significant interaction between daily steps and BMI affecting stress levels.

Alternative Hypothesis (H_1):
There is a significant interaction between daily steps and BMI affecting stress levels.

In the dataset Time Series Monitoring Data Group 010 we have found that:

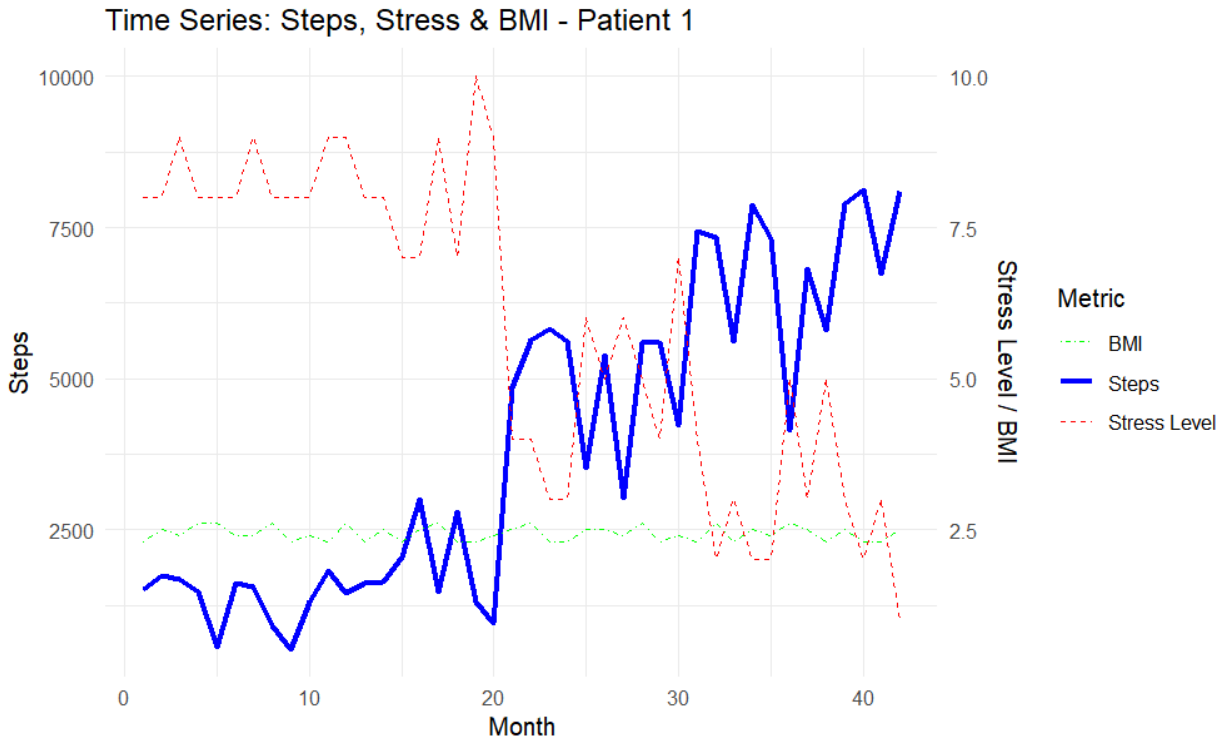
- Patient's average steps per month ranged widely in the span of 42 months suggesting varying levels of physical activity.
- BMI remained relatively stable between 23 and 26.
- Reported stress levels had a moderate average of 5.88 out of 10 with some months being much higher or lower indicating fluctuations in the patient's perceived stress over time.

Variable	Minimum	1st Quartile	Median	Mean	3rd Quartile	Maximum
Month (numerical)	1.00	11.25	21.50	21.50	31.75	42.00
Avg Steps (per month)	524	1,559	3,278	3,890	5,752	8,125
BMI	23.00	23.00	24.00	24.31	25.00	26.00
Stress Level	1.00	3.25	6.50	5.88	8.00	10.00

Time Series Plot of Patient 1' Steps, BMI, and Stress Level

- At the 20th month patient 1 started taking more steps and reached about 7500 steps at month 42.
- Stress levels can be observed decreasing simultaneously as the steps increase.

- BMI although fluctuating stayed relatively stable.



Multiple Linear Regression

- p-value (0.8199) is above 0.005 which means that the interaction of steps and BMI is not significant to stress levels.

Predictor	Estimate	Std. Error	t-value	p-value	Significance
Steps × BMI Interaction	0.000009901	0.00004318	0.229	0.8199	Not Sig.

The results suggest that while physical activity may help lower stress, BMI does not play a significant role in this relationship at least not as an interacting factor. Therefore, the null hypothesis is accepted, and we conclude that there is no significant interaction between steps and BMI in predicting stress.

As a recommendation, stress-reduction programs should include more than just physical activity. Mental health support, sleep management, and emotional counseling are also essential. BMI should still be monitored, but it should not be the focus when targeting stress.