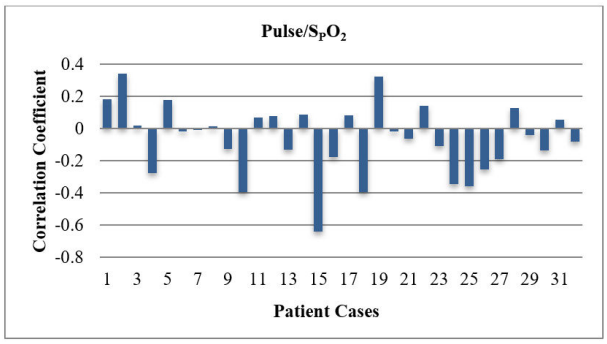

Figure 4. Correlation Results of Vital Signs for Sleep Apnea

correlation, 10 cases (31%) have positive correlation and 11 cases (34.5%) cases have no correlation. In Figure 2(c) about 12 cases (37.5%) have negative correlation, 7 cases (22%) have positive correlation and 13 cases (40.5%) cases have no correlation.

In Figure 2(b) and Figure 3, there exists significant correlation in Temperature/Pulse and Systolic BP/MAP, respectively. Correlation results for most of the cases are appeared positive as shown in Figure 2(b). Approximately, 30 cases (94%) have positive correlation and 2 cases (6%) have no correlation. About 90% average positive correlation exists for Systolic BP and MAP (shown in Figure 3), which is associated with IDH disease. From Figure 3, it becomes obvious that in all cases correlation results appear positive. About 60% (correlation coefficient = 0.6) average positive correlation exists for Temperature and Pulse (shown in Figure 2(b)), which are associated with Sepsis disease.

For Sleep Apnea, no significant correlation results appeared (for Pulse and SpO2) as shown in Figure 4. In Figure 4, for most of the cases, correlation results appeared negative. About 15 cases (47%) have negative correlation, 11 cases (34%) have positive correlation and 6 cases (19%) cases have no correlation.

Figure 5 presenting the scatter plot of above-mentioned correlation results for all 32 cases. Figure 5 also provides the linearity trend line of each correlation results. According to the definition of linearity, as much as the linearity trend line will be stable on the x-axis, it will show correlation results' stability. The linear trend line for Temperature/Pulse correlation is very stable as shown in Figure 5, which concluded that correlation result precision is above 90%. For the Systolic BP/MAP correlation, the linearity trend is about 75%. Moreover, the other three trend lines are not considerable because of their insignificant correlation results.

6. Conclusion

In this paper, we have analyzed the correlation among various vital signs for the purpose of monitoring the associated disease risks. Contrary to most of the existing schemes, we have used a real-life dataset of 32 patients for the analysis of three specific diseases that are found to be as common ailments in hospitalized patients. The analysis presented in this paper is helpful in the process to predict the disease pattern and patients' health condition. Our results show that there exists significant correlation among the studied vital signs, and we can use this correlation to predict the behavior of vital signs that may be unavailable in a specific scenario due to lack of resources. In the future, we aim to extend this work by applying machine learning techniques to find useful correlation among vital signs to predict risks of different diseases. Moreover, we intend to build an early alarm system using these predictions that can give some extra critical time to the doctors to react and save patients' lives.

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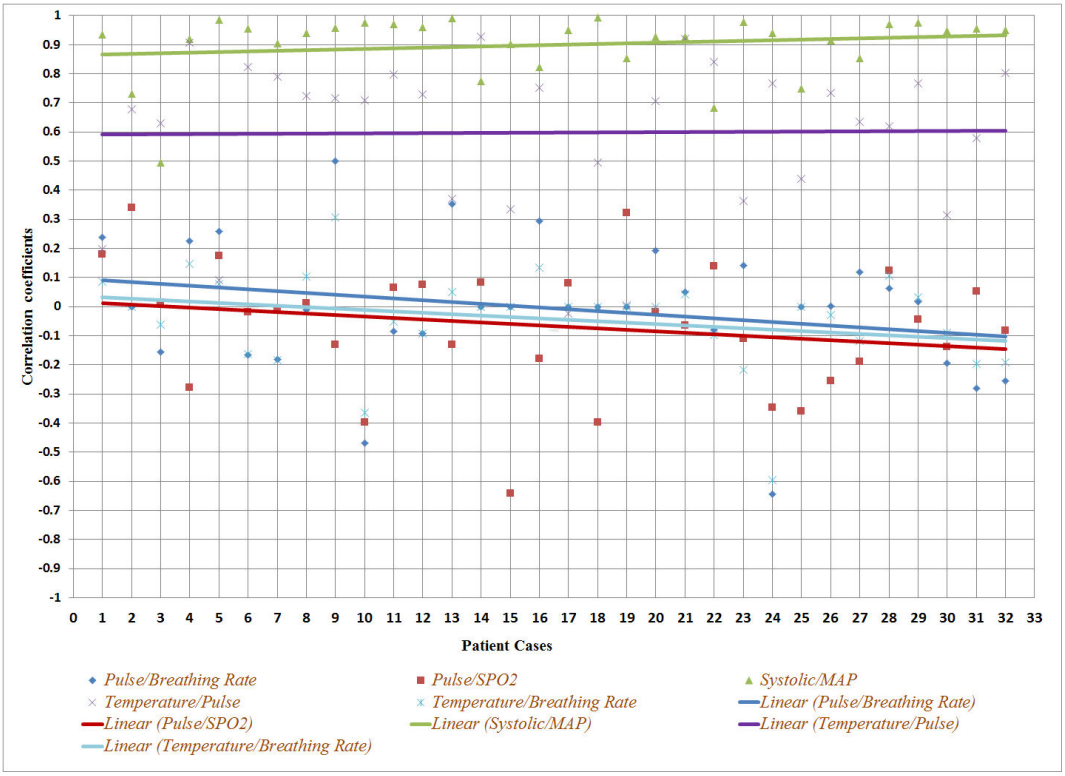

Figure 5. Linearity of Correlation Results

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