Analysis of the Influence of the Circaseptan Cycle on the Blood Pressure of a Retired Male Hypertension Patient

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Abstract: - Studies about blood-pressure measurements give contradictory results concerning variability across the week. Some studies indicate a Monday surge, other studies suggest relatively low values on the weekend, and still other studies do not find any significant differences across the week. The data analyzed thus far concern individuals, occasionally populations, that were measured either once or up to two weeks. This implies that the available data do not provide reliable information about the weekly variability of an individual if measured for a prolonged time. The present study fills this gap in knowledge by presenting an analysis of systematic measurements of an individual over a full year. The huge set of data (2196 SBP and 2196 DBP measurements) indicates a great variability across the week, without statistically significant tendencies.

Key-Words: - blood-pressure fluctuations, circaseptan cycle, diastolic pressure, hypothesis falsification, long-term monitoring, systolic pressure, weekly blood-pressure cycle.

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1 Introduction

Even only a decade ago, it was not really known [1] whether the day of the week has some influence on the height of the blood pressure (BP), even though some earlier studies had indicated a ´Monday surge´, [2]. This lack of knowledge about the variations of the BP across the week (the so-called circaseptan cycle) is remarkable, because it is known that cardiovascular events often occur on Monday morning, especially in the young working population, [3].

To fill the gap in knowledge about BP fluctuations across the week, a study was carried out involving 1852 participants who measured BP during 7 consecutive days, [1]. This study found BP to be lowest during the weekend (Saturday-Sunday): 129.0±18.9 (SBP) and 79.6±9.6 (DBP), and to be highest on Monday: 130.4±19.8 (SBP) and 80.6±9.9 (DBP), and that the BP increase was greater from Saturday–Sunday to Monday among the employed than among the unemployed (1.8/1.3 vs. 0.8/0.7; p = 0.02/0.01). This difference between working days and weekends was ascribed to work-related stress. This interpretation is plausible, as it has also been found (in a study with 752 participants) that the difference in SBP between working days and weekends is significantly higher for people with high job strain than for those with low job strain, [4]. These differences have, however, also been explained otherwise: weekend lowering may occur particularly by the effect of physical exercises in the weekend [5], but may also be due to a week-long (circaseptan) natural physiological cycle, [6].

1.1 Objective

Although the above-mentioned studies involved both participants below the age of 65 and older participants, they do not detail the ages, but it is most likely that the (great?) majority of participants were less than 65 years old. This raises, obviously, the question of whether retired people show any significant difference in BP between weekends and

other days of the week. The objective of the present study, therefore, is to find out possible structural BP variations across the week, and to analyze the findings statistically in order to determine whether the found differences have generic significance. Such an analysis of our huge data set thus might increase our insight into the variation of the BP over a week among elderly (unemployed) people.

2 Methods

In a full-year study (2024), the blood pressure was measured for a retired male (79 at the beginning, 80 at the end), three times a day, both left and right. This yielded 2196 SBP as well as 2196 DBP measurement values, which must give a much more reliable impression of the BP variation during the various days of the week than do the above studies. The measuring method and its conditions have been described in detail by [7]. The measurements were carried out at home by a retired male professor in one of the natural sciences, who was very interested in this study (which was carried out under the supervision of both his own GP and us) because he suffered distinctly from hypertension.

Our appointment with him was that he should try to measure his BP after having lain down (or at least having sat down quietly) for some minutes. Then he should perform a baseline measurement followed directly by a measurement of his left wrist BP and, again immediately, his right wrist BP. He should write down the measured values on a preprinted form, including the date and the measurement time (rounded to quarters of an hour, considering the time involved). The morning measurement should take place preferably between 07.00 and 08.00 h, the afternoon ones between 15.00 and 16.00 h, and the evening between 23.00 h and 24.00 h.

This approach must guarantee that the measurement data are mutually comparable, and that the data provide an accurate and reliable overview of the differences (if recognizable) for the various days of the week.

3 Results

It has already become clear during earlier analyses that the BP of the patient under study fluctuated uncommonly much and was higher than in healthy persons. The patient suffered clearly from hypertension, and the first analysis of his measurement data had therefore been aimed at investigating which medications would best lower his BP, [7]. The results of this investigation are summarized in Table 1 (Appendix), following the 9 phases that were characterized by different types of medication or pauses without medication between changes of medication.

3.1 Medical Context

The results of the above study yielded so much interesting data that it was decided to analyze the huge data set also for some other parameters. A fairly surprising finding was that the (on average) highest BP occurred – in contrast to common presumptions – neither in the morning (so-called morning surge) nor in the afternoon (following the circadian cycle) but in the evening. On the basis of these findings, it cannot be excluded that the patient represents an exceptional case, but even so, his measurement data provide an unprecedented source of information.

3.2 Measurement Data and Their Interpretation

When the measurements over all 366 days (2024 was a leap year) are taken together, hardly any difference between the various days of the week becomes visible. Also, the Saturday and Sunday show ´regular´ (though too high) values (Figure 1).

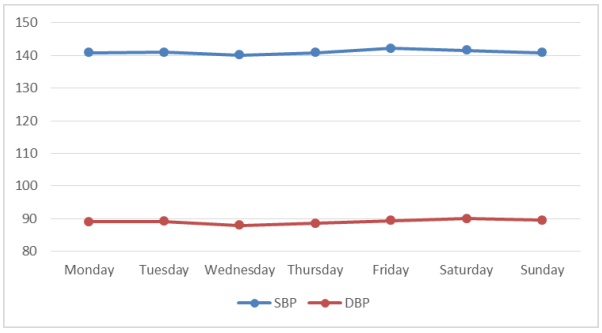

Fig. 1: Average SBP and DBP over the full year 2024. Note that the values for the SBP are (minimally) higher on Friday and Saturday than during the other days, whereas the DBP is (minimally) lower on Wednesday and Thursday
Source: created by the authors

3.3 Breakdown into the Intervals with and without Medication

It was clear from our earlier studies that such an overall picture does not represent the actual situation because of the damping effect of averaging. We therefore subdivided the data into intervals during which medication was administered (Figure 2).

This figure already shows more variation than Figure 1. Interestingly, Monday has, like found in most studies, [2], the highest average SBP, but Saturday shows, in contrast to the findings of other studies, [4], the lowest average SBP. Monday also

has the highest average DBP, but also here Saturday has the second-highest average DBP.

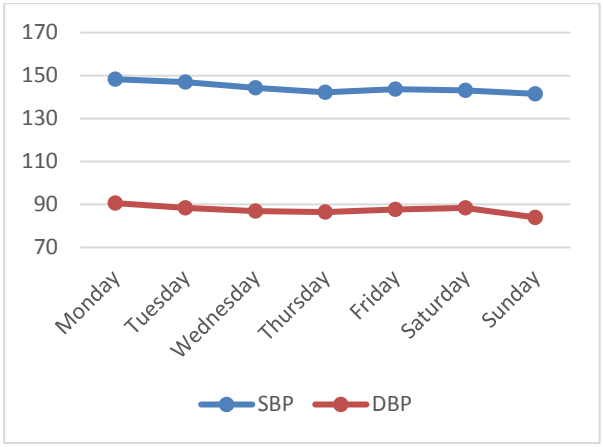

Fig. 2: Average SBP and DBP during the phases (1, 3, 5, 7, 9) when medication was administered
Source: created by the authors

The same procedure was followed for the phases (2,4,6,8; Table 1, Appendix) without medication (Figure 3), with even more remarkable outcomes.

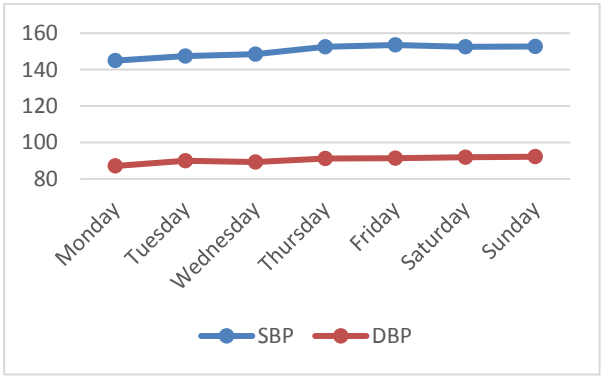

Fig. 3: Average SBP and DBP during the phases (2, 4, 6, 8) when no medication was administered
Source: created by the authors

These findings are so clearly in contrast with other studies that we decided to break down these data even further, so that a picture could be obtained for each individual phase.

Considering the differences found above for the intervals with medication (Figure 2) and those without medication (Figure 3), we decided to break up each of these figures: the results for the 5 individual phases during intervals when medication was administered are shown in Figure 4, and a similar graph has been constructed for the 4 phases during which no medication was administered (Figure 5).

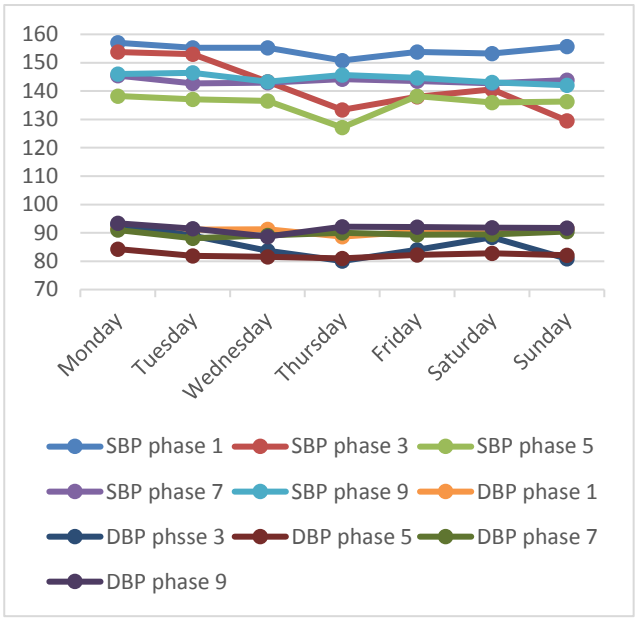

Fig. 4: Average SBP and DBP during the 5 individual phases in which medication was administered
Source: created by the authors

Here, the SBP shows the highest average value on Friday, but with Sunday and Saturday in second and third place, respectively. The data for the DBP are even more remarkable: Sunday and Saturday show the highest average values.

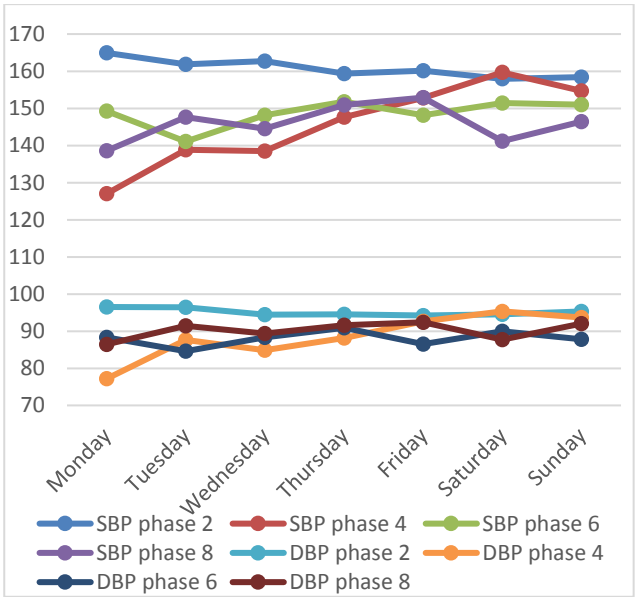

Fig. 5: Average SBP and DBP during the 4 individual phases in which no medication was administered
Source: created by the authors

Table 2. Average SBP values for the various days of the week for the five individual phases (1, 3, 5, 7, 9) with medication

day of the week	**SBP**					
	phase 1	*phase 3*	*phase 5*	*phase 7*	*phase 9*	*average*
Monday	157.03	153.75	138.26	145.46	146	*148.1*
Tuesday	155.22	153	137.04	142.7	146.43	*146.88*
Wednesday	155.32	143.33	136.48	142.96	143.25	*144.27*
Thursday	150.79	133.33	127.15	144.25	145.71	*140.25*
Friday	153.81	138	138.24	143.49	144.67	*143.63*
Saturday	153.26	140.58	135.98	142.79	143.13	*143.15*
Sunday	155.74	129.58	136.26	143.85	142.04	*141.49*
average	*154.45*	*141.65*	*135.63*	*143.64*	*144.46*	***143.97***

Source: created by the authors

Table 3. Average DBP values for the various days of the week for the five individual phases (1, 3, 5, 7, 9) with medication

day of the week	**DBP**					
	phase 1	*phase 3*	*phase 5*	*phase 7*	*phase 9*	*average*
Monday	91.62	92.92	84.28	91	93.37	*90.64*
Tuesday	91.1	89	81.91	88.1	91.53	*88.33*
Wednesday	91.23	83.67	81.57	89.15	88.71	*86.87*
Thursday	88.68	80.08	81	90.07	92.17	*86.4*
Friday	90.51	84	82.22	89.29	92.04	*87.61*
Saturday	89.77	88.42	82.8	89.44	91.83	*88.45*
Sunday	91.47	80.83	82.15	90.51	91.75	*87.34*
average	*90.63*	*85.56*	*82.28*	*89.65*	*90.21*	***87.95***

Source: created by the authors

Table 4. Average SBP values for the various days of the week for the four individual phases (2, 4, 6, 8) without medication. Source created by the authors

days of the week	**SBP**				
	phase 2	*phase 4*	*phase 6*	*phase 8*	*average*
Monday	164.94	127	149.28	138.56	*144.95*
Tuesday	161.89	138.83	141.06	147.61	*147.35*
Wednesday	162.72	138.5	148.17	144.5	*148.47*
Thursday	159.33	147.67	151.78	150.94	*152.43*
Friday	160.17	152.83	148.11	152.89	*153.5*
Saturday	157.94	159.67	151.44	141.17	*152.56*
Sunday	158.44	154.67	151	146.39	*152.63*
average	*160.78*	*145.60*	*148.70*	*146.01*	***150.27***

Source: created by the authors

The curves in Figure 4 and Figure 5 are so close together that a clear impression of the variation of the SBP and DBP values for the individual phases across the week is difficult to obtain. Therefore, we present the data here also in the form of tables. We do so separately for the SBP and DBP during the 5 phases with medication (Table 2 and Table 3, respectively) as well as for the 4 phases during which no medication was administered (Table 4 and Table 5, respectively).

Table 5. Average DBP values for the various days of the week for the four individual phases (2, 4, 6, 8) without medication. Source created by the authors

days of the week	**DBP**				
	phase 2	*phase 4*	*phase 6*	*phase 8*	*average*
Monday	96.5	77.17	88.33	86.44	*87.11*
Tuesday	96.44	87.67	84.61	91.39	*90.03*
Wednesday	94.44	84.83	88.83	89.33	*89.36*
Thursday	94.5	88.17	90.89	91.56	*91.28*
Friday	94.22	92.67	86.5	92.39	*91.45*
Saturday	94.5	95.33	90	87.72	*91.89*
Sunday	95.28	93.67	87.78	92	*92.18*
average	*95.13*	*88.43*	*88.13*	*90.12*	***90.46***

Source: created by the authors

Table 2 and Table 3 show clearly that the almost horizontal curves of Figure 1 are deceptive: although the differences per day of the week are not truly large, fluctuations appear to exist, indeed.

For the 5 phases with medication, the average SBP values range from 140.25 (Thursday) to 148.1 (Monday); the average DBP values range from 88.71 (Wednesday) to 93.347 (Monday). It thus appears that, in agreement with earlier studies, Monday shows the highest average values for both the SBP and the DBP. The situation is different for

the two weekend days. However, the Saturday and Sunday take, in contrast to earlier studies, not the lowest places but, as for the SBP, the first and second but lowest value; for the DBP, the weekend days take only the second and fifth position.

For the 4 phases without medication, the average SBP values range from 144.95 (Monday) to 153.5 (Friday); the average DBP values range from 87.11 (Monday) to 92.18 (Sunday). It thus appears that, in contrast to earlier studies, Monday shows the lowest average values for the DBP, whereas Sunday shows the highest average values.

3.4 Further Breakdown into Individual Weeks

The ranges in average SBP and DBP, as shown in Table 2, Table 3, Table 4 and Table 5, raise the question whether the averaging of data hides once more – because of the damping effect that this procedure has – larger actual differences. Consequently, we feel that it is only appropriate to provide here a further breakdown that might indicate that even the curves showing the averages for the various medication-dependent phases do not provide realistic information.

It is, obviously, impossible to provide our analyses for all weeks here. Therefore, we decided to do so for the weeks of one medical phase, and we take phase 5 (Table 1, Appendix) as an example. This phase seems most suitable because it covers 9 weeks, thus providing a sufficiently large number of measurements to allow drawing reliable conclusions about the variations of the SBP and DBP across the various days of the week. Because 18 curves in a single graph would be too difficult to distinguish, we present the values for the SBP in Figure 6 and the values for the DBP in Figure 7 in order to optimize clarity.

Considering that these curves are still so close together that they are difficult to interpret visually, we provide the underlying data again separately for the SBP (Table 6, Appendix) and the DBP (Table 7, Appendix).

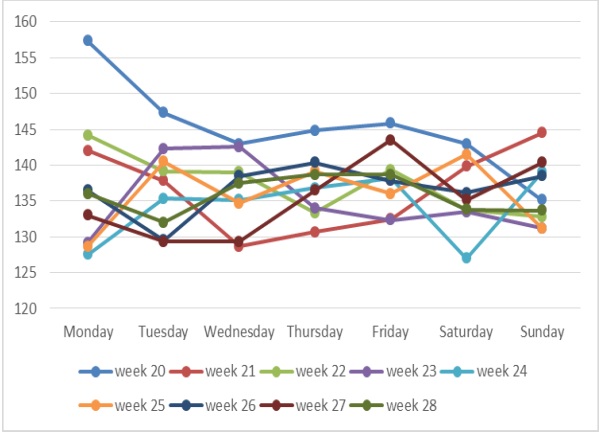

Fig. 6: Averages of the 6 SBP values measured daily during the days of each of the 9 weeks of medical phase 5
Source: created by the authors

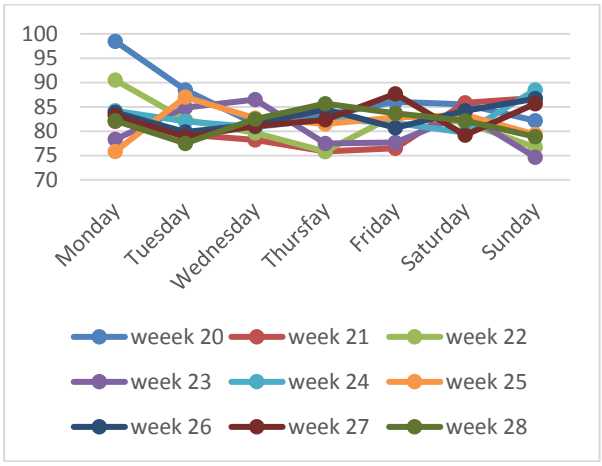

Fig. 7: Averages of the 6 DBP values measured daily during the days of each of the 9 weeks of medical phase 5
Source: created by the authors

3.4.1 Actual Distribution over the Days of the Week

Table 6 and Table 7 in Appendix, reveal what remained hidden when our measurement data had not yet been broken down this far; the actual measurement values do not justify the conclusions drawn on the basis of the averages. As far as the SBP is concerned, the (preliminary) conclusion that Monday shows the highest values and Thursday the lowest (Table 2) appears statistically not tenable. Some days of the week show (in phase 5!) both highest and lowest values, and the distribution seems haphazard: Monday (2x highest, 2x lowest), Tuesday (no highest, 3x lowest), Wednesday (1x highest, 2x lowest), Thursday (2x highest, no lowest), Friday (1x highest, no lowest), Saturday (1x highest, 1x lowest), Sunday (2x highest, 2x lowest); the occurrence of 10 lowest values in these 9 weeks is due to a combination of two (identical) lowest values in week 27.

A comparable picture is sketched for the DBP in Table 7 (Appendix). The highest and lowest average values shown in Table 3 for Monday and Wednesday, respectively, appear to have no general value: the highest and lowest values for the DBP in the individual weeks of phase 5 (Table 7, Appendix) seem, like for the SDP, haphazard: Monday (2x highest, 1x lowest), Tuesday (1x highest, 2x lowest), Wednesday (1x highest, 2x lowest), Thursday (1x highest, 2x lowest), Friday (1x highest, no lowest), Saturday (no highest, 1x lowest), Sunday (3x highest, 1x lowest).

It thus appears that, both for the SBP and DBP, the majority of days of the week show both one (or more) highest and lowest values, and that none of the days of the week shows either a highest or a lowest value. This could easily lead to the conclusion that no preferences exist, but it should be realized that the above values are the averages of 6 measurements per day (morning, afternoon, and evening, both left and right). This implies that it should be checked whether the average values are based on more or less constant daily values, or whether they represent strongly varying values. It is, obviously, out of the present scope to analyze this for all 366 days of the investigated year. We therefore decided, in order to avoid a biased choice, to select two days: the middle day (Thursday) of the middle week (24) of phase 5 (this was June 13, 2024), and the middle day of the investigated year (Tuesday, July 2; the one but last week of phase 5). The results for these two days are shown in Figure 8.

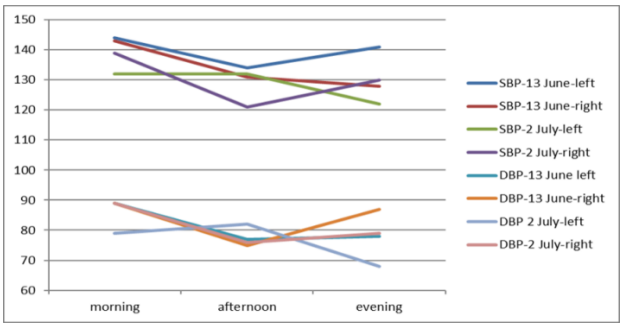

Fig. 8: Fluctuations of the SBP and DBP during the two selected days. Source created by the authors
Source: created by the authors

Although not negligible, the fluctuations over the day seem insufficient to alter the picture obtained from Table 6 and 7 in Appendix. This implies that the average daily values present a fairly reliable picture of the actual situation of the BP. Consequently, we decided to check which days of the week showed the highest and lowest values during all 52 weeks of our investigation. The objective was, obviously, to find out whether the above finding has the more generic implication that the lowest and highest values of the week are not concentrated in specific days of the week. The results of this analysis are presented in Table 8 (Appendix).

4 Discussion

In contrast to the great majority of BP measurements, probably billions of BP measurements that are performed annually by medical professionals [8], [9], the measurements dealt with here were performed at home by an aged male patient suffering from hypertension.

Although this may seem less reliable, several studies have indicated that the outcomes of such home measurements are comparable with professional measurements if a good procedure is followed, [10], [11], [12], [13]. Therefore, we made a strict agreement with the patient, who was also under the supervision of his GP and us. The measurement conditions have been described in detail by [7], to which we refer. The conditions concerned: (1) the medical background of the patient, (2) the time schedule of the measurements, (3) the conditions under which the measurements were performed, (4) the choice of the measurement equipment used, (5) the accuracy of the measurements and the reliability of the reported data, and (6) the choice of the medication and the duration of the nine phaseas during which the daily BP measurements were performed..

Another point to be discussed is whether the measurements might be biased because of specific habits or activities of the patient. We discussed this extensively because the patient had informed us during earlier consultations that he used to make long walks through the mountains, which certainly must have influenced his BP. He informed us, however, that he had to give up this hobby because his physical shape had significantly diminished during the COVID epidemic with all restrictions on outdoor activities. He made no more long walks and had no other day-dependent specific activities. This would imply that an analysis of all 52 weeks for the highest and lowest values of both the SBP and DBP should result in a picture that does not differ statistically significantly from what might be expected from a random distribution: the highest and lowest values of both the SBP and DBP of Mondays and Tuesdays should show a frequency of approx. 53 : 7 = ~7.8, whereas the frequency of Wednesdays to Sundays should be approx. 52 : 7 = ~7.43.

The findings of these analyses are shown in Table 9. The totals in this table are higher than 52 and 53 because some weeks have more than one day with the same highest or lowest SBP and/or DBP value.

The main subject to be discussed further is the significance of our findings and their generic validity. For the purpose, we have subjected the most relevant outcomes to some simple statistical analysis, with the objective to find out whether the distribution of the frequency of the highest and lowest values of the SBP and SBP across the week is random or follows a preferred pattern that is statistically significant.

Table 9. Frequency of the highest and lowest SBP and DBP values for the various days of the week for all 52 weeks (+ 2 days) of the entire year of monitoring

days of the week	**SBP**		**DBP**	
	high	*low*	*high*	*low*
Monday	11	11	16	9
Tuesday	6	11	8	12
Wednesday	10	10	7	6
Thursday	6	8	4	10
Friday	6	2	5	7
Saturday	6	10	7	9
Sunday	14	13	11	8
total	*59*	*65*	*58*	*61*

Source created by the authors

4.1 Statistics

As explained in Section 3, the averaging of the large number of data damps the differences to such a degree that no statistically reliable conclusions can

be drawn. We therefore restrict ourselves here to two sets of data: (1) the differences (for both SDP and DPB) found between the various days of the week in the selected medical phase 5, and (2) the data about the highest and lowest SBP and DBP values per week for all 52 weeks under investigation.

4.1.1 Differences per Day over the Phases with and without Antihypertension Medication

All BP measurements obtained during the nine investigated medical phases have been taken as input for a calculation of the mean SBP and DBP values per day of the week during (1) the combined five phases with antihypertensive medication, and (2) the combined four phases without such medication. Also, the standard deviations have been calculated. These data are presented in Table 10.

Table 10. Mean SBP and DBP, with standard deviations, for the various days of the week for the (combined) five phases with antihypertension medication and the four (combined) phases without such medication

day of the week	**SBP with medication**			**DBP with medication**	
	mean	*SD*		*mean*	*SD*
Monday	148.0	13.4		90.1	8.9
Tuesday	146.2	12.9		88.2	8.1
Wednesday	145.4	12.5		87.9	8.4
Thursday	144.4	11.4		87.4	8.7
Friday	145.4	10.7		88.2	7.8
Saturday	144.5	12.2		88.3	8.0
Sunday	145.1	12.9		88.7	9.1
day of the week	**SBP without medication**			**DBP without medication**	
	mean	*SD*		*mean*	*SD*
Monday	148.5	18.1		89.1	9.5
Tuesday	149.1	13.8		90.5	8.9
Wednesday	150.5	15.5		90.3	8.5
Thursday	153.4	13.8		91.9	6.6
Friday	153.6	11.3		91.2	6.3
Saturday	151.1	13.2		91.2	8.4
Sunday	152.2	9.5		91.9	5.7

Source created by the authors

It appears from this table that not only the variability in BP is considerable, but also that the standard deviations are very large, suggesting that the distribution of higher and lower values over the various days of the week does not follow a pattern but is rather random. This supports the other above findings that the day of the week has no significant influence on the height of the BP. It is interesting, however, that the standard deviations during the phases without antihypertension medication are somewhat larger (ranging from 9.5 to 18.1) than during the phases with medication (10.7 to 13.4).

This finding is consistent with what physiologically might be expected. Another finding is that the weekly variability is small compared to individual measurements.

4.1.2 Highest and Lowest Values per Week

We carried out an analysis of variance (ANOVA) for the seven days of the week, to test whether the differences between the average values of the various days of the week are statistically meaningful. The results are presented in Table 11.

Table 11. Analysis of variance (ANOVA) of the SBP

source of variation	**between groups**	**within groups**	**total**
sum of squares	1077.3	361171.0	362248.35
freedom degrees	6	2189	2195
mean square	179.556	164.9936	
F-statistic	1.0882		
p-value	0.3669		
F-critical	2.1002		

Source: created by the authors

Although the data presented in Table 9 give a clear and quick impression, this table should be considered not very reliable because the data represent almost by definition an exceptional situation. If, for instance, a Sunday has the highest SBP of the week, it can, in principle, well be that all other days of the same week had a value of only 1 mmHg less.

The results of the one-way ANOVA test can be summarized as: $F(6,2189) \approx 1.09$ ($p \approx 0.37$).

The results of this statistical analysis can also be shown in a box plot (Figure 9).

4.1.3 Additional Statistical Analyses

In addition to the ANOVA test, several statistical methods were applied to check whether the outcome of ANOVA would be falsified or confirmed. It seems out of scope here to deal with all these checks in detail, so we summarize in this section only the outcomes.

Autocorrelation analysis did not reveal any consistent periodic structure. Spectral density analysis likewise showed no dominant frequency corresponding to a 7-day cycle, indicating absence of a circaseptan rhythm.

A Kruskal-Wallis test demonstrated significant differences in BP distributions across the nine distinguished medical phases ($p<0.05$). Post-hoc comparisons revealed that the phases during which medication was administered (and particularly in the form of combination therapy) were associated with

significantly lower values than the phases without medication. These findings do not, however, show any relationship with a circaseptan cycle.

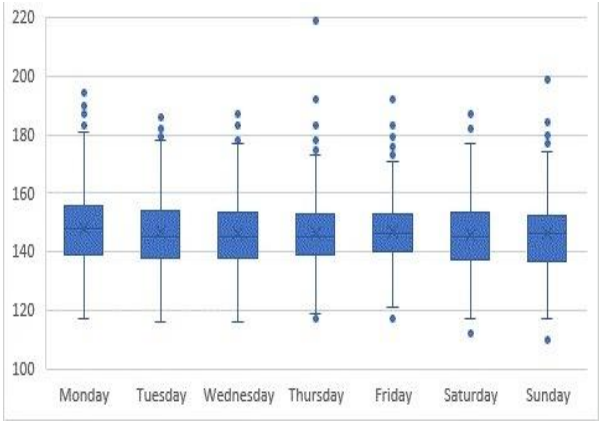

Fig. 9: Box plot of the SBP during the various days of the circaseptan cycle
Source: created by the authors

Mixed-effects modeling identified medication phases as a significant predictor of BP ($p<0.001$), with additional contributions from time of day. Day-of-week effects appeared not statistically significant, further supporting the absence of a circaseptan pattern.

Variance decomposition revealed substantially higher within-day and between-day variability of BP during the medical phases without medication than during phases with medication. No structured periodic variance was present, supporting the interpretation that the fluctuations in BP were driven by instability rather than by endogenous circaseptan regulation.

5 Conclusions

The ongoing discussion about the BP during the circaseptan cycle is based on measurements of individuals and groups that were monitored only once or for a maximum of two weeks. The present study is based on systematic monitoring of an aged male individual during a full year, three times a day, both left and right. The measurements show large variations, particularly in the SBP, but no significant differences are found between the average values of the seven days of the week.

All statistical analyses of our measurement data indicate that the BP values are driven by both treatment and instability, not by any timing related to a weekly (circaseptan) biological cycle. Nor was any indication found for a Monday surge.

It must thus be concluded that the year-long monitoring did not provide any evidence for a Monday surge or variations following the circaseptan cycle. A similar investigation might find a different result, however, if aimed at young or unemployed individuals. It is therefore advised to develop strategies and the conditions for such research aimed at reducing cardiovascular risks.

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Contribution of Individual Authors to the Creation of a Scientific Article (Ghostwriting Policy)

Both authors contributed to the present research, at all stages from the formulation of the problem to the final findings and solution.

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Data Availability

The complete set of daily measurement data is available from the corresponding author upon reasonable request, but only under specific conditions because of the patient´s privacy and ongoing data analysis by the authors.

Conflict of Interest

The authors have no conflicts of interest to declare that are relevant to the content of this article.

APPENDIX

Table 1. Characteristics of the 9 medication-dependent phases during the full year (366 days, 3 times a day) with BP measurements analyzed in the present study (simplified from [7]). The indicated medications were administered once daily

phase	medication*	range SBP	average SBP	range DBP	average DBP	duration (weeks)	*n*
1	L100	130-185	154	73-107	91	13	546
2	no medicine	141-182	161	80-103	95	3	126
3	L100 + Hy25	121-168	141	69-103	86	2	84
4	no medicine	117-168	146	77-100	89	1	42
5	L50 + Hy12.5	116-158	137	68-99	82	9	378
6	no medicine	128-176	150	74-105	88	3	126
7	Hi50	126-163	144	75-107	69	14	588
8	no medicine	121-219	146	70-106	90	3	126
9	Hi50	123-170	145	73-110	92	4 + 2 days	180

* L100 = Losartan 100 mg; L50 = Losartan 50 mg; Hy25 = hydrochlorotiazida 25 mg; Hy12.5 = hydrochlorotiazida 25 mg; Hi 50 = Higrotona 50 mg.

Source: created by the authors

Table 6. Averages of the 6 SBP values measured daily during the days of each of the 9 weeks of medical phase 5. The highest value per week is indicated in bold numbers, the lowest value in italics

day of the week	**SBP**									
	week 20	*week 21*	*week 22*	*week 23*	*week 24*	*week 25*	*week 26*	*week 27*	*week 28*	*average*
Monday	**157.33**	142	**144.17**	*129.17*	137.5	*128.67*	136.5	133	136	*138.26*
Tuesday	147.33	137.83	139.17	142.33	135.33	140.5	*129.5*	*129.3*	*132*	*137.03*
Wednesday	143	*128.67*	139	**142.5**	135.17	134.67	138.5	*129.3*	137.5	*136.48*
Thursday	144.83	130.67	133.33	134	136.83	139.17	**140.33**	136.5	**138.67**	*137.18*
Friday	145.83	132.5	139.33	132.33	138.17	136	137.83	**143.5**	138.67	*138.24*
Saturday	143	139.83	133.83	133.5	*127*	**141.5**	136.17	135.17	133.83	*135.98*
Sunday	*135.17*	**144.5**	*132.83*	133.17	**139**	131.17	138.5	140.33	133.67	*136.48*
average	*145.21*	*136.57*	*137.88*	*135.36*	*135.57*	*135.94*	*136.76*	*135.3*	*135.76*	***137.09***

Source: created by the authors

Table 7. Averages of the 6 DBP values measured daily during the days of each of the 9 weeks of medical phase 5. The highest value per week is indicated in bold numbers, and the lowest value in italics

day of the week	**DBP**									
	week 20	*week 21*	*week 22*	*week 23*	*week 24*	*week 25*	*week 26*	*week 27*	*week 28*	*average*
Monday	**98.5**	82	**90.5**	78.33	84.17	*75.83*	83.83	83.17	82.17	*84.28*
Tuesday	88.5	79.33	82.33	84.83	82	**87**	*76.83*	*78.83*	*77.5*	*81.91*
Wednesday	*81.5*	78.17	79.67	**86.5**	80.83	82.67	81.33	81	82.5	*81.57*
Thursday	83.33	*75.83*	*75.83*	77.5	82.5	81.5	84.5	82.33	**85.67**	*81.00*
Friday	86	76.5	83.33	77.67	81.67	82.83	80.67	**87.67**	83.67	*82.22*
Saturday	85.5	85.83	81.83	83.5	*79.67*	83.33	84.17	79.17	82.17	*82.80*
Sunday	82.17	**86.83**	76.67	*74.67*	**88.5**	79.33	**86.67**	85.67	78.83	*82.15*
average	*86.5*	*80.64*	*81.45*	*80.43*	*82.76*	*81.78*	*82.57*	*82.55*	*81.79*	***82.28***

Source: created by the authors

Table 8. Distribution across the days of the week of the highest and lowest SBP and DBP values during the 9 weeks of medical phase 5

SBP high						**DBP high**					
54 measurements						***58 measurements***					
morning		*afternoon*		*evening*		*morning*		*afternoon*		*evening*	
23		***14***		***17***		***8***		***29***		***21***	
left	right	left	right	left	right	left	right	left	right	left	right
10	13	5	9	8	9	3	5	13	16	8	13
SBP low						**DBP low**					
morning		*afternoon*		*evening*		*morning*		*afternoon*		*evening*	
19		***34***		***9***		***16***		***30***		***15***	
left	right	left	right	left	right	left	right	left	right	left	right
16	3	15	19	5	4	9	7	14	16	5	10

Source: created by the authors