

## PSYCHOPHYSIOLOGICAL ASPECTS OF SHALAT: A CHRONOBIOLOGY MEASUREMENT

**Libbie Annatagia, Nita Trimulyaningsih, Endah Puspita Sari**

Departement of Psychology, Universitas Islam Indonesia

[libbie.annatagia@gmail.com](mailto:libbie.annatagia@gmail.com)

### ABSTRACT

Shalat is an obligation for Moslems. It is written in Al Qur'an and Hadith. This study examined the psychophysiological aspects of those who perform obligatory shalat. The subject of this study was a 22 years old male student. The data was obtained from chronobiology devices named Stress Pilot and Smardwatch. Subject was measured by stress pilot two times: 2 hours after shalat and 20 minutes after shalat. Subject also measured by Smardwatch within 24 hours. Furthermore, the data from smardwatch were transfered to the computer. This study found that subject had a good stress regulation (quality of regulation was in level 31: concentration-relaxation, RSA: 34 & 35, age comparison: 61% - 70% and 71% - 80%). These findings prove that shalat give a good pychophysiological effect for subject.

**Keywords:** *psychophysiological, shalat, chronobiology*

### INTRODUCTION

Moslems are more likely to use religious coping techniques to cope with stressors. Meer and Mir (2014) find that religious beliefs are considered protective and encourage seeking social support, whilst acting on religious beliefs encourages resilience, hope and promotes 'positive religious coping'. Religious identity may influence wellbeing through various routes and a belief in God has demonstrated better treatment outcomes. For example, attending the mosque was a useful coping strategy; and reduction in depression during the fasting month of Ramadan (Meer & Mir, 2014). This study also confirmed the significance of a faith identity to Muslims, many of whom relate their health to their faith. Most practitioners took the approach that using religion as a resource encourages people to act on their beliefs. One of the rituals in Islam that can be this resources was salat.

*Shalat, Salah, salat*, or prayer is a form of prayer in Islam which has ritual, formal requirements and manners, which are essential to its correct observance. It is the most central elements of Islamic practice and worship. Among the Islamic rituals, it is the most prevalent since it must be performed five times a day – at dawn, noon, mid-afternoon, sunset, and after dark. According to Ayoub (Rijal, 2009), *Shalat* is actually a combination of prayer recitation and prayer through a formal movement. *Shalat* consists of both obligatory and the non-obligatory prayers. The obligatory *shalat* include the five daily prayers and Friday prayer. The latter must be performed in congregation, while the former can be performed individually, but it is recommended that they be performed in congregation where possible. The non-obligatory salat are numerous and include tahyatul masjid (performed when entering a mosque), the tahajud (performed during the midnight), istikharah (performed when asking for guidance to choose between two alternatives), tawbah (performed after committing a perceived

sin), 'ied al-fitri and 'ied al-'adha (on the two holidays), istisqa' (when asking for rain to fall), and rawatib (before and after obligatory prayers).

Indeed, the Prophet Muhammad said: "Between belief and unbelief lies the performance of *shalat*." This statement implies that the performance of ritual prayer defines an individual as a believer or Muslim (Rijal, 2009). The explanation about salat in the hadith and Quran apparently showed that there is a great wisdom (hikmah) of *shalat*. *Shalat* gives personal benefit to Muslims such as punctuality, sense of duty, self-discipline, character building, self-control, patience and perseverance, efficiency and refinement (Rijal, 2009).

Prayer in general, literally identified at least four possible mechanisms by which prayer may exert its influence on the health and well being of the individual (Jantos & Kiat, 2007): (a) Prayer as relaxation responses. Western form of religion produce desirable physiological changes, such as slowed breathing, reduction in heart rate, a drop in blood pressure, peripheral warming, slower brainwave activity (marked by an increase in alpha and theta activity), and a hypometabolic state. Prayer, silent or spoken, is associated with increased cortical activity, exemplified by higher beta frequencies, as seen in alert and attentive communication. (b) Prayer as an expression of positive emotions. McCullough agrees that prayer improves mood and leads to a state of calm that extends to other areas of the life of the person praying positive emotions generate physiological changes that have far-reaching consequences on our health and wellbeing. By The hypothalamic– pituitary system in the brain is the primary communication channel linking thoughts and emotions with messenger molecules that are released into the cerebrospinal fluid and through the blood system into the whole body. (c) Prayer as a channel for supernatural intervention. The most common reason why people turn to prayer is their belief in a divine being that transcends the natural universe and hears and responds to prayer, and prayer was the primary source of relief.

Moslems who perform *shalat* as a routine get the physical benefits from this ritual. *Shalat* involves a repetition movement of the body. *Shalat* also meets the principle of exercise: a warming up session, continuity, and enhance motivation. "[Prophet], recite what has been revealed to you of the Scripture; keep up the prayer: prayer restrains outrageous and unacceptable behavior." (Qur'an 29: 45). *Shalat* contains an excellent provision for the nourishment of the soul and provides a most valuable defense against the inroads of materialism and God-negligence (Rijal, 2009).

Required five times a day according to a sacred spatial orientation, the ritual prayer sanctify the daily rhythm of the believer. It also allows him to constantly re-new the link with the three founding realities of Islamic life, that is God (and His speech), the Prophet and the community (al-Ummah) (Sanseverino, 2010). The various dispositions engage all of the faculties, in particular the consciousness by intention, the speech by recitation, as well as the limbs by the various movements and positions (Sanseverino, 2010). *Shalat*, especially Friday prayer, strengthen Moslems minority religious and national identity. Joining and practicing Islamic rituals and activities, including Friday prayer, reinforces an individual's membership of the Indonesian Moslems community. On a social level, *shalat* teaches tolerance, unity, and cooperation with members of society (Rijal, 2009).

The communal rituals make social, political, economic and emotional links between participants (Monib & Din, 2013). Pedak (2011) said that movements in salat harmonizing the movements, thought, emotion, and spiritual. Sholeh (2006) revealed the importance of adaptation of homeostatic in every person who perform tahajud. This study found that tahajud could enhance the immunologic response of the body. Those who perform tahajud properly, sincerely, and continuously would have a positive motivation and an active coping, as well as have an adaptable circadian rhythm. Furthermore, Azam & Abidin (2014) found that those who perform tahajud have a lower stress compared to those who didn't.

One common criticism of prayer research is that prayer has become a popular therapeutic method for which there is no known plausible mechanism (Josen & Kiat, 2007). The studies of *shalat* has recently attracted little attention (Sanseverino, 2010; Rijal, 2009), especially when it comes to explore the psychophysiological aspects of *shalat*.

One of the point of view that used to have a deep understanding of the psychophysiological aspects of *shalat* is chronobiology. Chronos taken from the Greek word means time. Chronobiology is the science of temporal processes in the various bodily functions of biological systems which can be measured in terms of periodical phenomena of varying duration (Balzer, 2009), that objectively explores and quantifies mechanisms of biological time structure including important rhythmic manifestations of life right from molecular level of living being, from unicellular organism to complex organism such as human being (Singh, 2009).

The chronobiologists task is to investigate temporal processes in biological systems. Subdisciplines of chronobiology include chronomedicine, chronophysiology, chronopharmacology, chronotherapy, chronodiagnosis and chronoprevention, each of which describes certain areas of application of chronobiology (Balzer, 2009). Professor Franz Halberg known as the father of choronobiology, through his 60 years dedication to explore chronobiological research in the area of chronobiometry (physiological and statistical evaluation of the genetically anchored and cosmically influenced time structures), chronobioengineering (collecting physiological data by means of sophisticated equipments), chronobiological diagnosis of disease risk syndromes the chronotherapy, improvement of prognosis, treatment in different fields of medicine and last but not the least, chronobioastrobiology focusing on rhythms and broader chronomes to explore the origins of life (Singh, 2009).

Singh (2009) stated that chronobiology consists of rhythms' multi frequency spectrum that allows us to approach risks, diagnosis, and treatment dependent on appointment time, especially of the dynamics of time, gender, age, ethnicity and geographical location. The rhythm structure of living organism is partly endogenous, genetically programmed and thus differentially and rhythmically responsive to environmental cycles. A deviation from the physiologic range serves mainly to diagnose overt disease. Not only the body rhythms are affect daily, weekly, monthly, and yearly functions, but also the prevalence of disease symptoms, medical test results and even the way the body responds to drug therapies.

In this study, researchers would like to explore the psychophysiological aspects of those who perform obligatory *shalat*, using the chronobiology measurement.

## **METHOD**

The subject of this study was a 22 years old male student. His height is 167 cm, and his weight is 60 kg. He performs *shalat fardhu* as a routine. He also performs *dhuha* and *tahajud*. After *shalat*, he take his time to remembrance of God and recite Qur'an. In Monday and Thursday, he usually do fasting.

Two chronobiology measurements were involved in this study: stress pilot and smardwatch. Additional data were taken from interview. Stress pilot is a stress measurement tool that record the heart rate variability. ([www.stresspilot.biz](http://www.stresspilot.biz)). The Smardwatch® science human is a multiparametric monitoring system that enables to measure vital parameter of humans. The system can either transmit the measured data via telemetry over a range of approx. 30 m (inside) / 100 m (outside) or store it for 12 or opt. 72 hours. Classification of measurement include behavior, muscular reaction, vegetative-emotional reaction, vegetative-nerval reaction, and temperature regulation system ([www.chronomar.com](http://www.chronomar.com)).

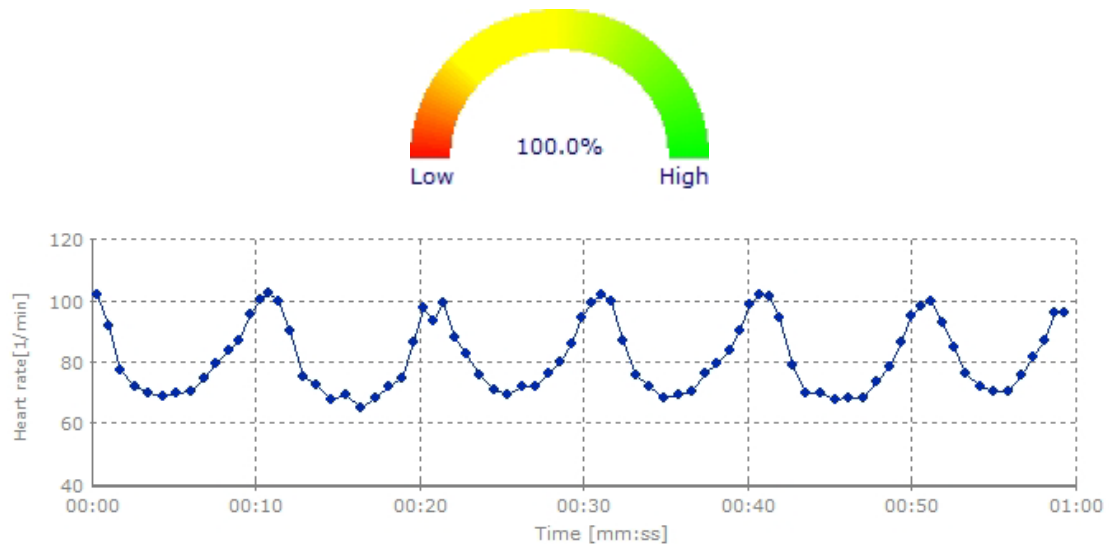
Stress pilot Procedures: 1) Started the Stress Pilot software; 2) Entered subject's data (name, date of birth, password); 3) Selected the option "HRV measurement"; 4) Attached the earclip to subject's earlobe. Lookod for the pulse display on the lower display panel and watched the signal for about a minute; 5) Asked subject to follow the instruction of the bar on the left-hand side of the screen. There was a coloured bar that moves up and down rhythmically. Asked subject to try to breathe in the same rhythm as the bar. Breathe in when the bar moves up and breathe out when the bar moves down; 6) Started the measurement; 7) Subject were measured by stress pilot in two times: 2 hours after Dhuhur, and 20 minutes after Ashr.

Smardwatch procedurs: 1) Put Smardwatch on subject's wrist; 2) Activated the Smardwatch connection in computer; 3) Smardwatch was used by respondent for 24 hours during his activities; 4) After 24 hours, Smardwatch was released from respondent; 5) Recorded the data; 6) Analyzed the stress regulation during Ashr, Maghrib and Isya.

Stress pilot data analysis is conducted by Stress Pilot software ([www.stresspilot.biz](http://www.stresspilot.biz)), while smardwatch data analysis is conducted by Chronobiological Regulatory Diagnosis (CRD) ([www.chronomar.com](http://www.chronomar.com)). Additional data was taken from interview.

## **RESULTS**

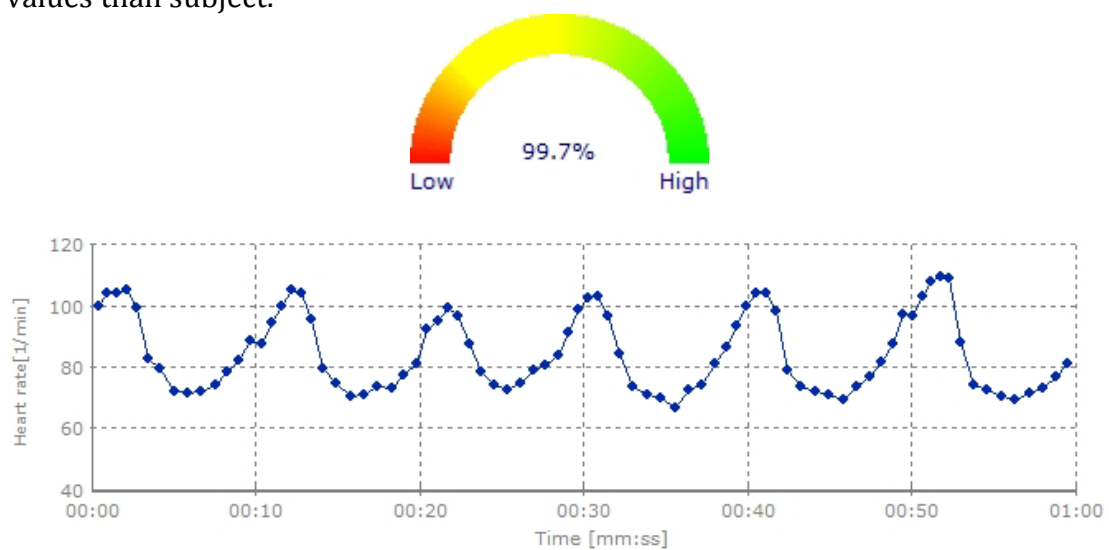
Stress Pilot measurement quality was good, at 100.00%. The average change to subject's heart rate with deep breathing (resp. sinus arrhythmia) was 34/min. With this, the following result is realized: 65.8% out of one comparison group have attained worse values, 34.2% have attained better values than subject.



**Tabel 1. Age Comparison for First Measurement**

| Rank/Age | 20-30<br>Years | 31-40<br>Years | 41-50<br>Years | 51-60<br>Years | 61-70<br>Years | 71-80<br>Years |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|
| 100-91%  | 57.1 -40.4     | 50.1-34.8      | 43.0 -29.2     | 35.8 -23.5     | 28.6 -17.8     | 21.3 -12.0     |
| 90 -81%  | 45.3 -35.6     | 39.8 -30.7     | 34.2 25.8      | 28.5 -20.8     | 22.8 -15.8     | 17.2 -10.8     |
| 80 -71%  | 39.9 -32.2     | 35.0 27.7      | 30.1 -23.3     | 25.2 18.8      | 20.2 -14.3     | 15.3 -9.9      |
| 70 -61%  | 36.1 -29.3     | 31.7 -25.3     | 27.3 21.3      | 22.8 -17.3     | 18.4 -13.2     | 13.9 -9.2      |
| 60 -51%  | 32.9 -26.6     | 28.9 -23.0     | 24.9 -19.3     | 20.9 -15.7     | 16.8 -12.1     | 12.8 -8.4      |
| 50 -41%  | 29.9 -24.0     | 26.3 20.7      | 22.6 -17.5     | 19.0 -14.2     | 15.3 -11.0     | 11.7 -7.8      |
| 40 -31%  | 26.9 -21.2     | 23.7 -18.3     | 20.4 -15.5     | 17.2 -12.7     | 13.9 -9.8      | 10.7 -7.0      |
| 30 -21%  | 23.8 -17.9     | 20.9 -15.5     | 18.0 13.2      | 15.2 -10.8     | 12.3 -8.5      | 9.6 -6.2       |
| 20 -11%  | 20.1 -13.5     | 17.7 -11.8     | 15.3 -10.0     | 12.9 -8.3      | 10.6 -6.7      | 8.3 -5.1       |
| 10 -0%   | 15.1 -0.0      | 13.3 -0.0      | 11.6 -0.0      | 9.8 -0.0       | 8.2 -0.0       | 6.5 -0.0       |

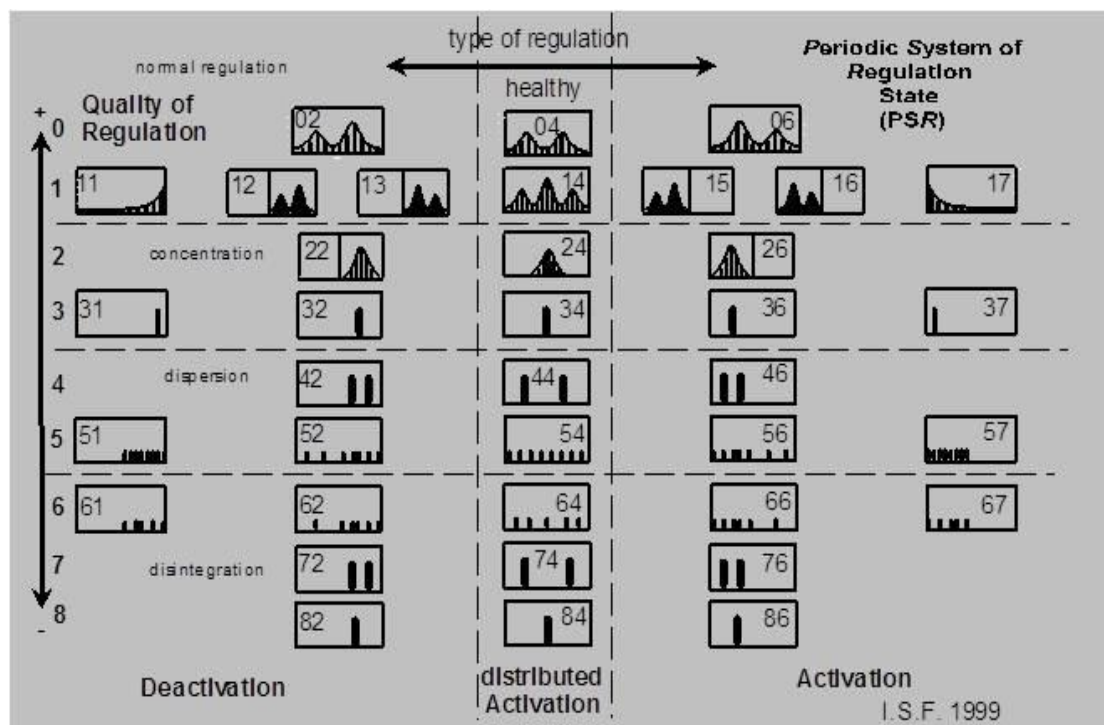
Measurement Quality 20 minutes after Ashr Shalat was good, at 99.69%. The average change to subject heart rate with deep breathing (resp. sinus arrhythmia) was 35/min. With this, the following result is realized: 70.1% out of one comparison group have attained worse values, 29.9% have attained better values than subject.

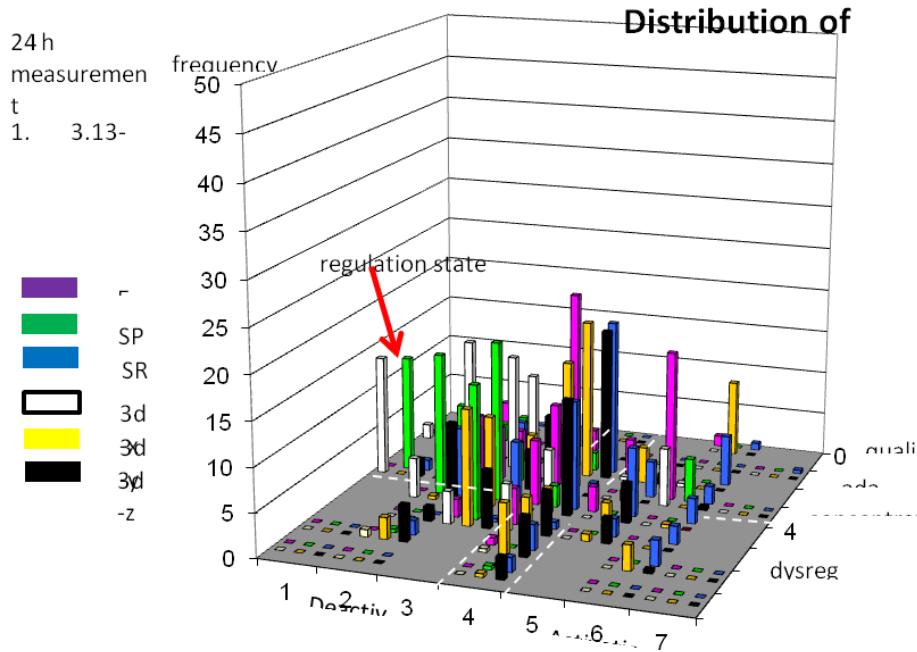


**Tabel 2. Age Comparison for the Second Measurement**

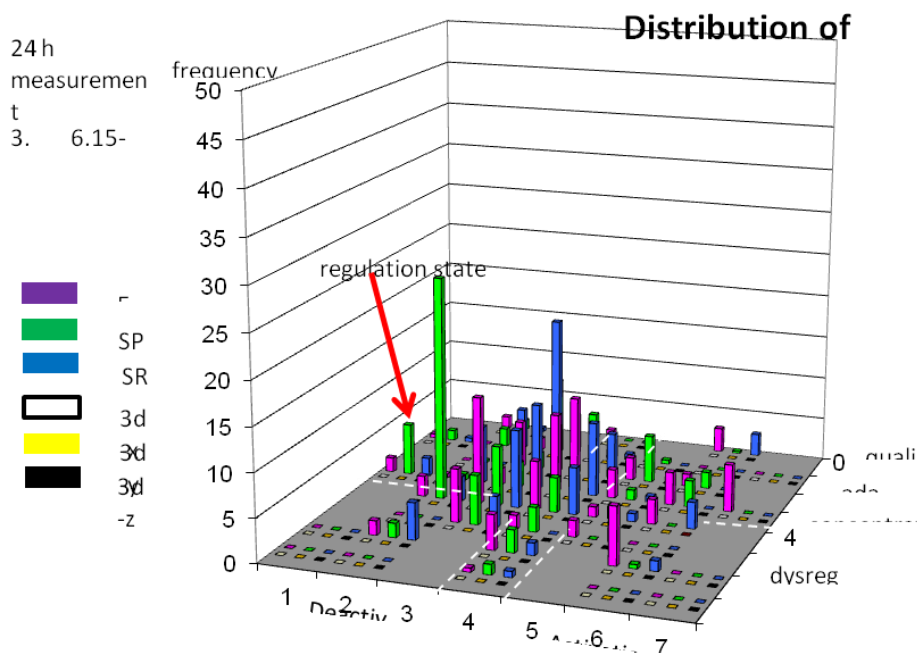
| Rank/Age | 20-30<br>Years | 31-40<br>Years | 41-50<br>Years | 51-60<br>Years | 61-70<br>Years | 71-80<br>Years |
|----------|----------------|----------------|----------------|----------------|----------------|----------------|
| 100 -91% | 57.1-40.4      | 50.1-34.8      | 43.0-29.2      | 35.8-23.5      | 28.6-17.8      | 21.3-12.0      |
| 90 -81%  | 45.3 -35.6     | 39.8 -30.7     | 34.2 -25.8     | 28.5 -20.8     | 22.8 -15.8     | 17.2 -10.8     |
| 80 -71%  | 39.9 -32.2     | 35.0 -27.7     | 30.1 -23.3     | 25.2 -18.8     | 20.2 -14.3     | 15.3 -9.9      |
| 70 -61%  | 36.1 -29.3     | 31.7 -25.3     | 27.3 -21.3     | 22.8 -17.3     | 18.4 -13.2     | 13.9 -9.2      |
| 60 -51%  | 32.9 -26.6     | 28.9 -23.0     | 24.9 -19.3     | 20.9 -15.7     | 16.8 -12.1     | 12.8 -8.4      |
| 50 -41%  | 29.9 -24.0     | 26.3 -20.7     | 22.6 -17.5     | 19.0 -14.2     | 15.3 -11.0     | 11.7 -7.8      |
| 40 -31%  | 26.9 -21.2     | 23.7 -18.3     | 20.4 -15.5     | 17.2 -12.7     | 13.9 -9.8      | 10.7 -7.0      |
| 30 -21%  | 23.8 -17.9     | 20.9 -15.5     | 18.0 -13.2     | 15.2 -10.8     | 12.3 -8.5      | 9.6 -6.2       |
| 20 -11%  | 20.1 -13.5     | 17.7 -11.8     | 15.3 -10.0     | 12.9 -8.3      | 10.6 -6.7      | 8.3 -5.1       |
| 10 -0%   | 15.1 -0.0      | 13.3 -0.0      | 11.6 -0.0      | 9.8 -0.0       | 8.2 -0.0       | 6.5 -0.0       |

Smardwatch measured periodic system of regulation states. Quality of regulation: concentration and relaxation. According to Balzer (2009) a state of well-being is one of deactivation. Thus in an ideal case all four parameters should lie in the upper left-hand quadrant in the deactivation region and with a high degree of regulation quality.

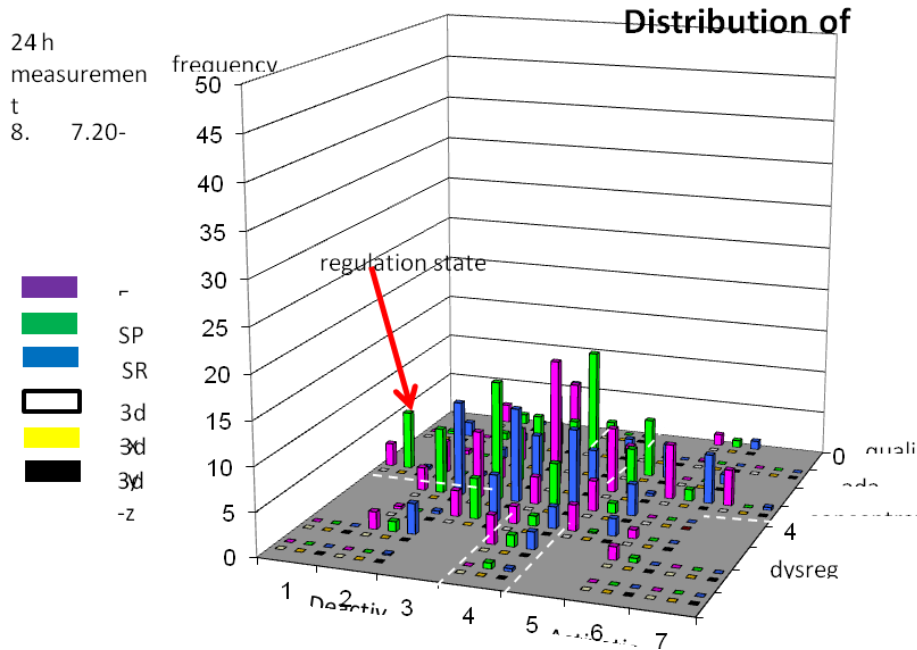




Before performed Ashr shalat, subject was in deactivated condition. When he started to pray, he turned to activated condition. In aspect of quality of regulation, concentration, and relaxation, When subject is start to perform shalat, he try to get focus in movement and activity. When he perform shalat, there is an activation in parasympathetic nerves, as well as deactivation in sympathetic nerves. When he perform shalat *magrib*, there is an activation in parasympathetic nerves, as well as deactivation in sympathetic nerves. There is also a high concentration level at the beginning of the Maghrib shalat. Among the three salah, the highest level of concentration and parasympathetic activation is in Maghrib salah.



When he perform shalat isya, there is an activation in parasympathetic nerves, as well as deactivation in sympathetic nerves. The concentration level is not as high as in Ashr and Maghrib salah.



## DISCUSSION

Stress pilot's result at the first measurement (2 hours after Dzuhur) showed that subject respiration sinus arrhythmia was 34/min. With this, the following result is realized: 65.8% out of one comparison group have attained worse values, 34.2% have attained better values than subject. age comparison was 61-70%. The second measurement (20 minutes after Ashr) showed respiration sinus arrhythmia was 35/min. With this, the following result is realized: 70.1% out of one comparison group have attained worse values, 29.9% have attained better values than subject. This result indicated that subject had a good stress regulation, compared to other people at the same age.

Subject said that after Ashr, he feel more fresh and relax. These feeling especially came from the water sensation when he took *wudhu*. According to Pedak (2011) *wudhu* give a fresh sensation that will activate limbic system. A prayer (*du'a*) that perform when someone took *wudhu* will stimulate the temporal lobes in brain and alfa wave, that have responsibility in creativity and learning. As Syathi (Al-Khuli, 2012) stated that *wudhu* will regulate the blood pressure, heart rate, increasing **erythrocyte**, strengthening respiratory system, and increasing oxygen supply. It also stimulate the regulation of muscle response (neck, pulmonary, and abdomen muscle). Those are the reason why *wudhu* give a refreshing sensation to the body.

After performed shalat, subjek stated that his body was feel more relax, especially around his eyes and eyebrows, as well as his back. This result confirmed Haryanto (2007) statement about *shalat*. *Shalat* is a kind of muscle relaxation, especially in some parts of the body: head, elbow, hand, feet, abdomen, back, thigh, knee, and calf. In general, shalat give a good impact to psychophysical condition. As stated by Ancok dan Suroso (2011) that *shalat* is more likely an exercise. When someone perform shalat, he/she will feel contraction in the muscle. Azam & Abidin's research (2014) found that people who perform tahajud experienced a less stress than those who didn't.

The result from stress pilot measurement also showed that the subject's second measurement (RSA: 35, age comparison: 71-80%) had a better values than the first measurement (RSA: 34, age comparison: 61-70%). The 20-minutes-after-*shalat* measurement showed better results than 2-hours-after-*shalat* measurement. We can conclude that each performance of *shalat* had a good effect to subject's psychophysiological condition, but the better effect found in immediately measurement (second measurement). This results strengthening the benefit of five times obligatory *shalat* (Subuh, Dzuhur, Ashar, Maghrib, Isya). Moslems perform those obligatory *shalat* not in a time, but five time per day. As it is known that, human need exercise and relaxation so that they don't feel tired and weary. Performing *shalat* five times per day will prevent human from tired and weary, since *shalat* has a refreshing and relaxing effect. Haryanto (2007) said that Islam had arranged best time to *shalat*. The reason why moslems have to perform *shalat* five times per day is because it symbolize balance & harmonization, so that moslems should not just spend the time to think about dunya, but also think about the hereafter. The balance life is playing an important role in people mental health. Furthermore, Haryanto (2007) also stated that *shalat* is a daily, weekly, and yearly activites. This is the reasons why *shalat* could be a way to establish the personality. Some of the personality characteristics of those who perform *shalat* as a routine: discipline, punctual, hard worker, loving the cleanliness, and good manner.

Meanwhile, smardwatch measurement showed that subject had a good stress-regulation (Regulation state: 31). Regulation state: 31 located in the upper left-hand quadrant of the type of regulation. According to Balzer (2009) a state of well-being is one of deactivation. Thus in an ideal case all four parameters should lie in the upper left-hand quadrant in the deactivation region and with a high degree of regulation quality. This result indicated that when subject proform *shalat*, he was in a good concentrating-relaxing condition. *Shalat* activated his parasympathetic nerves, which lead into a relax condition. According to Cahyani (2014), *shalat* has a relaxation effect, that restrain stress by regulating the bervous syse. In autoreglatin mechanism, it's stated that relaxation could decrease the blood pressure. *Shalat* also prevent someone from experience anxiety. When someone perform *shalat*, his/her soul comes to Allah, so he/she will release the sensation of sadness, anxiety, restlessness, and exhaustion. This also known as coping mechanism. Results of the research also showed the descriptive data for each *shalat*.

In Ashr, there was a deactivated to small activated movement. Before subject performed *shalat*, he was in deactivated condition. During *shalat*, smardwatch detected a small movement. Regulation state in Ashr was in level 31. This means that subject in a good concentration and relaxation during *shalat*. From the interview, researcher found that when subject is started to perform Ashr *shalat*, he tried to get focus in movement and activities. When he performed *shalat*, there was an activation in parasympathetic nerves, as well as deactivation in sympathetic nerves. This result showed that *shalat* had a meditation effect, as stated by Haryanto (2007) that *Shalat* had the similar effect with meditation and yoga practices. Furthermore, during performing *shalat*, someone will try to remember nothing but Allah (*dzikrullah*).

In Maghrib, the Regulation state was 31. The quality of regulation were concentration and relaxation. When he performed *shalat*, there is an activation in

parasympathetic nerves, as well as deactivation in sympathetic nerves. There was also a high concentration level at the beginning of the Maghrib *shalat*. Among the three *shalat*, the highest level of concentration and parasympathetic activation was in Maghrib. In Maghrib *shalat*, subject became the leader of the pilgrims, so he tried to enhance his concentration level. In this *shalat*, he choosed An Nas after Al fatihah, because this surah contains a request to Allah to cast out the demons whisper.

In Isya, the egulation state was 31. Subject's quality of regulation was in level 31, that indicated concentrating-relaxing condition. When he performed *shalat*, there was an activation in parasympathetic nerves, as well as deactivation in sympathetic nerves. The concentration level in Isya was not as high as in Ashr and Maghrib. Subject said that when he performed Isya *shalat*, he found that it's hard to get the focus, because the weather is not good. It was rainy outside. He still wore the smardwatch so he felt worry if the smardwatch will have a serious damage because of the rain. This thought was interrupt his concentration.

## CONCLUSION

From the results and discussion above, we can conclude that subject had a good stress regulation (measured by stress pilot and smardwatch). It proves that *shalat* give a good psychophysiological effect to subject. This study also found that the 20-minutes-after-*shalat* measurement showed better result than 2-hours-after-*shalat* measurement. This result indicated that, for subject himself, the best psychophysiological effect of *shalat* was in immediately measurement. This also strengthening the idea that *shalat* should be performed minimum five times per day, not just in a time. However, this study also had limitation in the number of subject. Since it was a single-case study, the result may not be generalized. It is suggested that the next study should take more subjects in psychophysiological study of *shalat*, so that the result may be generalized.

## REFERENCES

- Azam, S.M., & Abidin. Z. (2014). efektivitas shalat tahajud dalam mengurangi tingkat stres santri. *Jurnal Intervensi Psikologi*, 6(2), 171-180.
- Al-Khuli, H. (2012). Menyingkap rahasia gerakan-gerakan sholat. Jogjakarta: Diva Press
- Balzer, H. (2009). Chronobiology – as a foundation for and an approach to a new understanding of the influence of music. In Haas, R. & Brandes, V. *Music that Works* (page 25-82). Vienna: Springer-Verlag/Wien.
- Cahyani, H. F. (2014). *Hubungan shalat terhadap tekanan darah pada pasien hipertensi di Posbindu Anggrek Kelurahan Cempaka Putih Kecamatan Ciputat Timur*. Skripsi. Jakarta: UIN Syarif Hidayatullah.
- Fingelkurts, A. A., Fingelkurts, A. A., Tamminen, T. K. (2015). EEG-guided meditation: A personalized approach. *Journal of Physiology-Paris*, [doi:10.1016/j.jphysparis.2015.03.001](https://doi.org/10.1016/j.jphysparis.2015.03.001)
- Haryanto, S. (2007). *Psikologi shalat. Aspek-aspek psikologis ibadah shalat*. Yogyakarta: Pustaka Pelajar.
- Josen, M., & Kiat, H. (2007). Prayer as medicine: how much have we learned?. *MJA*, 186(10), 551-553.

- Monib, M., Din, M. S. A. (2013). The Role of congregational rituals in islamic pattern of life. *Academic Journal of Interdisciplinary Studies*, 2(8), 241-246.
- Pedak, U. M. (2011). *Dahsyatkan otak dengan sholat*. Yogyakarta: Pustaka Pelajar
- Rijal, S. (2009). Friday prayer and an Indonesian Islamic identity in Canberra, Australia. *Journal of Indonesian Islam*, 3, 148-167.
- Sagiran. (2009). *Mukjizat gerakan shalat*. Jakarta: Qultum Media.
- Sanseverino, R. V. (2010). *Interpreting the meaning of islamic ritual: The spiritual significance of ritual prayer according to Al Hakim al Tirmidzi (d. 279/892) and Ahmad Ibn 'Ajiba (d. 1224/1809)*.
- Sholeh, M. (2006). *Terapi salat tahajud*. Jakarta Selatan: Penerbit Hikmah.
- Singh, R. K. (2009). Chronomic and chronobiology in health and disease. *Indian Journal of Clinical Biochemistry*, 24(4), 319-323.
- Ghoffar, M. (2012). *Salat: Olahraga ampuh untuk diabetes melitus*. Yogyakarta: Graha Ilmu.
- Meer, S., & Mir, G. (2014). Muslims and depression: The role of religious beliefs in therapy. *Journal of Integrative Psychology and therapeutics*, doi: 10.7243/2054-4723-2-2
- [www.stresspilot.biz](http://www.stresspilot.biz)
- [www.chronomar.com](http://www.chronomar.com)

والله أعلم بالصواب

