DE GRUYTER OPEN

Research Article

Effect of Pharmacist Counseling on the Success of Therapy and the Quality of Life of Hypertensive Patients in a Hospital in East Nusa Tenggara

Magdarita Riwu[1,2]

Gilang Yubiliana[3]

Eli Halimah[1]

Keri Lestari[1]

Auliya Suwantika[1]

Dyah Perwitasari[4]

Ajeng Diantini[1]

[1]*Department of Pharmacology and Clinical Pharmacy, Faculty of Pharmacy, Padjadjaran University of Bandung*
[2]*Medical School of University of Nusa Cendana Kupang*
[3]*Faculty of Dentistry of Padjadjaran University of Bandung*
[4]*Faculty of Pharmacy of Ahmad Dahlan University Yogyakarta*

Doi: 10.1515/mjss-2017-0055

Abstract

Hypertension is a chronic disease that requires an intensive monitoring from time to time to prevent complications leading to cardiovascular disease. In addition, its complex health needs have an effect on the treatment process and the motivation of the patient for treatment. Therefore, pharmacist counseling is expected to provide information to patients in handling health problems, especially related to the treatment of hypertension. Counseling is expected to provide behavioral changes to optimize therapeutic effects and improve the quality of life of patients. The purpose of this study is to analyze the influence of pharmacist counseling on the success of therapy and quality of life of hypertensive patients. The study was conducted at a hospital in Kupang, East Nusa Tenggara to outpatients in Depo Induk implementing true experimental design and pretest posttest with control group with simple random sampling method during April - June 2017. The data collection included blood pressure, age, gender, education level, treatment success seen from decreased or controlled blood pressure, and quality of life with Short Form-36 (SF-36). The subjects of the study were 100 people divided into 50 people in the non-counseling group (who merely received information on medication as usual by pharmacist in Depo Induk) and 50 people in the counseling group (who received drug information service as usual by pharmacist in Depo Induk and individual counseling by pharmacist/researcher). Counseling was given in the form of giving insight about drugs, hypertension, and non-pharmacological approach (lifestyle modification) in managing hypertension. The results showed that with counseling, pharmacists can improve treatment success proven by the decrease of systolic blood pressure (-9 mmHg, p=0,000) and diastolic blood pressure (-7 mmHg, p=0,000); improve the quality of life of hypertensive patients with p<0.000 value of both pre and posttest and treatment (counseling) and also validated by final data test results between non-counseling group and counseling group.

Keywords: *success of therapy, pharmacist counseling, quality of life, hypertensive patients*

1. Introduction

Hypertension is a common cause of cardiovascular disease, widely recognized as the most common cardiovascular disorder and the number one risk factor for mortality. Hypertension causes at least 45% of deaths due to heart disease and 51% of deaths due to stroke. Almost 50% of 17.5 million deaths in the world are caused by cardiovascular disease associated with systemic arterial hypertension disease. The prevalence of hypertension in Indonesia in 2013 is 9.5%, 7.4% in Nusa Tenggara Timur, and 6.3% in Kupang.

Management of pharmacological aspects in controlling blood pressure has been implemented, but there is still an increase in complications related to hypertension. Some complications occurred due to poor treatment in controlling blood pressure such as coronary heart disease, peripheral vascular disease, and kidney disorders. Achievement of blood pressure control in addition to pharmacological approaches is also influenced by nonpharmacological aspects such as diet and physical activity so that the role of pharmacist in determining the success of hypertension therapy is highly needed.

The therapeutic problems of patients with chronic diseases are related to adherence to therapy so that pharmacists as pharmaceutical professionals are responsible for providing education through counseling to patients to make them understand the goals of therapy change and adhere to healthy lifestyles, and improve medication adherence.

The quality of life (QoL) of hypertensive patients is influenced by several socio-demographic factors such as age, gender, education, and family history of hypertension. Quality of life is also directly affected by the lack of education, lifestyle modification, and low levels of patient understanding on the management of the disease. Quality of life (QoL) is a complex concept. Therefore, to assess the outcomes of interventions related to quality of life, it uses the SF-36 questionnaire which is one of the generic instruments used to measure overall quality of life in general in patients with chronic diseases such as hypertension.[20] SF-36 assess 8 (eight) domains that include, physical function (10 questions), physical limitations (4 questions), body pain (2 questions), general health (6 questions), vitality (4 questions), social function (2 questions), emotional limitation (3 questions), and mental health (5 questions).

In East Nusa Tenggara, especially Kupang, pharmaceutical services in the field of clinical pharmacy, especially counseling, is still minimal. This is related to the lack of pharmacists. Pharmaceutical services in hospitals for outpatients, especially in Depo Induk, exceed the ratio of 1:50 with the number of pharmacist's as much as two people and the average visit of 175 patients. Pharmaceutical services provided when delivering drugs to patients are merely limited to drug name information, indications, and rules of use. This condition ultimately affects the lack of information about drugs, hypertension, and lifestyle modifications for patients when getting drugs.

Based on the above information, the research was conducted to analyze the influence of counseling pharmacist to the success of therapy and the quality of life of hypertensive patients in a hospital in East Nusa Tenggara.

2. Method

2.1 Research Subject

The research was designed in a pretest posttest study with control group. The subjects were hypertensive outpatients who become the participant of National Health Insurance (*Jaminan Kesehatan Nasional*/JKN) and perform and take medication at Depo Induk at East Nusa Tenggara Hospital from April to June 2017. The subjects were selected through a simple randomized study in patients diagnosed as suffering hypertension with or without complications, ≥18 years old and ≤65 year's old, receiving two kinds of drugs, known for their blood pressure values, and willing to participate in the study by signing informed consent.

2.2 Number of Research Subjects

The number of research subjects was obtained using the formula of proportion based on the prevalence of hypertension occurrence in Kupang (6.3%) and 10% to fill the possibility of drop out so that the total subjects were 100 people. The subjects were divided into two groups, i.e. 50 people in the non-counseling group (only receiving drug information services as usual by pharmacists in Depo Indah) and 50 people in the counseling group (receiving drug information service as usual by pharmacist in Depo Indah and counseling by researchers). In Depo Induk, the drug information is usually given in the form of drug name, indication, and rule of use.

2.3 Research Instrument

The instrument used is questionnaire. To measure the quality of life, Indonesia version of SF-36 questionnaire was used consisting of 36 questions divided into 8 domains. They are physical function (10 questions), physical limitations (4 questions), body pain (2 questions), general health (6 questions), vitality (4 questions), social function (2 questions), emotional limitation (3 questions), and mental health (5 questions). The questionnaires have been tested valid and reliable to measure the quality of life of hypertensive patients.

2.4 Data Collection

The data were prospectively collected from hypertensive patients who meet the criteria in 30 days. The data collection included age, sex, education level, occupation, blood pressure, and filling out the Indonesian version of SF-36 questionnaire. After one month when the subjects returned to do medical checkup, the final data were taken in the form of blood pressure and filling out the Indonesian version of the SF-36 questionnaire. Filling out questionnaires was done by research subjects while waiting for drug preparation.

2.5 Procedures and Treatment

Research subjects who met the criteria of inclusion and exclusion were randomly selected. Research subjects were informed of their voluntary participation and guaranteed that all their personal data will be kept confidential, and they are entitled to withdraw at any time during the study without having to give a reason. Proof of voluntary participation is by signing the informed consent. This research does not interfere with service process where the research subjects still get drug information service as usual by pharmacist at Depo Induk Hospital. The difference is there is additional service in the form of counseling to the counseling group. Treatment in the form of counseling was given by the pharmacist as a researcher. Counseling is an individualized educational intervention provided in a special counseling room with duration of 15-30 minutes (according to time agreement with the subject). Educational interventions were provided after ensuring the understanding of research subjects on the drug, hypertension diseases, and lifestyle modifications. Educational intervention in the form of counseling to the subject of research is provided without cost.

2.6 Analysis

The demographic data of research subjects were analyzed by descriptive statistics. Score/value of blood pressure and quality of life tested in distribution normality using Kolmogorov-Smirnov test. Normally distributed data were tested using parametric statistics, t test (for paired and free samples) and non-distributed data were resumed by different test with non-parametric statistic method, Wilcoxon test (for pre-post sample), and Mann Whitney test (For free samples in this case non-counseling and counseling groups).

Effect of treatment in the form of pharmacist counseling was determined by comparing blood pressure and quality of life before and after treatment.

3. Results

The characteristics of the demographic of subjects who met the inclusion and exclusion criteria were 100 people divided randomly in two groups: 50 people in non-counseling group and 50 people in counseling group. The results of demographic parameters of female hypertensive patients (57/100) were more numerous than male (43/100). Mostly the age of the patients are 54-65 years old (60/100) followed by the age of 42- 53 years (32/100) as much as 60 people. The educational background of the patients varies, in which 47 people (47/100) graduated from high school followed by university level (28/100), elementary school (13/100) and junior high school (12/100). (Table 1.)

Table 1. Distribution of Research Subject Demographics

Demographics	Non-counseling (n=50)		Counseling (n=50)		Total (n=100)	
	N	%	N	%	n	%
Sex						
Male	20	40	23	46	43	43
Female	30	60	27	54	57	57
Age (years)						
18-29	1	2	1	2	2	2
30-41	3	6	3	6	6	6
42-53	13	26	19	38	32	32
54-65	33	66	27	54	60	60
Level of Education						
Elementary School	7	14	6	12	13	13
Junior High School	7	14	5	10	12	12
High School	24	48	23	46	47	47
University Level	12	24	16	32	28	28

Differences in mean values of baseline blood pressure and end of observation in the subjects of non-counseling group are not significant (p> 0,05) both systolic blood pressure (p = 0,352) and diastolic blood pressure (p = 0,559). On the other hand, in counseling group, there was a significant difference (p <0.05) in both systolic blood pressure (p = 0,000) and diastolic blood pressure (p = 0.000). This data indicates a change in blood pressure in the group who received treatment in the form of pharmacist counseling. These results indicate that pharmacist counseling has a positive effect on decreasing systolic blood pressure (-9mmHg, p=0,000) and diastolic blood pressure (-7mmHg, p=0,000). Differences in mean values of blood pressure variables between pre-post non-counseling groups and pre-post counseling groups are presented in Table 2.

Table 2. Differences in Mean Value of Blood Pressure Variable (pre-post)

Criteria	Non-counseling				Counseling			
	Mean		Δ (Post – Pre)	*p*	Mean		Δ (Post – Pre)	*p*
	Pre	Post			Pre	Post		
Systolic Blood Pressure	133,8	135,6	1,8	0,352	135,6	126,6	-9	0,000
Diastolic Blood Pressure	84,4	85,2	0,8	0,559	85,6	78,6	-7	0,000

In Table 3, the results of Mann Whitney test to the initial data (pre) of non-counseling group and counseling group for the indicator value of systolic blood pressure (p = 0.501) and diastolic blood pressure (p = 0.653) is not different (p> 0.05). In other word, (pre) systolic or diastolic blood pressure of the whole research subjects is the same or no significant difference. Different test of non-counseling group and counseling group for indicator value of systolic blood pressure (p = 0,000) and diastolic blood pressure (p = 0,000) showed p value <0,05 meaning that there was a difference of blood pressure indicator value between non-counseling group and counseling group at the end of the observation. These results indicate the success of therapy in the form of decreasing both systolic and diastolic blood pressure influenced by the pharmacist counseling. Based on the

results of the interview, the patients revealed that the received pharmacist counseling made them become more understand the drugs, hypertension disease, and lifestyle modification and influence on the motivation of patients in the use of accepted drugs.

Table. 3 Mean of Blood Pressure and Compliance Variables (pre-pre and post-post)

Variable	Pre non-counseling	Pre counseling	P	Post non-counseling	Post counseling	P
Systolic Blood Pressure	133,8	135,6	0,501	135,6	126,6	0,000
Diastolic Blood Pressure	84,4	85,2	0,653	85,2	78,6	0,000

The mean difference in scores of quality of life variables is based on the filling of the SF-36 questionnaire done by pre-post research subjects. In the non-counseling group for the domain of physical function (p=0.771), general health (p=0.563), social function (p=0.099), and emotional limitation (p=0.191), there is no difference in the average number of scoring the initial data and the final data (one month after initial data retrieval without treatment) with p> 0,05. However, in physical function domain (0,021), body pain (p = 0,006), vitality (p = 0,000), and mental health (p = 0,020), there is an average difference in scores. The increase in the average number of scoring on non-counseling group before and after one month of observation for the domain of physical function, body pain, and general health is influenced by the drugs given to deal with complaints/clinical symptoms felt by the subject of current research health control to hospital (initial observation). Drugs given to deal with complaints/clinical symptoms in question are such as headache, low back pain (LBP) (paracetamol, diclofenac, meloxicam), abdominal pain (lansoprazole, Ranitidine, Ulsidex, Omeprazole), tingling, muscle cramps (Gabapentin, vitamin Neurotrophic), and depression (Amitriptyline).

The increase in the mean scoring value of the domain of emotional limitation might be related to the age of the subjects in non-counseling group included in the criteria for adults (approximately 55.74 ± 8.79 years), so that the subjects emotionally/psychologically have been able to accept the conditions/circumstances experienced. The mean of quality of life score of hypertensive patients (pre-post) is presented in Table 4.

Generally, in the counseling group, there is a significant difference in the value of quality of life indicators before and after counseling on eight domains. The increase in the mean score before and after counseling on eight domains showed besides the drugs given during health controls to the hospital, there is intervention in the form of pharmacist counseling on the additional information regarding side effects of medication, hypertension, possible complications, the need for regular treatment and drug use as recommended, and lifestyle modification. In addition, based on interviews with research subjects, they feel the attention and motivation of the pharmacist as a provider of health services when getting counseling.

Table 4. Mean Score of Variable Quality of Life of Hypertensive Patients (pre-post)

Domain	Non-counseling			P	Counseling			P
	Mean		Δ		Mean		Δ	
	Pre	Post	(Post - Pre)		Pre	Post	(Post - Pre)	
physical function	65,00	62,60	-2,40	0,021	59,70	76,20	16,50	0,000
physical limitations	16,53	18,00	1,47	0,771	10,50	65,50	55,00	0,000
body pain	49,00	61,75	12,75	0,006	57,50	86,00	28,50	0,000
general health	366,83	50,42	13,59	0,563	49,75	81,08	31,33	0,000
Vitality	62,20	59,00	-3,20	0,000	57,10	77,40	20.30	0,000
social function	48,00	57,75	9,75	0,099	57,75	77,50	19,75	0,000
emotional limitation	20,00	28,67	8,67	0,191	15,33	59,36	44,03	0,000
mental health	70,56	69,36	-1,20	0,020	62,48	87,60	25,12	0,000

The result of test of difference of indicator of quality of life which consist of eight domains between preliminary data in non-counseling and counseling group shows no significant difference (p> 0,05).

On the contrary, in post data between non-counseling and counseling group, there is no significant different in indicator value (p <0,05). This shows that the difference in the value of this indicator is due to the effect of the intervention in the form of pharmacist counseling. Test results are presented in Table 5.

Table 5. Mean Score of Quality of Life Variable of Hypertensive Patients (pre-pre and post-post)

Domain	Pre non-counseling	Pre counseling	P	Post non-counseling	Post counseling	p
physical function	65,00	59,70	0,259	62,60	76,20	0,000
physical limitations	16,53	0,50	0,215	18,00	65,50	0,000
body pain	49,00	57,50	0,966	61,75	86,00	0,000
general health	36,83	49,75	0,643	50,42	81,08	0,000
Vitality	62,20	57,10	0,153	59,00	77,40	0,000
social function	48,00	57,75	0,587	57,75	77,50	0,000
emotional limitation	20,00	15,33	0,256	28,67	59,36	0,000
mental health	70,56	62,48	0,052	69,36	87,60	0,000

4. Research Ethics

The research was conducted after obtaining ethical permit from Health Research Ethics Committee of Faculty of Medicine, University of Nusa Cendana Kupang with the number of Letter of Recommendation of Ethical Approval: 02a/UN15.16/KEPK/2017, dated March 15, 2017. In this research, there are two groups which are non-counseling group and counseling group. Therefore, by considering ethical aspect, at the end of research, the subjects in non-counseling group are given treatment in the form of pharmacist counseling so there is no difference of treatment between both research groups.

5. Discussion

The results of this study indicated hypertensive patients are more dominated with female patients than male and the prevalence of hypertension mostly occurred at the age of 42-65 years. These results suggested that the diagnosis of hypertension begins at age ≥18 years and increases with age. In most cases, the increase in blood pressure correlates with increasing age and tends to be higher in women than in men. In addition, the majority of patients have a good level of education.
Most of the patient's mistakes are caused by the lack of understanding on treatment regimens such as dosage or self-regulation of the treatment regimen. The key role of the pharmacist in helping patients get the best therapeutic results is by providing pharmaceutical counseling services. Pharmacist counseling is one of pharmaceutical service responsibilities to improve patient understanding of treatment with the ultimate goal of achieving definite results of improving and/or maintaining patient quality of life.

Pharmacist counseling can help to manage chronic diseases such as hypertension. What is given during counseling are in the form of attention, motivation, knowledge of medicines, hypertension, and lifestyle modification. This study showed an improvement in blood pressure, which in turn has an impact on the improvement of quality of life of hypertensive patients. These results were shown by differences in pre-post treatment outcomes and also validated as a result of treatment in the form of pharmacist counseling with different post test results in both groups. The role of pharmacists in the management of chronic diseases through counseling has reduced the information gaps related to complications. Based on the results of interviews, patients have the understanding that complications of kidney disorders is caused by long-term use of drugs so that hypertension medication is mostly done when the complaints/clinical symptoms in the form of headache and shoulder pain occur. Similar results by Mollaoğlu, et al (2015) also showed that drug is consumed only if there are clinical symptoms.

Uncontrolled blood pressure mostly can lead to the decrease of quality of life of patients. This is due to poor medical compliance and lack of knowledge and awareness of hypertension.

In this study, pharmacist counseling provided the motivation for the patient not to be afraid of the side effects of the drug. In addition, it gave information related to the side effects of the drug and its treatment so that the patient consumed the drugs based on the rules without feeling fear of the side effects of the drug. The result of interviews with patients showed that they are afraid of taking drugs in the long term continuously with the consideration that the drugs received are chemicals and can cause interference effects on organs such as the kidney. Besides, drug use also becomes irregular due to perceived side effects such as cough and frequent urination during the night day.

6. Conclusion

This study showed that the role of the pharmacist in providing counseling to hypertensive patients has a positive impact in improving the patient's understanding of medication, hypertension, and lifestyle modification to achieve maximum therapeutic effect and ultimately improve patient's quality of life. In addition, the involvement of pharmacists in the therapeutic and management process of hypertensive diseases is highly significant because there is information gap related to the use of drugs obtained during health control.

The results of this study indicated that pharmacist counseling could improve the therapeutic efficacy and quality of life of hypertensive patients. Therefore, it is expected to increase the role of pharmacists in the process of management of chronic diseases such as hypertension. Increasing the role of pharmacists through pharmaceutical services in the field of clinical pharmacy in the form of counseling can ultimately help to reduce the burden of the health system and can reduce drug-related problems, management of chronic diseases, and lifestyle modification of hypertensive patients in Kupang, East Nusa Tenggara.

7. Strengths and Limitations

What becomes the strength of this study is the success of therapy and quality of life influenced by the intervention in the form of pharmacist counseling. This is evidenced by the result of research using pretest-posttest design with a control group whose members were chosen randomly so that the states of both groups were equal before treatment.

The limitation of this study is that the observation time is relatively short so it cannot guarantee the continuity of patient compliance in carrying out the therapy and lifestyle modification. However, the results of this study provide data that the intervention in the form of pharmacist counseling contributes to behavior change, the achievement of therapeutic effect, and quality of life of the patient.

8. Acknowledgement

Thank you to Rahmawati Y, Perwitasari DA, and Adnan A for permission to use the Indonesian version of SF-36 questionnaire, all respondents, and all parties who have participated in this research.

References

Agency for Health Research and Development, Ministry of Health. 2013. Basic Health Research 2013. Jakarta.

American Association of Colleges of Pharmacy (AACP). Role of a Pharmacist. (downloaded December 28, 2016). Available from: http://www.aacp.org/resources/student/pharmacyforyou/Pages/roleofapharmacist.aspx

Aguwa CN, Ukwe CV, Ekwunife OI. 2008. Effects of Pharmaceutical care programme on blood pressure and quality of life in a Nigerian Pharmacy. Pharm World Sci. 2008; 30:107-110

Beardsley R, Kimberlin CL, Tindal WN. 2008. Communication skills in Pharmacy practice a practical guide for students and practitioners. Edisi ke-5. Philadelphia: Lippincott Williams & Wilkins; 2008

Cazarim Mde S, de Freitas O, Penaforte TR, Achcar A, Pereira LRL. Impact assessment of pharmaceutical care in the management of hypertension and coronary risk factors after discharge. PLoSONE 11(6):e0155204

Health Office of East Nusa Tenggara Province. 2016. Health Profile 2015. Kupang

Heisler M, Hofer TP, Klamerus ML, Schmittdiel J, Selby J, Hogan MM,. 2010. Study protocol: The adherence an intensifikcation of medications (AIM) study- a Cluster Randomized Controlled Effectiveness Study. Trials. 2010; 11:95

Ike SO. 2009. Prevalence of hypertension and its complications among medical admissions at the University of Nigeria Teaching Hospital, Enugu (Study 2). Niger J Med 2009;18(1):68–72

Jafar TH, Islam M, Hatcher J, Hashmi S, Bux R, Khan A, Poulter, N,Badruddin S, Chaturvedi N. 2010. Hypertension Research Group. Community based lifestyle intervention for blood pressure reduction in children and young adults in developing country: cluster randomised controlled trial. BMJ 2010;340:c2641

Kemenkes RI. Rencana strategis kementerian kesehatan tahun 2015–2019. Jakarta; 2016

Klocek M, Kawecka JK. 2003. Quality of Life in Patient with Essential Arterial Hypertension, Part II: The Effect of Clinical Factors, *Przgl Lek*. 2003:60(2): 101-6

Kupang City Health Office. 2015. Health Profile of Kupang City 2015. Kupang

Lim SS, Vos T, Flaxman AD, Danaei G, Shibuya K, AdairRohani H, et al. 2013. A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 2013;380(9859):2224–60

Mathers C, Stevens G, Mascarenhas M. 2009. Global health risks: mortality and burden of disease attributable to selected major risks. Geneva: World Health Organization.

Ministry of Health RI. 2014. Regulation of the Minister of Health No. 58 of 2014. About the standard of pharmaceutical services in the Hospital. Jakarta.Cebeci F, Celik SS,. 2008. Discharge training and couselling increase self-care ability and reduce post discharge problems in CABG patients. J Clin Nurs. 2008;17(3):412–420

Mollaoğlu M. Solmaz G. and Mollaoğlu M. 2015. Adherence to therapy and quality of life in hypertensive patients. Acta Clin Croat 2015; 54:438-44

Ogah OS, Okpechi I, Chukwuonye II, Akinyemi JO, Onwubere BJ, Falase AO, Stewart S, Sliwa K. 2012. Blood pressure, prevalence of hypertension and hypertension related complications in Nigerian Africans: A review. World J Cardiol 2012;4(12):327–40

Ogunlana MO, Dairo, Odunaiya NA. 2009. Profile and predictor of health related quality of life among hypertensive patients in south western Nigeria. BMC Cardiovascular disorder. 2009; 9-25

Ramanath KV, Balaji D, Nagakishore CH, Kumar SM, Bhanuprakash M. 2012. A study on impact of clinical pharmacist interventions on medication adherence and quality of life in rural hypertensive patients. J Young Pharmacists 2012;4:95-100

Rahmawati,Y, Perwitasari DA, Adnan A. 2014. Validation of Indonesian version of SF-36 questionnaire to hypertension patient at health center Yogyakarta. Pharmacy. 2014;(11): 01 Juli 2014

Shahina PT, Revikumar KG, Krishnan R, Jaleel VA, Shini VK. 2010. The impact of pharmacist interventions on quality of life in patients with hypertension. Int J Pharm Sci Rev Res, 2010;5(3):Article no. 31

Sushmita S, Aarati K, Bharat P, Roshani S, Sunil S, Kalpana P, Kumar UD. 2010. Knowledge, attitude and practice outcomes: an effect of pharmacist provided counseling in hypertensive patients in a tertiary care teaching hospital in Western Nepal. Int J Ph Sci 2010;2(2):583–7

World Heart Federation (WHF). 2015. Cardiovascular disease risk factors. (Downloaded December 6, 2016). Tersedia dari: http://www.world-heart-federation.org/cardiovascular-health/cardiovascular-disease-risk-factors

World Health Organization (WHO). 2015. Top ten causes of death. (Downloaded December 6, 2016). Tersedia dari: http://www.who.int/mediacentre/factsheets/fs310/en/