



## **FACTORS ASSOCIATED WITH MEDICATION ADHERENCE IN HYPERTENSION IN THE NGLUWAR PUBLIC HEALTH CENTER IN MAGELANG REGENCY**

Taufan Agung Wicaksono<sup>1\*</sup>, Arwinda Nugraheni<sup>2</sup>, Firdaus Wahyudi<sup>2</sup>, Pipin Ardhiyanto<sup>3</sup>

<sup>1</sup>Undergraduate Program, Faculty of Medicine, Diponegoro University, Semarang, Indonesia

<sup>2</sup>Department of Public Health, Faculty of Medicine, Diponegoro University, Semarang, Indonesia

<sup>3</sup>Department of Cardiovascular and Vascular Medicine, Faculty of Medicine, Diponegoro University, Semarang, Indonesia

\*Corresponding Author : E-mail: [taufant913@gmail.com](mailto:taufant913@gmail.com)

### **ABSTRACT**

**Background:** Adherence is an important matter in the succession of hypertension medication. Despite the fact, it was found that many with hypertension had not used antihypertension medications as prescribed. **Objective:** To acknowledge the factors correlated to antihypertension medication adherence. **Method:** We used an observational, cross-sectional study model with a quantitative analytical approach. Some 131 qualified hypertensive patients of Ngluwar Public Health Center were recruited in February and March of 2021. A sampling method of purposive sampling was used. The data obtained were statistically analyzed using the chi-square test. **Results:** Eighty-two respondents (62.6%) had high medication adherence and 49 respondents (37.4%) were low at medication adherence. The statistical analysis results are as follows. Level of education ( $p = 0.374$ ,  $PR = 1.264$ ,  $CI\ 95\% = 0.765-2.090$ ), job status ( $p = 0.025$ ,  $PR = 0.591$ ,  $CI\ 95\% = 0.367-0.953$ ), comorbidity ( $p = 0.366$ ,  $PR = 1.239$ ,  $CI\ 95\% = 0.772-1.988$ ), duration of hypertension ( $p = 0.604$ ,  $PR = 1.124$ ,  $CI\ 95\% = 0.722-1.751$ ), family support ( $p = 0.142$ ,  $PR = 1.396$ ,  $CI\ 95\% = 0.890-2.190$ ), health worker support ( $p = 0.002$ ,  $PR = 1.994$ ,  $CI\ 95\% = 1.313-3.028$ ), affordability ( $p = 0.329$ ,  $PR = 1.246$ ,  $CI\ 95\% = 0.802-1.937$ ) and accessibility ( $p = 0.564$ ,  $PR = 1.240$ ,  $CI\ 95\% = 0.623-2.468$ ), and polypharmacy ( $p = 0.573$ ,  $PR = 0.848$ ,  $CI\ 95\% = 0.488-1.474$ ). **Conclusion:** Job status and health worker support were significantly associated to antihypertensive medication adherence.

**Keywords:** Adherence, Hypertension, Medication, Polypharmacy, Support

### **INTRODUCTION**

Hypertension according to the International Society of Hypertension (ISH) is defined as a condition of systolic blood pressure of 140 mmHg or higher and/or diastolic blood pressure of 90 mmHg or higher in repeated office blood pressure measurements.<sup>1</sup> According to WHO, hypertension is a major risk factor for coronary heart disease and hemorrhagic stroke.<sup>2</sup> Hypertension has been the cause of 45% of deaths due to ischemic heart disease and 51% of deaths in the case of cerebrovascular stroke in 2008.<sup>3</sup>

WHO stated the prevalence of hypertension worldwide had reached 1 billion cases per 2008, and 40% of the cases were adults of 25 years old or older.<sup>3</sup> In South-East Asia, hypertension had caused the death of 1.5 million in 2011. Not less than one-third of the adults had hypertension that year.<sup>4</sup> According to the study of Riskesdas 2018, the prevalence of hypertension in Indonesia had reached 34.1%.<sup>5</sup> As of 2019, 30.4% of the population of 15 years old or older were hypertensive in Central Java.<sup>6</sup> In the same year in the district of Magelang, the Central Bureau of Statistics of Magelang District recorded 89,973 people suffering from hypertension.<sup>7</sup>

Among the aspects of hypertension, adherence is an important thing to consider.<sup>8</sup> Adherence was found significantly correlated to the success of antihypertensive therapy according to studies.<sup>9,10</sup> Despite the fact, studies have found many with hypertension had low medication adherence. Vrijens et al stated about 50% of people with hypertension stopped their medication after 1 year of therapy.<sup>11</sup> In Indonesia, 45.6% of people with hypertension did not adhere to the antihypertensive medication properly based on a study in 2018.<sup>12</sup> Other studies conducted in Semarang exhibited at least 44.4% of the participants were low in medication adherence.<sup>13,14</sup>

Medication adherence is a health behavior thus it is established from several factors according to Lawrence Green's theory.<sup>15</sup> Studies found that the level of education, job status, comorbidity, duration of hypertension, family support, health worker support, affordability and accessibility, and polypharmacy were correlated to medication adherence.<sup>8,14-22</sup>

There have been no studies covering these factors in the Ngluwar Public Health Center. This is the reason this study was conducted, aiming to find the link of said factors to medication adherence in the



Magelang Regency, particularly in the Ngluwar Public Health Center.

## METHOD

This study was a quantitative analytical observational study with a cross-sectional approach. The study was conducted from February to March 2021 in the Ngluwar Public Health Center in Magelang Regency.

The participants of this study were the patients of the Ngluwar Public Health Center who met the set criteria. The inclusion criteria included having hypertension or currently being in antihypertensive therapy, signing the informed consent form, and being in the Ngluwar Public Health Center; whereas the exclusion criteria comprised of expressing to quit participating in this study and being pregnant or childbed. This study obtained 131 participants using the method of purposive sampling.

Interviews were conducted to gather the data. The data was in a quantitative form to categorize the participants into high and low groups. This research studied a dependent variable of antihypertensive medication adherence, and some independent variables, comprising the level of formal education, job status, comorbidity, duration of hypertension, family support, health worker support, affordability and accessibility, and polypharmacy. The medication adherence was measured using the 8-item Morisky Medication Adherence Scale (MMAS-8), whereas the rest of the variables were measured using expert-validated questionnaires. The obtained data were statistically analyzed using the chi-square test. The variable which met the value of  $p < 0.05$  was considered significantly correlated to medication adherence.

## RESULTS

This study successfully gathered data from 131 patients within approximately 1 month. The majority of the participants were women. Most participants were 60 years old or above. Among 131 patients, 87 of them graduated from junior high school or below. A proportion of 51.9% of patients had been diagnosed with hypertension for  $\geq 4$  years. Only 29% of patients reported low health worker support. The medication was deemed easy to access by most of the participants. A small number of patients, 29 out of 131 patients, were prescribed 4

medications or more. Other characteristics are as seen in Table 1.

**Table 1.** Characteristics of the participants

Characteristic	Frequency	Percentage
Sex		
Male	39	29.8
Female	92	70.2
Age		
30-39	3	2.3
40-49	18	13.7
50-59	45	34.4
60-69	40	30.5
70-79	19	14.5
80-89	6	4.6
Last formal education		
Senior High or higher	44	33.6
Junior High or lower	87	66.4
Job Status		
Working	69	52.7
Not working	62	47.3
Comorbidity		
Yes	52	39.7
No	79	60.3
Duration of hypertension		
< 4 years	63	48.1
$\geq 4$ years	68	51.9
Family support		
High	67	51.1
Low	64	48.9
Health worker support		
High	93	71
Low	38	29
Affordability		
High	74	56.5
Low	57	43.5
Accessibility		
High	120	91.6
Low	11	8.4
Polypharmacy		
$\geq 4$ medicines	21	16
< 4 medicines	110	84
Total	131	100

**Table 2.** Adherence to medication among participants

Adherence to medication	Frequency	Percentage
High	82	62.6
Low	49	37.4
Total	131	100



As presented in Table 2, a majority of participants reported high medication adherence. Only 37.4% of patients were low on medication adherence. The hypothesized factors related to medication adherence were tested using the chi-square method. As a result, 2 variables had significant associations to medication adherence.

They were job status ( $p = 0.025$ ,  $PR = 0.591$ ,  $CI\ 95\% = 0.367-0.953$ ) and health worker support ( $p = 0.002$ ,  $PR = 1.994$ ,  $CI\ 95\% = 1.313-3.028$ ). The rest showed no association to medication adherence. The associations between the studied variables to medication adherence are presented in Table 3.

**Table 3.** Association between studied variables to medication adherence

Variable	Low adherence (%)	High adherence (%)	Prevalence ratio (CI 95%)	Value of p
Formal education			1.264 (0.765-2.090)	0.374
Low	35 (71.4)	52 (63.4)		
High	14 (28.6)	30 (36.6)		
Job status			0.591 (0.367-0.953)	0.025*
Not working	17 (34.7)	45 (54.9)		
Working	32 (65.3)	37 (45.1)		
Comorbidity			1.239 (0.772-1.988)	0.366
No	32 (65.3)	47 (57.3)		
Yes	17 (34.7)	35 (42.7)		
Duration of hypertension			1.124 (0.722-1.751)	0.604
< 4 years	25 (51)	38 (46.3)		
≥ 4 years	24 (49)	44 (53.7)		
Family support			1.396 (0.890-2.190)	0.142
Low	28 (57.1)	36 (43.9)		
High	21 (42.9)	46 (56.1)		
Health worker support			1.994 (1.313-3.028)	0.002*
Low	22 (44.9)	16 (19.5)		
High	27 (55.1)	66 (80.5)		
Affordability			1.246 (0.802-1.937)	0.329
Low	24 (49)	33 (40.2)		
High	25 (51)	49 (59.8)		
Accessibility			1.240 (0.623-2.468)	0.564
Low	5 (10.2)	6 (7.3)		
High	44 (89.8)	76 (92.7)		
Polypharmacy			0.848 (0.488-1.474)	0.573
No	40 (81.6)	70 (85.4)		
Yes	9 (18.4)	12 (14.6)		
Total	49 (100)	82 (100)		

## DISCUSSION

Adherence is important in antihypertensive medication. Previous studies have shown several factors which influence medication adherence significantly. Among these shown factors, the variables of this study were among them. The data needed were collected and tested statistically. The result indicated 2 variables significantly associate to medication adherence.

Formal education in Indonesia consists of elementary school, junior high school, senior high school, college, and post-graduates. In this study,

graduating from junior high school to none was categorized as low formal education, while graduating at least from senior high school was considered as the opposite. As shown in Table 3, the data distribution indicates no association between formal education level to medication adherence. This find is contrary to what a previous study had revealed. There was yet a possibility that the patient's knowledge about hypertension might have disrupted the significant association of formal education to medication adherence.<sup>15</sup>



The patient's tendency to listen to the health worker, which was shown by the p-value of 0.002 and the prevalence ratio of 1.994 of the health worker support, might have explained the non-significance of the formal education level to medication adherence. A good relationship between a health worker and the patient can elevate medication adherence by increasing one's knowledge about the illness together with the will to be cured.<sup>15,23</sup>

The patients' job status is significantly associated to medication adherence, signified by its p-value of 0.025. The prevalence ratio of 0.591 indicates that the working made one adhered less to the medication. Sinuraya et al also found the same.<sup>18</sup> Working made respondents easy to forget their medications. Patients also had less to no time to visit the physicians due to their occupations. As a result, doses might be missed.<sup>24,25</sup>

Related to comorbidity, this study found a similar result to a previous study. The patient's perception of the disease severity might have caused the comorbidity to become negligible.<sup>26</sup> A correct knowledge about complications and comorbidities could increase medication adherence.<sup>27</sup> Another study found that patients who knew that hypertension is serious yet preventable showed better adherence.<sup>28</sup>

The duration of hypertension was found not associated with medication adherence as discovered in prior studies.<sup>18,21,29</sup> It was due to the patient's perception of the severity of the disease. The patients who thought they were fine reported less adherence.<sup>29,30</sup> In another study, patients used their medication only when symptoms started to show.<sup>28</sup> It was explained that the patient's attitude towards symptomless illnesses influenced the patient's medication adherence. People will not try to find a cure when they think they are healthy.<sup>31,32</sup>

Support is positively associated with medication adherence. It is to provide the need of others, comprising talking and confiding, facilities, information, and mental and motivational assistance. Support in this matter comprises family support and health worker support.<sup>14,15,28,33</sup>

Family support was not found correlated to medication adherence, consistent with the find of a previous study.<sup>21</sup> It might happen as the health worker support gave a better impact on the patient than the support given by the family, signified by the values of p and PR of both variables. In previous studies, family support gave the smallest impact on

medication adherence compared to friend support, surrounding support, and health worker support.<sup>28,33</sup>

The health worker support, similar to previous studies, was observed to give a positive impact on medication adherence. A PR-value of 1.994 indicates that the health worker support had a positive impact on medication adherence. Educating about hypertension and its medication, listening to the patient's complaints, and giving feedbacks together with the consultation duration and the follow-up were among the support.<sup>13,15</sup> The WHO added that the duration of the consultation and the follow-up also influenced medication adherence.<sup>23</sup>

There were no prior studies discussing affordability as a whole as it was often represented by income, health insurance membership, or universal coverage. Both indicators of health insurance and universal coverage in addition to therapy and transportation expenses were sought in this study. The variable showed no significant association with medication adherence. Prior studies were consistent with this result showing no correlation between income and universal coverage to medication adherence.<sup>18,20</sup>

Medication adherence is a health behavior. There are 3 types of factors from which a health behavior is established according to Lawrence Green's theory, i.e. predisposing factors, enabling factors, and reinforcing factors.<sup>34</sup> Based on the theory, other factors are associated with medication adherence, one of them being the patient's belief in medication. In the study of Lash et al, the observed tamoxifen was included in universal coverage thus affordability was not a concern. Despite that, there was still a minority of patients who discontinued taking the medication. These patients reported having problems with severe tamoxifen side effects and expressed concerns with new prescriptions. On the contrary, patients who reported positive belief in the therapy showed better adherence to their medication. This shows that patient's belief in the medication correlated to medication adherence despite the affordability.<sup>35</sup>

The same explanation might be applied to accessibility. Someone will exert bigger and better efforts to reach their goals, especially the clearer and the more important ones.<sup>32</sup> That will make affordability and accessibility ignorable. The insignificant association of accessibility to



medication adherence in this study is consistent with the findings in the studies of Sukma and Sabrina.<sup>13,14</sup>

The polypharmacy in this study showed no association with medication adherence. It is contrary to the study of Darnindro perhaps due to its different definition of polypharmacy.<sup>26</sup> The find in this study can be further explained by Grant's discovery that polypharmacy was not strongly associated with medication adherence. Instead, the patient with lower adherence reported problems with side effects and tended to not reporting the side effects to their physicians. This find showed that more effective and proactive communication between patients and their physician may lead to an improvement of medication adherence.<sup>36</sup>

This study was conducted to understand medication adherence and the factors that correlate to it. Despite its aim, this study is bound with limitations Firstly, this study has not measured the patient's knowledge of hypertension, the patient's perception of the severity of the disease, and the patient's belief in the medication. The measurement of these factors might serve as better evidence to explain why some factors were non-related to medication adherence. Secondly, the data were solely from interviews, which is susceptible to error.<sup>35</sup> Thirdly, the data of family support and health worker support were not confirmed by any interviews with the patient's family nor the physicians.

## CONCLUSION

Among the studied variables, it was found that job status and health worker support were the only variables that show significant correlations to medication adherence. Other variables, i.e. level of education, comorbidity, duration of hypertension, family support, affordability and accessibility, and polypharmacy were not found associated with medication adherence. Further studies particularly probing the additional variables of patient's knowledge about hypertension, patient's perception of the severity of the disease, patient-perceived belief in the medication, and their potential connection with the findings similar to this study are welcomed. Due to the close relation of health worker support to medication adherence, physicians and other health workers are strongly recommended to build a good relationship with the patients. Physicians in every visit may remind the patients to maintain their medication adherence, to ask anything about their

illness(es), and to report any side effects related to the prescribed medications.

## Ethical Approval

This study has been approved with the publication of Ethical Clearance No. 57/EC/KEPK/FK-UNDIP/III/2021 by the Medical and Health Research Ethics Commission of Ethic (KEPK) of the Faculty of Medicine of Diponegoro University.

## Conflicts of Interest

The authors declare no conflict of interest.

## Funding

No specific funding was provided for this article.

## Author Contributions

Writing-original draft preparation, Taufan Agung Wicaksono; writing-review and editing, Arwinda Nugraheni, S.KM., M.Epid, dr. Firdaus Wahyudi, Sp. OG, M.Kes, and dr. Pipin Ardhiyanto, Sp.JP(K), FIHA.

## Acknowledgments

This work was supported by The Department of Public Health, Faculty of Medicine, Diponegoro University, and The Department of Health of Magelang Regency.

## REFERENCES

1. Unger T, Borghi C, Charchar F, Khan NA, Poulter NR, Prabhakaran D, et al. 2020 International Society of Hypertension Global Hypertension Practice Guidelines. *Hypertension*. 2020;75(6):1334–57.
2. World Health Organization. Risk Factors. In: World Health Organization (WHO), editor. *Noncommunicable Diseases in the South-East Asia Region: Situation and Response*. New Delhi: World Health Organization; 2011. p. 23–42.
3. World Health Organization (WHO), editor. *Why Hypertension is A Major Public Health Issue*. In: *A Global Brief on Hypertension: Silent Killer, Global Public Health Crisis*. Geneva: WHO Press; 2013. p. 8–15.
4. Risk Factors. In: *Noncommunicable Diseases in the South-East Asia Region*. New Delhi: World Health Organization; 2011. p. 23–38.



5. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. Prevalensi Hipertensi Berdasarkan Hasil Pengukuran pada Penduduk Umur  $\geq 18$  Tahun Menurut Provinsi, 2007-2018. In: Hasil Utama Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2018. p. 85.
6. Dinas Kesehatan Provinsi Jawa Tengah, editor. Pengendalian Penyakit. In: Profil Kesehatan Provinsi Jawa Tengah Tahun 2019. Semarang: Dinas Kesehatan Provinsi Jawa Tengah; 2019. p. 85–114.
7. Badan Pusat Statistik Kabupaten Magelang. Kasus 10 Penyakit Terbanyak 2017-2019 [Internet]. [cited 2020 Nov 17]. Available from: <https://magelangkab.bps.go.id/indicator/30/512/1/-kasus-10-penyakit-terbanyak-.html>.
8. Vrijens B, Antoniou S, Burnier M, de la Sierra A, Volpe M. Current Situation of Medication Adherence in Hypertension. *Front Pharmacol*. 2017;8(MAR):1–8.
9. Cahyani FM. Hubungan Kepatuhan Minum Obat Antihipertensi Terhadap Tercapainya Target Terapi Pasien Hipertensi di Puskesmas Wirobrajan Yogyakarta. *J Pharm Sci Med Res*. 2018;1(2):10.
10. Mutmainah I. Hubungan Kadar Gula Darah dengan Hipertensi Pada Penderita Diabetes Melitus Tipe 2 di Rumah Sakit Umum Daerah Karanganyar. *Univ Muhammadiyah Surakarta Fak Kedokt*. 2012;(Nefropati Diabetik):1–23.
11. Vrijens B, Vincze G, Kristanto P, Urquhart J, Burnier M. Adherence to Prescribed Antihypertensive Drug Treatments: Longitudinal Study of Electronically Compiled Dosing Histories. *BMJ*. 2008;336(7653):1114–7.
12. Badan Penelitian dan Pengembangan Kesehatan Kementerian Kesehatan RI. Proporsi Riwayat Minum Obat dan Alasan Tidak Minum Obat pada Penduduk Hipertensi Berdasarkan Diagnosis Dokter atau Minum Obat, 2018. In: Hasil Utama Riskesdas 2018. Jakarta: Kementerian Kesehatan Republik Indonesia; 2018. p. 88.
13. Sukma AN, Widjanarko B, Riyanti E. Faktor-Faktor yang Berhubungan dengan Kepatuhan Pasien Hipertensi dalam Melakukan Terapi di Puskesmas Pandanaran Kota Semarang. *J Kesehat Masy*. 2018;6(5):687–95.
14. Sabrina B, Susanto HS, Adi MS. Faktor Lingkungan Sosial yang Berhubungan dengan Tingkat Kepatuhan Terapi Penderita Hipertensi Primer di Puskesmas Kedungmundu Kota Semarang. *J Kesehat Masy*. 2015;3(April):120–9.
15. Puspita E, Oktaviarini E, Dyah Y, Santik P, Ilmu A, Masyarakat K, et al. the Role of Family and Health Officers in Compliance Treatment of Hypertension Patients. *J Kesehat Masy Indones*. 2017;12(2):25–32.
16. Pujasari A, Setyawan H, Udiyono A. Faktor-Faktor Internal Ketidakpatuhan Pengobatan Hipertensi di Puskesmas Kedungmundu Kota Semarang. *J Kesehat Masy*. 2015;3(3):99–108.
17. Rasajati QP, Raharjo BB, Ningrum DNA. Faktor-Faktor yang Berhubungan dengan Kepatuhan Pengobatan pada Penderita Hipertensi di Wilayah Kerja Puskesmas Kedungmundu Kota Semarang. *Unnes J Public Heal*. 2015;4(3):16–23.
18. Sinuraya RK, Destiani DP, Puspitasari IM, Diantini A. Medication Adherence among Hypertensive Patients in Primary Healthcare in Bandung City. *Indones J Clin Pharm*. 2018;7(2):124–33.
19. Kim HJ, Yoon SJ, Oh IH, Lim JH, Kim YA. Medication adherence and the occurrence of complications in patients with newly diagnosed hypertension. *Korean Circ J*. 2016;46(3):384–93.
20. Liberty IA, Pariyana P, Roflin E, Waris L. Determinan Kepatuhan Berobat Pasien Hipertensi pada Fasilitas Kesehatan Tingkat I. *J Penelit dan Pengemb Pelayanan Kesehat*. 2017;1(1):58–65.
21. Pratiwi W, Harfiani E, Hadiwardjo YH. Faktor-Faktor Yang Berhubungan dengan Kepatuhan dalam Menjalani Pengobatan pada Penderita Hipertensi di Klinik Pratama GKI Jabar Jakarta Pusat. *Semin Nas Ris Kedokt* [Internet]. 2020;27–40. Available from: <https://conference.upnvj.ac.id/index.php/sensorik/article/view/430>.
22. Muharrir, Ridwan M., Maulana R. Hubungan Polifarmasi dengan Tingkat Kepatuhan Minum Obat Pasien Gagal Jantung di Rumah Sakit Umum Daerah dr. Zainoel Abidin Banda Aceh. *Universitas Syiah Kuala*; 2015.
23. Towards The Solution. In: Adherence to Long-



- Term Therapies: Evidence for Action. Geneva: World Health Organization; 2003. p. 27–38.
24. Lee GKY, Wang HHX, Liu KQL, Cheung Y, Morisky DE, Wong MCS. Determinants of Medication Adherence to Antihypertensive Medications among A Chinese Population Using Morisky Medication Adherence Scale. *PLoS One*. 2013;8(4):e62775.
  25. Notoatmodjo S. *Promosi Kesehatan dan Perilaku Kesehatan Ed. Revisi 2012*. Jakarta: Rineka Cipta; 2012.
  26. Darnindro N, Sarwono J. Prevalence of Noncompliance of Control Visits in Hypertensive Patients Treated at Primary Referral Hospitals and Related Factors. 2017;4(3):123–7.
  27. Benson J, Britten N. Patients' Decisions about Whether or Not to Take Antihypertensive Drugs: Qualitative Study. *Br Med J*. 2002;325(7369):873–6.
  28. Osamor PE, Owumi BE. Factors Associated with Treatment Compliance in Hypertension in Southwest Nigeria. *J Health Popul Nutr*. 2011 Dec;29(6):619–28.
  29. Kionowati, Mediastini E, Septiyana R. Hubungan Karakteristik Pasien Hipertensi terhadap Kepatuhan Minum Obat di Dokter Keluarga Kabupaten Kendal. *J Farmasetis*. 2018;7(1):6–11.
  30. Lulebo AM, Mutombo PB, Mapatano MA, Mafuta EM, Kayembe PK, Ntumba LT, et al. Predictors of Non-adherence to Antihypertensive Medication in Kinshasa, Democratic Republic of Congo: A Cross-sectional Study. *BMC Res Notes*. 2015 Oct;8:526.
  31. Hyman DJ, Pavlik VN. Characteristics of Patients with Uncontrolled Hypertension in the United States. *N Engl J Med* [Internet]. 2001;345(7):479–86. Available from: <https://doi.org/10.1056/NEJMoa010273>.
  32. Notoatmodjo S. *Promosi Kesehatan Teori dan Aplikasi*. Jakarta: Rineka Cipta; 2010. 398 p.
  33. Sugesti R, Mustohiroh S. Hubungan Pengetahuan, Peran Keluarga, Lingkungan dan Dukungan Tenaga Kesehatan terhadap Perawatan Tali Pusat. *J Ilm Kebidanan Indones*. 2018;8(4):197–208.
  34. Green LW, Kreuter MW, Deeds SG, Partridge KB, Bartlett E, editors. *Educational Diagnosis: Assessing Causes of Health Behavior*. In: *Health Education Planning: A Diagnostic Approach*. 1st ed. California: Mayfield Publishing Company; 1980. p. 68–85.
  35. Lash TL, Fox MP, Westrup JL, Fink AK, Silliman RA. Adherence to Tamoxifen over The Five-year Course. *Breast Cancer Res Treat* [Internet]. 2006;99(2):215–20. Available from: <https://doi.org/10.1007/s10549-006-9193-0>.
  36. Grant RW, Devita NG, Singer DE, Meigs JB. Polypharmacy and Medication Adherence in Patients with Type 2 Diabetes. *Diabetes Care*. 2003 May;26(5):1408–12.