

Carol Geraldine C. Pablo, Kwien Anne I. Austria, Hannah Nicole M. Cortez, Kristian B. Garcia, Karen Grace P. Julao, Nicole Anne V. Pulido, John Colvin K. Rosales, and Joie Patricia F. Samson

Medication Adherence of Hypertensive and Diabetic Patients taking Complementary and Alternative Medicine: An Intervention Study

INTRODUCTION

Hypertension and Diabetes Mellitus, known as the most common comorbidities,¹ are associated with increased healthcare utilization. This results to a change in mental state, physical health, behavior, attitude, habits, and knowledge that can affect a patient's willingness and ability to adhere to a medication regimen.² The prevalence of non-adherence to the therapy of hypertensive and diabetic patients is associated with adverse health outcomes, increased hospitalization rates, forgetfulness, limited knowledge on the indications of the conventional medicines, refusal to stop smoking, illicit drug or alcohol use,^{3, 4} and lack of dissemination information especially in small communities where optimal healthcare is not fully observed. Non-adherence to therapy also paved way for the patients to adhere to Complementary and alternative Medicines (CAM)^{5, 6} which is defined by the National Center for Complementary and Alternative Medicine (NCCAM) as a group of different medical health care practices, systems, and products that are not considered to be part of the conventional medicine.⁷ A study showed that the use of CAM could lower medication adherence,^{8, 9} however, a study stated that more educated CAM users are likely to be more adherent to their conventional medicines.¹⁰ Researchers from the University of California stressed that medication education, such as seminars and teaching of proper utilization of pillboxes, is a key factor in helping non-adherent patients to better stick to their drug treatment plans, and to eradicate barriers against information dissemination.¹¹ Medication adherence education would help expand the views of each person on medication adherence, and is an open opportunity at improving the pharmaceutical care to prevent further complications that may arise with non-adherence.

Through medication adherence education, patients who are concurrently using CAM will have an increased adherence to conventional medications,¹⁰ will be more knowledgeable regarding the importance of balancing the use of CAM ¹² while adhering to therapy, and the patient-pharmacist

relationship will further be strengthened.¹¹ This study sought to determine the most prevalent complementary and alternative medicine (CAM) used by hypertensive and diabetic respondents, to ascertain if there is a relationship between medication adherence and attitude towards CAM use between the respondents, and to assess whether medication adherence seminar significantly increased the medication adherence of hypertensive and diabetic patients using CAM with their prescribed maintenance medications.

METHODS

This quasi-experimental study design with pre- and post-test in a single group consists of 66 respondents who are clinically diagnosed with hypertension and/or diabetes, currently prescribed with their maintenance medicine while practicing or using CAM, at least 18 years old and may or may not have not more than 2 co-morbidities. Respondents were selected through purposive sampling whom are patients at NGC Health Center with a Phase 2 Level 1: Basic Certification as a National Government Health Center at Commonwealth Katuparan, Quezon City, Philippines. This Urban Public Health Center caters to a total of 93, 627 patients. Qualified respondents were invited to participate in the study with the help of health center officials. The nature and the confidentiality of the study was briefly explained and if they wish to withdraw from the study they may do so. Respondents who voluntarily agreed to participate in the study were given a consent form. The study was approved by the Ethics Review Committee of the University of Santo Tomas before the conduct of the study. (FOP-ERC 1-1718-06)

The study utilized three survey questionnaires: A researcher-assisted patient medication profile and CAM demographics questionnaire ^{7,14} which is used to gather the socio-demographic profile of the respondents and determine the CAM that they use. The study categorized CAM on five types based on the classification of the National Center for Complementary and Integrative Health ¹⁴ and on the survey contents used by Choi et.al, ⁷ with some modifications on each category of CAM based on what is applicable in the Philippines. The five categories are: medicinal plants which refer to the Top 10 medicinal plants recommended by the DOH Philippines; 15, 16 herbal supplements which included mangosteen capsules, Lutein/Vit-C/Vit-E/Zn Supplement, bitter gourd supplement, etc.; 17, 18 tea from organic materials which included lemon tea, mangosteen coffee and tea, chamomile tea, etc.; 16, 18 Mind and body activities such as yoga, meditation, etc.; 18, 19 and Manipulative and body-based practices such as acupuncture, traditional massage (hilot), etc.18, 19 The second questionnaire is the 10-item self-administered CAM attitude questionnaire designed to evaluate the attitudes of the respondents towards their use of CAM.

The questionnaire was divided into 3 categories: positive beliefs about CAM, environmental influence on the use of CAM and psychological comfort: reasoning behind their attitude towards CAM and was adapted from the questionnaire of Islahudin, F.et.al,²⁰ The modified 10-item self-administered pre- and post-Morisky-patterned Medication adherence scale questionnaire that is designed to measure the level of adherence of the patients prior and after the educational intervention. The questionnaire was adapted from the 10-item Morisky Scale of Encabo, J. et.al.,²⁰ all questionnaires were adapted and contextualized and subjected to a pilot validation. Content uniformity of questionnaires were also checked by two (2) professors of University of Santo Tomas – Faculty of Pharmacy with their respective area of expertise. All questionnaires were translated in the vernacular Filipino and was validated by a Filipino professor. The Cronbach alpha coefficient is 0.798 for the CAM Attitude questionnaire and 0.801 for the Morisky - Patterned questionnaire. This study was submitted to the University of Santo Tomas - Faculty of Pharmacy Ethics Review Committee for review and approval.

A medication adherence and CAM intervention seminar was conducted by two (2) registered pharmacists. The 2-hour educational seminar tackled Hypertension, Diabetes, CAM and medication adherence. The Morisky adherence scale questionnaire was given prior and after the intervention with CAM attitude questionnaire.

Means and counts were used to summarize the sociodemographic profile and the list of complementary and alternative used by the patients. Percentage were used in categorical data pertaining to CAM type. A Two-Tailed Paired T-test were used to analyze the significance of the seminar with the results obtained from a pre- and post-medication adherence questionnaire. Pearson-correlation was performed to determine the relationship between Attitude towards CAM use and medication adherence of patients. All statistical tests were performed using SPSS 21.0 with p-value of less than or equal to 0.05 indicating a significant difference.

RESULTS AND DISCUSSION

SOCIO-DEMOGRAPHIC PROFILE OF THE RESPONDENTS

Table 1 shows the respondents socio-demographic profile. There were more females (74.2%) than male (25.8%) patients and majority of them were married (59.1%), educated up to the secondary level (69.7%), and are unemployed (59.1%). Most of geriatric age (34.8%), has an income of Php 1,000-10,000, with ≥ 5 children (27.3%), and are catholic (77.3%). Most respondents were non-smokers or non- alcoholic drinkers (83.8%).

Profile	Frequency	Percentage
<i>Gender</i>		
Male	17	25.8%
Female	49	74.2%
<i>Age</i>		
18-39	1	1.5%
40-49	20	30.3%
50-59	14	21.2%
60-69	23	34.8%
≥ 70	8	12.1%
<i>Education</i>		
Elementary	15	22.7%
Highschool	46	69.7%
College	5	7.6%
<i>Work</i>		
With Work	24	36.4%
Without Work	39	59.1%
Retired	3	4.5%
<i>Civil Status</i>		
Single	11	16.7%
Married	39	59.1%
Separated	1	1.5%
Live in	4	6.1%
Widow	11	16.7%
<i>Children</i>		
0	6	9.1%
1	8	12.1%
2	9	13.6%
3	15	22.7%
4	10	15.2%
>5	18	27.3%
<i>Religion</i>		
Catholic	51	77.3%
Christian	6	9.1%
Islam	-	-
No Religion	-	-
Others	9	13.6%
<i>Income</i>		
9		13.6%
No income	4	6.1%
0-1,000	35	50%
1,001-10,000	16	24.2%
10,001-20,000	2	3.0%
20,001-30,000		
<i>Social History</i>		
None	55	83.3%
Smoking	10	15.1%
Alcohol Drinking	1	1.5%

CHRONIC ILLNESSES PRESENT IN PATIENTS

For respondent-patients reported with chronic disease condition, almost all are diagnosed with hypertension (95.5%) and 21.2% have diabetes. This indicates that there is a higher prevalence of hypertension than diabetes at the study site.

	Frequency	Percentage
Hypertension	63	95.5%
Diabetes	14	21.2%
Cancer	1	1.5%
Lower Respiratory Disease	1	1.5%
Tuberculosis	-	-
Stroke	4	6.1%
Kidney Disease	1	1.5%
Liver Disease	1	1.5%
HIV	-	-
Others	6	9.1%

	Frequency	Percentage (n=66)
<i>Hypertension</i>		
Amlodipine	22	33.33%
Metoprolol	2	3.03%
Losartan	28	42.42%
Captopril	3	4.56%
Atenolol	1	1.52%
Nifedipine	1	1.52%
Hydrochlorothiazide	1	1.52%
Simvastatin	1	1.52%
Telmisartan	1	1.52%
Felodipine	2	3.03%
Diltiazem	1	1.52%
ISDN	1	1.52%
<i>Diabetes</i>		
Metformin	13	19.70%
Gliclazide	1	1.52%
<i>Cancer</i>		
Tamoxifen	1	1.52%
<i>Asthma</i>		
Salbutamol	1	1.52%

PRESCRIBED MEDICATION OF PATIENTS

There are different blood pressure drugs that are used w/ losartan, an angiotensin-receptor blocker (ARB), that is prescribed to a 42.42% of the respondents. Amlodipine, a medication used alone or in combination, used to treat high blood pressure and chest pains (angina) is prescribed to 33.33% of the respondents. Other drugs used are statins simvastatin), beta-blockers (metoprolol, Atenolol), angiotensin-converting enzyme inhibitor (captopril), calcium-channel blocker (nifedipine, felodipine, diltiazem), diuretic (hydrochlorothiazide), anti-angina (Isosorbide dinitrate), angiotensin-receptor blocker (Telmisartan). Diabetic respondents responded mostly to metformin (19.70%), a biguanide. The high patronage to metformin, amlodipine and losartan can be contributed to the acquirability of these drugs in the health center as mandated by the Department of Health.

	Frequency	Percentage
Medicinal Plants	53	80.3%
Medicinal Supplements	18	27.3%
Herbal Tea	25	37.9%
Mind and Body Practices	26	39.4%
Manipulative Body Practices	36	54.5%

CATEGORIES OF CAM AND DISTRIBUTION CHART OF CAM USED PER TYPE

Table 4 shows the total counts of CAM patronized by the 66 patient-respondents while table 5 shows the detailed categories with their frequencies. In the different categories of CAM, herbal plants (80.3%) are the most used CAM type by the respondents as seen in table 4. Manipulative body practices (traditional massage, body & foot massage, ventosa) have 54.5% of population patronizing it while mind and body practices (jogging/walking, sports, zumba) have 39.4% of respondents using this type of CAM; herbal tea (ginger tea, mangosteen tea, lemon tea) have 37.9% of the population taking this type of CAM; medicinal supplements (mangosteen capsules, bitter gourd capsules). The distribution chart in table 5 shows the summary of CAM used by patients. Results shows that jogging/or waking (45.5%) is the most prevalent CAM; traditional massage (33.3%) and ginger tea (25.8%) are the second and third most prevalent CA, respectively.

Table 5. Distribution Chart of CAM used per type

CAM Used	Frequency	Percentage
<i>Medicinal Plants</i>		
Lagundi	14	21.2%
Sambong	15	22.7%
Ampalaya	12	18.2%
Bawang	9	13.6%
Guava	7	10.6%
Tsaang-Gubat	2	3.1%
Yerba Buena	-	-
Niyog-Niyogan	1	1.5%
Akapulko	1	1.5%
Pansit-Pansitan	1	1.5%
Others	1	1.5%
	63	
<i>Medicinal Supplements</i>		
Mangosteen capsules	11	16.7%
Vitamin E supplement	1	1.5%
Silymarin capsules	-	-
Garlic, ginseng + grape seed a+ ginkgo biloba supplement	-	-
Bitter Gourd supplement	4	6.1%
Moringana Malunggay capsules	1	1.5%
Fish Oil capsules	1	1.5%
Lutein/vit C/vit E/Zn capsules	-	-
Others	5	7.6%
	22	

<i>Herbal Tea</i>		
Mangosteen coffee and tea	10	15.2%
Chamomile tea	1	1.5%
Lemon tea	6	9.1%
Ginger tea	17	25.8%
Green tea	6	9.1%
Peppermint tea	-	-
L-Carnitine and Green tea Extract	-	-
Ampalaya tea	-	-
Banaba tea	1	1.5%
Malunggay tea	4	6.1%
Sambong tea	3	4.5%
Others	2	3.0%
	50	
<i>Mind and Body Practices</i>		
Yoga	1	1.5%
Jogging/Walking	30	45.5%
Meditation	1	1.5%
Zumba	6	9.1%
Sports(Basketball/Volleyball)	7	10.6%
Running	2	3.0%
Gym	1	1.5%
Others	3	4.5%
	51	
<i>Manipulative Body Practices</i>		
Acupuncture	2	3.0%
Body & Foot Massage	15	22.7%
Traditional Massage	22	33.3%
Vertosa	6	9.1%
"Tawas"	7	10.6%
"Albularyo"	4	6.1%
"Medico"	2	3.0%
Others	2	3.0%

Table 6. Between-Group Comparison of Medication Adherence and CAM Attitude (N=66)

Medication Adherence (n=66)		CAM (n=66)		r-value	p-value (two-tailed)	Decision
Mean	SD	Mean	SD			
2 (1.8939)	.86164	4 (3.5606)	.80630	-0.730	.049	Significant Negative

*Significant at $\alpha < 0.05$

BETWEEN-GROUP COMPARISON OF MEDICATION

Adherence and CAM Attitude

In Table 6, it shows that patients “Agree” to use CAM, with a mean score of 4 (Mean= 3.5606, SD= 0.80630) and were found to be “Sometimes” nonadherent to their medication with a medication adherence mean score of 2 (Mean= 1.8939; SD= 0.86164). A significant negative correlation between medication adherence prior to intervention and CAM Attitude was shown by the Pearson correlation coefficient test (r-value= -0.730, p-value = 0.049). This means that an increase in medication adherence shows a decrease in CAM attitude, and vice versa. Thus, showing an inverse relationship between the two variables.

It is reported that there is a possibility of patients turning to CAM when they encounter barriers to medication leading to non-adherence (McQuiad, 2014). In a study by Krousel-Wood, et. al (2010)22 , CAM use was associated with a decrease in medication adherence to adult hypertensive patients. Likewise, George, M. (2006) 23 state that while most of the patients trusted using conventional medicine, CAM use is still their choice of medicine to cure their diseases for it is considered natural, effective, and potentially curative. Meanwhile, it is reported that some patients have low adherence to their prescribed medication due to their medication beliefs such as worry about the medicines’ adverse effects which in part mediate in their. decision in using CAM (Roy, 2010). Complementary and Alternative Medicine use is a self-management/

behavioral barrier relating to medication non-adherence. The result of this study shows that diabetic and hypertensive patients taking complimentary and alternative medicine are adherent to their maintenance medication prior to intervention. This finding can be justified with the fact that CAM use is not necessarily “competitive” with conventional medicine (Philp, 2012).

BETWEEN-GROUP COMPARISON OF MEDICATION ADHERENCE

	Pre-Intervention (N=66)		Post-Intervention (N=66)		t-value	p-value (two-tailed)	Decision
	Mean	SD	Mean	SD			
Medication Adherence	2 (1.8939)	.8616 4	1 (.6061)	.6295 0	4.50 3	.000	Significant

Table 7 presents the comparison of medication adherence between pre-intervention and post-intervention period. The mean score of the patients during the pre-intervention period is 2 (Mean=1.8939; SD = 0.86164) suggesting that they are “Sometimes” nonadherent

to their medication. As for the post-intervention, a mean score of 1 (Mean= 0.6061; SD = 0.62950) suggests that patients are “Rarely” nonadherent to their medication. It used a two-tailed test significance taken at $p < 0.05$, wherein the value of significance reported is $p = 0.000$. Results show that there is a statistical increase in the medication adherence of patients from the pre-intervention to post-intervention period.

Medication adherence intervention programs have been widely used worldwide in order to improve the patients’ adherence, to build a trusting relationship, and to communicate easily with each other. Medication adherence education can provide an impact on health outcomes than therapy improvements. Adherence can be improved by a variety of factors such as education and assessing health literacy (Brown & Bussell, 2011)4. Educational interventions have a positive impact in adherence and in other clinical outcomes and knowledge (Costa, 2015)26. Furthermore, patient education through proper motivation and support by health care professionals is shown to increase medication adherence (Jimmy, 2012).

CONCLUSION

In the pre-intervention period, the overall score of the patients was 2, which was equivalent to being “sometimes” non-adherent to their prescribed medication. On the contrary, the post-intervention period presented an overall score of 1, which means that the patients were “rarely” non-adherent to their prescribed medication. These results showed a statistical increase in the medication adherence of the patients following an intervention by using a medication adherence seminar. Based on the data gathered from the patients, it is therefore concluded that

there is a general improvement in medication adherence in hypertensive and diabetic patients who used CAM following a medication adherence seminar that functioned as an intervention. The following are offered to look forward to future researchers to supplement this pilot study for related research: first, the future researchers may choose to conduct the study to another community such as communities of indigenous people with a larger population; second, the time and duration of the research should be lengthened to better assess the attitudes of patients with regards to medication adherence and CAM use; third, new interventions for the study may be done to determine and assess their effectiveness on patient's attitude with regards to medication adherence; fourth, the future researchers may continue the study with other non-communicable diseases like cancer and non-respiratory diseases; and last, in future studies the focus on the specific attitudes of patients with regards to their medication adherence and CAM intake attitudes can be included. This study has some limitations. The researchers limited the study to pharmaceutical education intervention, attitude on complementary and alternative medicine use, and medication adherence assessment. The population was limited to patients with hypertension and diabetes in a local community, narrowed through purposive sampling based on the inclusion and exclusion criteria. The time for the study is also limited.

REFERENCES

1. Petrie, J. R., Guzik, T. J., & Touyz, R. M. (2017). Diabetes, hypertension and cardiovascular disease: Clinical insights and vascular mechanisms. *Canadian Journal of Cardiology*. doi:10.1016/j.cjca.2017.12.005
2. Yap, A. F., Thirumoorthy, T., & Kwan, Y. H. (2016). Medication adherence in the elderly. *Journal of Clinical Gerontology and Geriatrics*, 7(2), 64-67. <https://doi.org/10.1016/j.jcgg.2015.05.001>
3. Williams, J., Steers, W. N., Ettner, S. L., Mangione, C. M., & Duru, O. K. (2013). Cost-related Non adherence by Medication Type Among Medicare Part D Beneficiaries With Diabetes. *Medical Care*, 51(2), 193-198. doi:10.1097/mlr.0b013e318270dc52
4. Brown, M.T., Bussell, J., Dutta, S., Davis, K., Strong, S., & Mathew, S. (2016). Medication Adherence: Truth and Consequences. *The American Journal of the Medical Sciences*, 351(4), 387-399. <https://doi.org/10.1016/j.amjms.2016.01.010>
5. Debas, H. T., Laxminarayan, R., & Straus, S. E. (2006). Complementary and Alternative Medicine. Disease Control Priorities in Developing Countries. The International Bank for Reconstruction and Development / The World Bank. Retrieved from <http://>

www.ncbi.nlm.nih.gov/pubmed/21250367

6. Pagán, J. A., & Pauly, M. V. (2005). Access to Conventional Medical Care And The Use Of Complementary And Alternative Medicine. *Health Affairs*, 24(1), 255-262. <https://doi.org/10.1377/hlthaff.24.1.255>
7. Choi, B., Han, D., Na, S., & Lim, B. (2017). Factors related to the parallel use of complementary and alternative medicine with conventional medicine among patients with chronic conditions in South Korea. *Integrative Medicine Research*, 6, 223-229. <https://doi.org/10.1016/j.imr.2017.04.002>
8. Candar, A., Demirci, H., Baran, A. K., & Akpınar, Y. (2017). The association between quality of life and complementary and alternative medicine use in patients with diabetes mellitus. *Complementary Therapies in Clinical Practice*, 31, 1-6. doi:10.1016/j.ctcp.2018.01.002
9. Krousel-Wood, M. A., Muntner, P., Joyce, C. J., Islam, T., Stanley, E., Holt, E. W., . . . Webber, L. S. (2010). Adverse Effects of Complementary and Alternative Medicine on Antihypertensive Medication Adherence: Findings from the Cohort Study of Medication Adherence Among Older Adults. *Journal of the American Geriatrics Society*, 58(1), 54-61. doi:10.1111/j.1532-5415.2009.02639.x
10. Cherniack, E. P. (2011). Complementary medicine use is not associated with non-adherence to conventional medication in the elderly: A retrospective study. *Complementary Therapies in Clinical Practice*, 17(4), 206-208. doi:10.1016/j.ctcp.2010.11.005
11. Medication Education Key to Successful Adherence in Patients with Diabetes. (n.d.). Retrieved December 17, 2017, from <https://health.ucsd.edu/news/2011/Pages/02-08-pharmacy-diabetes-adherence.aspx>
12. WHO. (2004). Guidelines on Developing Consumer Information on Proper Use of Traditional, Complementary and Alternative Medicine: 1. General Considerations: 1.1 The benefits of TM/CAM. Retrieved September 2, 2017, from <https://apps.who.int/medicinedocs/en/d/Js5525e/5.1.html>
13. NCCIH. (2015). Complementary, Alternative, or Integrative Health: What's In a Name? | NCCIH. Retrieved September 2, 2017, from <https://nccih.nih.gov/health/integrative-health#cvsa>
14. Ten (10) Herbal Medicines in the Philippines Approved by the Department of Health (DOH). (n.d.). Retrieved October 11, 2017, from <http://www.philippineherbalmedicine.org/>

doh_herbs.htm

15. Herbal Supplements Recommended by Philippine DOH. (n.d.). Retrieved October 11, 2017, from <https://www.altheadistributor.com/10-herbal-plants-endorsed-doh/>
16. Most Popular Pinoy Made Supplements. (n.d.). Retrieved October 11, 2017, from <http://www.topten.ph/2016/03/07/most-popular-supplements/>
17. Philippine Herbal Medicine. (n.d.). Retrieved October 11, 2017, from <http://www.medicalhealthguide.com/philippineherbalmedicine.htm>
18. Philippines Alternative Medicine. (n.d.). Retrieved October 11, 2017, from <http://www.stuartxchange.org/AltMed.html>
19. Islahudin, F., Shahdan, I., & Mohamad-Samuri, S. (2017). Association between belief and attitude toward preference of complementary alternative medicine use. *Patient Preference and Adherence*, Volume 11, 913-918. doi:10.2147/ppa.s132282
20. Encabo, J. %, Letran, R. D., Matias, C. M., Modina, S. Y., Payuran, J. F., Reyes, C. T., & Jazul, J. P. (2017). Medication Adherence Among Adult Hypertensive Patients in a Local Community in Caloocan City, Philippines. *Thai Journal of Pharmaceutical Sciences (TJPS)*, 41(5), 173-176. Retrieved October 21, 2017, from http://ipnacs2017.weebly.com/uploads/1/5/1/8/15182734/sp-1_rachelle_ann_d._letran_173-176_.pdf
21. Mcquiad, E.L., Ph.D., ABPP,, D. D., Ph.D., Adams, S. K., D., Ph.D. & Mitchell, J. T. (2014). Complementary and Alternative Medicine Use and Adherence to Asthma Medications among Latino and Non-Latino White Families. *Acad Pediatr*, 14(2), 192-199
22. Krousel-Wood, M. A., MD. (2010). Adverse effects of Complementary and Alternative Medicine Use on Antihypertensive Medication Adherence: Findings from CoSMO. *J Am Geriatr Soc*, 58(1), 54-61.
23. George, M., PhD, RN, AE-C., Birck, K., FNP, RN, Hufford, D.J., PhD, Jemmott L., PhD, RN, FAAN,, & Weaver, T., PhD, RN, CS, FAAN5. (2006). Beliefs about Asthma and Complementary and Alternative Medicine in Low-Income Inner-City African-American Adults. *IJ Gen Intern Med.*, 21(12), Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC1924749/>.
24. Roy A, Lurslurchachai L, Halm EA, et al. Complementary and alternative medication use and adherence to inhaled corticosteroid among inner-city asthmatics. *Ann Allergy Asthma Immunol* 2010;104:132-8

25. Philp, J. C., MD, Maselli, J., MSPH, Pachter, L. M., DO,d, & Cabana, M. D., MPH. (2012). Complementary and Alternative Medicine use with pediatric asthma treatmen. *Pediatrics*, 129(5), e1148-e1154. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4074611>
26. Costa,, E., Giardini, A., Savin, M., Menditto, E., Lehane, E., Laosa,, O,,... Marengoni, A. (2015). International tools to improve medication adherence: review of literature. *Interventional tools to improve medciation adherence: review of literature*, 9, 1303-1214. Retrieved from <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4576894>
27. Jimmy, B., & Jose, J. (n.d.). Patient Medication Adherence: Measures in Daily Practice. *Oman Med J*, 26(3), 155-159. Retrieved from <https://ww.ncbi.nlm.nih.gov/pmc/articles/Pmc3191684>