IMPACT OF PHARMACEUTICAL CARE ON PATIENTS WITH HYPERTENSION: A REVIEW ARTICLE

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Abstract

Background: Hypertension is the leading cause of cardiovascular disease and premature death worldwide. Lack of knowledge about hypertension is a major challenge in controlling hypertension. To reduce this burden, patients have to be aware of lifestyle changes and take measures regarding self-care. Pharmaceutical care is founded on the caregiver's responsibility to address all patient's drug-related needs to achieve measurable outcomes that improve the patient's quality of life.

Methods: A systematic review was performed using MEDLINE, EMBASE, Scopus, and LILACS databases for articles published from January 2000 (year of PC to July 2022, for randomized controlled trials that involved pharmacist care interventions among outpatients with hypertension. Reviewers independently abstracted data and classified pharmacists' interventions based on mean changes in blood pressure.

Results: The studies analyzed in terms of practice settings, 11 (73%) of the studies were conducted in community pharmacy and 4 (27%) were in clinics. The sample size ranged from a minimum of 24 patients and a maximum of 567. Drug therapy follow-up ranged from 2 to 10 months. In 8 (53.33%) of the articles, the age range of the sample was 18 to 60 years. The interventions exclusively delivered by pharmacist education and counseling about medications, lifestyle or compliance; distribution or use of educational material; patient educational workshop, patient interview; assessment of medication compliance; monitoring of medication therapy such as assessment, adjustment, or change of medications defined as drug-related problems (DRPs) identification. Pharmaceutical care and Usual pharmacy dispensing services were both associated with statistical reductions in systolic and diastolic BP, but no major differences were demonstrated between standard care and pharmaceutical care. In case, the weighted mean difference in systolic BP, −9.1mmHg [95% CI, −29.4 to −2.9]; the weighted mean difference in diastolic BP, −5.1 mm Hg [95% CI, −7.0 to −3.1]; and control, weighted mean difference in systolic BP, −6.8mmHg [95% CI, −21.6 to −1.4]; and weighted mean difference in diastolic BP, −2.2 mm Hg [95% CI, −4.6 to −0.2]). Moreover, there was a positive impact of pharmaceutical care.

Conclusion: Patients who received pharmaceutical care had controlled blood pressure as compared to the group of patients using standard pharmaceutical services. Pharmaceutical care also had a positive effect on controlling blood pressure and cardiovascular risk.

KEYWORDS: Hypertension; Pharmaceutical care; Pharmacy Practice, Quality of life, Drug adherence

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Introduction:

Hypertension is a prominent preventable cause of premature morbidity and mortality. People with hypertension and established cardiovascular disease are at particularly high risk, so reducing blood pressure to below-standard targets may be beneficial. This strategy could reduce cardiovascular mortality and morbidity but could also increase adverse events. The optimal blood pressure target in people with hypertension and established cardiovascular disease remains unknown (Saiz et al. 2020). Hypertension is the leading cause of cardiovascular disease and premature death worldwide (Mile et al, 2016). Lack of knowledge about hypertension is a major challenge in controlling hypertension. To reduce this burden, patients have to be counseled on lifestyle changes when they visit their health facility and take measures regarding self-care (Erkoc et al. 2012; Hu, Li, and Arao 2013). Self-care involves medication adherence, eating a low-fat diet, regular physical exercise, limiting alcohol consumption, not smoking, weight reduction, self-monitoring of blood pressure (BP), regular health care visit, and reducing stress (He et al. 2000; Worku Kassahun et al. 2020).

Pharmaceutical care is founded on the caregiver's responsibility to address all patient's drug-related needs to achieve measurable outcomes that improve the patient's quality of life. Involves forming a therapeutic connection with the patient, taking responsibility for all the patient's pharmacotherapy, regardless of source, and focusing on the patient's drug-related requirements. Pharmacists have an important role in improving medicine´s use, especially in chronic patients due to their easy access to patients. For hypertension patients, pharmacists have shown to be effective in improving adherence and getting better outcomes in its control.

The pharmacy profession is moving from a technical to a more patient-focused paradigm, 10 including the implementation of cognitive services provided under the aegis of pharmaceutical care. Although a previous study has demonstrated the effectiveness of pharmacist interventions in hypertensive patients, the data analyzed included other cognitive pharmaceutical services (Aguiar et al. 2012). Pharmacist interventions such as patient education, physician feedback, and medication reviews can help to reduce risk factors. Patients with cardiovascular illness should be managed in a certain way (Elements 2020). Practicing pharmaceutical care for hypertensive patients by community pharmacists is of great importance. That is why the aim of the study is to make a review of the effectiveness of pharmaceutical care on patients with hypertension.

Methodology

A systematic review was performed using MEDLINE, EMBASE, Scopus, and LILACS databases for articles published from January 2000 (year of PC conception) to July 2022, using the search terms "pharmaceutical care," "hypertension," and "blood pressure" in different combinations. Articles repeatedly indexed in 1 or more databases were considered only once (ie, duplicates were excluded). Obtained records in this study were included and excluded based on the following criteria. The inclusion data criteria included

1. Article published in English
2. Availability of abstract and full-text publications in the databases
3. Reports containing research on PC exclusively

Results:

A total 150 Potentially relevant articles retrieved through databases. 66 Articles excluded by which duplicates or triplicates. 84 Article citations from search, out of which 52 Articles excluded based on title or abstract. 32 Full articles reviewed of which 17 of Articles excluded: Review, different disease, full text not available. 15 Full articles were extracted and review work carried out on this (Figure: 1).

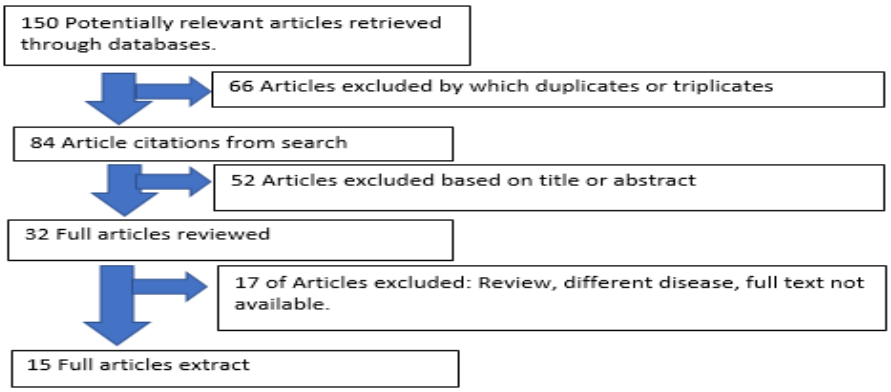


Figure 1 Study selection flow chart through literature

Almost all the studies analyzed (93.8%) were published in pharmacy journals.47,50-52 The studies were conducted primarily in North America (8)47-51,53,54,60 and South America (3).56,57,59 In terms of practice settings, 9 (56.3%) of the studies were conducted in ambulatory care clinics,48-51,53,56,57,59,61 6 (37.5%) in community pharmacies, 47,52,54,58,60,62 and only 1 (6.2%) in both settings.55 Of the multisite studies, the maximum number of participating sites was 55.62 Sample size ranged from a minimum of 24 patients58 to a maximum of 235,55 and more than half of the studies (9) had sample sizes smaller than 100.47-49,52,56-59,62 Drug therapy follow-up ranged from 4 to 14 months,62 with 8 (50.0%) studies reporting a 6-month follow-up.49-56 In 6 (37.5%) of the articles, the age range of the sample was not reported,47,51,52,58-60 and in those that did report this information, the most frequent ages were equal to or greater than 18 years.

Table 1. Characteristics of Included Studies: Study Setting and Design, Sample Size, and Study Participants

Source; Country	Study Setting	Study Design, Duration	Sample Size, Total No. (Intervention/Usual Care	Study Participants; Mean Age
Ebid et al, 2014; Egypt	Outpatient clinic	A randomized controlled trial. 3 months	280	18 to 80 years of either sex.
Ralapanawa, U.,et al, 2020; Srilanka	Hypertensive clinic	Descriptive study,	253	Median age male 65 and female was 64 years.
Robinson, J. D., et al, 2010; North Florida	community pharmacy	6-month	180 PC and 196 UC patients	patients who may benefit from the PC program
Aguwa, C. N., et al, 2008; Nigeria	community pharmacy.	non-randomized, single-site, crossover design. 5/5-month Uc and Pc	24 patients out of the 40 recruited completed the study	mean age of 51.6 +_ 11.7 years.
Lee, J. K., et al, 2006; America	community-based patients	A randomized controlled trial. 2-month run-in phase/6-month intervention phase.	200	65 years or older
Östbring, M. J., et al, 2021; Sweden	cardiology clinic	prospective, randomized, controlled. 7- months	316 patients. 157 control and 159 intervention group.	Mean age 68 years.
Bhavit B Oza., et al, 2014; India	outpatient department.	Cross-sectional study.2 -months	269 patients	58.25 ± 10.35 years.
Xiao, M., et al, 2019; China	communities	cross-sectional survey	567 patients completed the survey	patients (83.42%) were older than 60 years.
Oparah, A. C., et al, 2006; Nigeria	community pharmacy	A non-randomized, single-site study. First visit, and follow-up visits on monthly basis for a period of six months.	36 patients	50 years
Ramanath, K. V., et al, 2012; India.	Medicine department of a hospital	A prospective, randomized, and interventional study. 6-month	52 patients.26 cases and 26 control	62 years
Aguiar, P. M., et al, 2012; Brazil	community pharmacy	Nonrandomized, single-intervention. Monthly visits were scheduled during a 10-month period	35 of 51 patients completed the study.	65.9 years
Garçao, J. A., et al, 2002; Portugal	community pharmacy	A randomized, controlled study.6-month	Intervention-41 Control-41	Intervention Group-66.56 Control Group-63.48
Skowron, A., et al, 2011; Poland	Community pharmacies	randomly assigned to study and control group	28 and 56 patients from community pharmacies in the study and control group respectively.	65 years
Ha, N. T., et al, 2014; Vietnam	Rural community	A cross-sectional study. 2 months	275 patients	65.8 years
Sharma, S., et al, 2014; Nepal	community pharmacy-based	A single-cohort pre-/post-intervention. 9 months	50 patients	60.34 ± 1.48 years

Table 2. Characteristics of Included Studies: Key Components of Pharmacist Interventions, Intervention Frequency, Usual Care Group, and Outcomes

Source; Country	Key Components of Pharmacist Interventions	Intervention Frequency	Description of Usual Care Group	Outcomes Extracted
Ebid et al, 2014; Egypt	-pharmacist consisted of a baseline interview for 30-60 minutes and follow-up visits. -received essential information about the nature of hypertension, its complications, the importance of controlling it, medications, and compliance, encourage patients to self-care and lifestyle modifications that include diet and physical activities. -structural pictures, illustrated diagrams, and written materials [Arabic leaflets] were provided together with self-measurement for BP was taught and patients were encouraged to adhere to their therapies	All patients visited the clinic monthly for up to three months for checks and evaluation.	Patients in the control group, who were receiving the usual hospital care only, were asked to visit the clinic monthly as usual for check and evaluation.	Pharmacist intervention can significantly improve BP control, medication adherence, patients' knowledge, attitude, practice, and QOL in hypertensive
Ralapanawa, U.,et al, 2020; Srilanka	-Provide essential information about hypertension, lifestyle modification, and other self-care activities.	Monthly	No pharmaceutical care	Almost 75% of the patients had optimum drug compliance.
Robinson, J. D., et al, 2010; North Florida	-Patients were instructed, to use a standardized procedure, as to how to use the BP machine.	over a 12-month period.	Usual care	PC patients demonstrated larger improvements in QOL in physical and social function compared with UC patients.

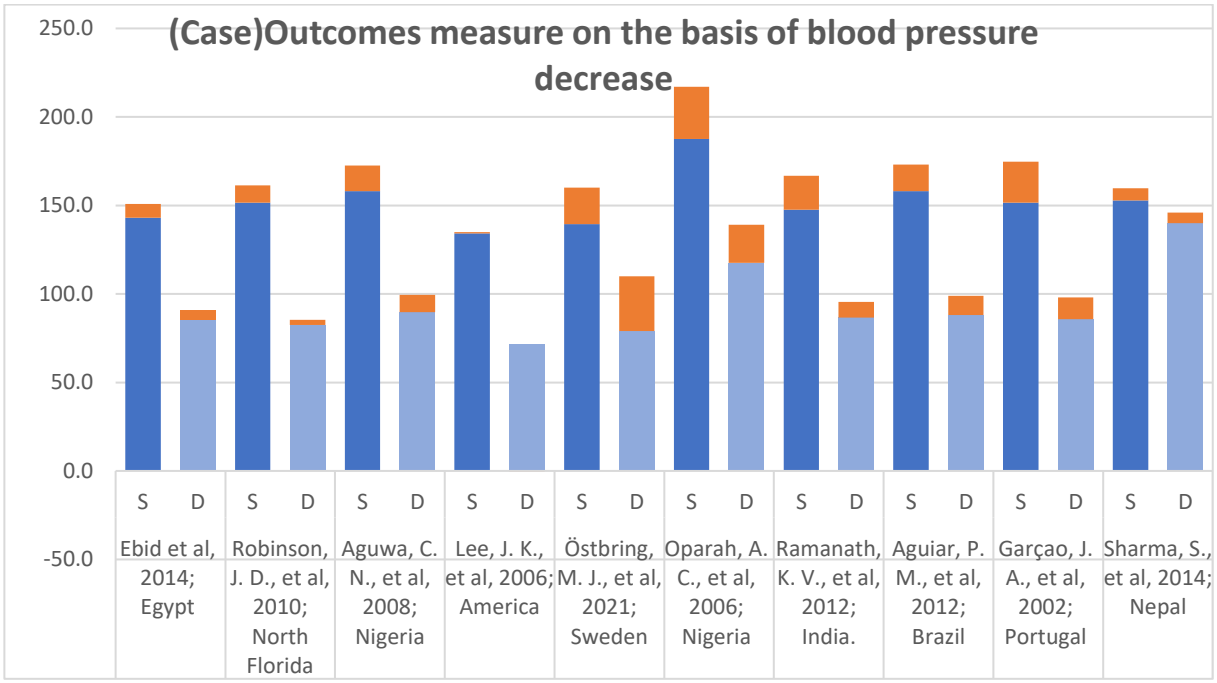
Aguwa, C. N., et al, 2008; Nigeria	The nine steps of good PC practice were followed: - -specifically, developing a pharmacist-patient relationship. -collecting, analyzing, and interpreting relevant information. -listing and ranking drug-related problems; establishing pharmacotherapeutic outcomes with the patients. -determining feasible pharmacotherapeutic alternatives. -selecting the best pharmacotherapeutic solution. -designing a therapeutic monitoring plan; implementing the individual regimen and monitoring plan and follow-up.	underwent 5 months of usual care and another 5 months of pharmaceutical care.	No pharmaceutical care	- significant reductions In intervention for systolic BP (14.3 _ 14.4 mmHg) and diastolic BP (10.8 _ 10.7 mmHg. -significant the mean increase in the number of patients that adhered.
Lee, J. K., et al, 2006; America	-standardized medication education. -regular follow-up by pharmacists. -medications dispensed in time-specific packs.	2-month run-in phase and 6-month intervention phase.	Usual pharmacy dispensing services	-significant improvements in systolic BP.
Östbring, M. J., et al, 2021; Sweden	-Therapeutic relationship with the patient, take responsibility for all the patient's pharmacotherapy, regardless of source, and focus on the patient's drug-related needs. -patient education, feedback to the physician, and medication reviews.	The intervention group was seen by a clinical pharmacist two to five times as required over seven months.	standard care	Increased patient adherence.
Ramanath, K. V., et al, 2012; India.	verbal counseling, provision of an information leaflet, and subsequent monitoring with reinforcement were provided.	Baseline patient-specific data were acquired on the first visit, and follow-up visits were scheduled on a monthly	No pharmaceutical care	-improved blood pressure control. -Improve patient satisfaction with pharmaceutical care.
Aguiar, P. M., et al, 2012; Brazil	- focused on health education and monitoring of drug-related problems (DRPs). - encouraged patients to reflect and discuss situations related to hypertension (nature, causes, and treatment). - changes in lifestyle, and self-management of medications. - Education interventions were given verbally and visually through interactive presentations using slides and handwriting, and an informative brochure and medication charts	Monthly visits were scheduled during a 10-month period.	No description	Improved blood pressure and improving medication adherence.
Garçao, J. A., et al, 2002; Portugal	-To monitor blood pressure. -Assess adherence to treatment. - Prevent, detect, and resolve drug-related problems (DRPs). -Encourage nonpharmacologic measures for blood pressure control. Control patients received traditional care	monthly appointments for 6 months.	No description	Significant improvements in blood pressure control
Skowron, A., et al, 2011; Poland	Drug-related problems should be detected and solved and the patient should be educated about pathophysiology, risk factors, treatment, and style of life with hypertension as well as unassisted blood pressure measurement.	At least 12 meetings should be done during which blood pressure should be measured using a sphygmomanometer	standard pharmaceutical services.	Improve knowledge and control BP.
Sharma, S., et al, 2014; Nepal	-lifestyle modification and non-pharmacological approaches concerning hypertension management. - DASH (Dietary Approaches to Stop Hypertension).	Three counseling sessions over a period of six months.	No description	Improved patients' disease knowledge, practice, and management of their hypertension

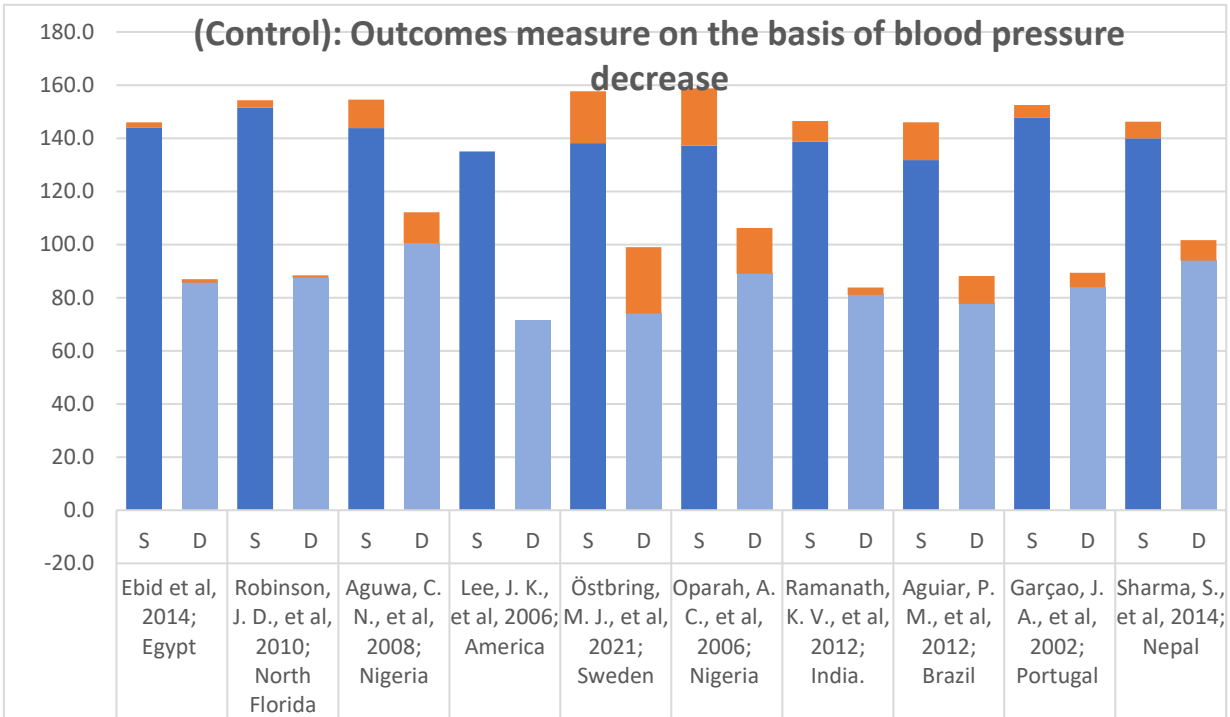
The interventions exclusively delivered by pharmacist or implemented in collaboration with physicians or nurses included first educational interventions directed to patients (defined as education and counseling about medications, lifestyle or compliance; distribution or use of educational material; patient educational workshop) in 5 studies. Second, medication management (defined as medication review from medical records or patient interview; assessment of medication compliance; monitoring of medication therapy such as assessment, adjustment, or change of medications) in almost all studies. Third, focus on feedback to health care professional (defined as drug related problems (DRPs) identification; recommendation to physicians regarding medications change; meeting with team to discuss care) in 6 studies over all a one month to 12 months period.

Table 3: Outcomes measure on the basis of blood pressure

Source	Case: systolic BP (baseline/End point mean)	Control: systolic (baseline/end point mean)	Case: diastolic BP	Control: diastolic	Ldl (before and after intervention)
Ebid et al, 2014; Egypt	143.0 (16.4) 135.1 (15.2)*	144.0 (20.5) 142.0 (20.2)	85.5 (7.3) 80.1 (8.2)	85.6 (9.0) 84.2 (8.9)	N/A

Robinson, J. D., et al, 2010; North Florida	151.5 ± 14.0 –9.9 ± 2.0	151.5 ± 14.9 –2.8 ± 2.3	82.4 ± 13.2 –2.9 ± 1.3	87.4 ± 9.9 –1.0 ± 1.5	-
Aguwa, C. N., et al, 2008; Nigeria	158.1 _ 14.4	143.8 _ 10.7	89.8 _ 9.7	100.6 _ 11.5	-
Lee, J. K., et al, 2006; America	134.2 (18.6) 133.4 (17.6)	135.0 (20.3) 135.0 (20.3	71.4 (10.0) 71.7 (9.1)	71.4 (10.6) 71.7 (9.1)	92.8 (30.4)/ 91.6 (30.5)
Östbring, M. J., et al, 2021; Sweden	139.5 (20.6	138.1 (19.6)	79 (48.4)	74 (49.0)	58/55
Oparah, A. C., et al, 2006; Nigeria	187.67_29.46 137.22_21.65	-	117.56_21.65 89_17.23	-	-
Ramanath, K. V., et al, 2012; India.	147.54 ± 20.45 128.27 ± 6.35	138.85 ± 16.03 131.08 ± 5.16	86.62 ±11.35 77.73 ± 3.63	81.12 ± 7.16 78.46 ± 4.12	-
Aguiar, P. M., et al, 2012; Brazil	158.1 ±15.0 131.8 ±14.2	-	88.1± 10.8 77.7 ± 10.4	-	-
Garçao, J. A., et al, 2002; Portugal	151.68 - 23.16 128.54 ± 15.06	147.70 -15.97 142.9 ± 20.42	85.66 -13.16 73.32 ± 8.20	83.90 -9.18 78.59 ± 8.55	
Sharma, S., et al, 2014; Nepal	152.86 (6.9) 140 (6.2)	-	140 (6.2) 93.9 (7.8	-	-





These analyses were conducted for the outcome BP, for which a relatively large number of studies were available (n=10). Pharmaceutical care and Usual pharmacy dispensing services were both associated with statistical reductions in systolic and diastolic BP, but no major differences were demonstrated between the standard care and pharmaceutical care (pharmaceutical care: weighted mean difference in systolic BP, −9.1mmHg [95% CI, −29.4 to −2.9]; weighted mean difference in diastolic BP, −5.1 mm Hg [95% CI, −7.0 to −3.1]; and pharmacist collaborative care: weighted mean difference in systolic BP, −6.8mmHg [95% CI, −21.6 to −1.4]; and weighted mean difference in diastolic BP, −2.2 mm Hg [95% CI, −4.6 to −0.2]) (Table 3). Moreover, there were no major differences in BP reductions according to the type or the number of interventions or to the control of BP.
systematic review, identifying 15 study that assessed 3215 both case and control patients, supports the benefit of pharmacist care interventions in the management of major CVD risk factors among outpatients. Pharmacist interventions achieved greater reductions in systolic and diastolic BP,

Discussion:
From several reviewed articles it was found that optimal use of medications was most likely the main contributing factor to the success of the pharmaceutical care program. The main reason for the lack of tight control of antihypertensive medication therapy was that physicians were satisfied with blood pressure values and did not pursue recommended therapeutic goals on resistant or difficult-to-control hypertension. While on the patient's side, knowledge, attitude, and practice (KAP); clinical inertia, and nonadherence were prevalent(Moser and Setaro 2006).

However, studies have shown that not only positive effect of pharmaceutical care on quality of life is improved, but also a promising reduction of blood pressure could be obtained(Wal et al. 2013).

The management of chronic diseases including hypertension is strongly linked to lifestyle modifications. The behavioral changes are of prime importance and include several non-pharmacological approaches such as dietary adjustment, physical exercise, and self-monitoring of blood pressure(Sharma et al. 2014). Pharmacist intervention for hypertensive patients in a community pharmacy in Nigeria showed beneficial reduction in blood pressure as well as improved quality of life. Positive results were obtained in the various outcome measures such as, patients exercised more frequently, became aware of salt restriction (Ekwunife 2015). Another study in India concluded that pharmacist involvement/need is very important in other chronic disease managements of rural population for increasing the QOL by preventing recurrence of disease, its progression, and minimizing of hospital admissions(Kv et al. 2000).

Assessment of KAP towards HTN is essentially required for knowing the present awareness level and help to develop as well as practice newer developments. KAP enhancing programs greatly helped to reduce the burden of HTN. Several studies have shown that the knowledge about complications of HTN and the importance of adherence to close during monitored follow-up by Pharmacist(Ralapanawa et al. 2020). Similarly, a 3-month study resulted in a significant reduction of SBP, DBP and an increase knowledge and awareness on hypertension, adherence, and patient quality of life (Ebid, Ali, and Ghobary 2014).

Conclusion:
Patients who received pharmaceutical care had controlled blood pressure as compared to the group of patients using standard pharmaceutical services. Pharmaceutical care also had a positive effect on controlling blood pressure and cardiovascular risk**.**

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