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Under Pressure: Ambulatory Blood Pressure Control

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BACKGROUND

- Hypertension (HTN) is the most common reason for a non-pregnant adult to present to their primary care provider.[1]
- Poor blood pressure control leads to myocardial infarction, stroke, and renal failure with only an estimated 50.1% of hypertensive adults controlled.[2]
- Jefferson Hospital Ambulatory Practice (JHAP) patients in 2016 showed a hypertension control rate of 47.2% on all clinic days.
- The stand-out problem for JHAP was the infrequency of timely follow-up with the primary care provider (PCP).
- Using JNC 8 guidelines, our group developed a standardized flow sheet to be followed in any encounter involving a hypertensive patient.

SMART AIM

- Improve hypertension control with the following goal: Within three months 60% of patients with hypertension will have a blood pressure less than 140/90 during their most recent office visit.

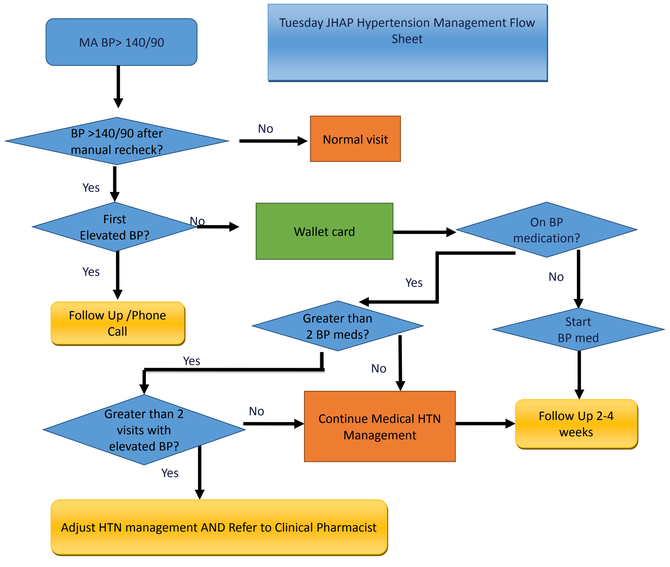
STAKEHOLDERS

- Stakeholders include patients, resident physicians, medical technicians and the clinical pharmacist.

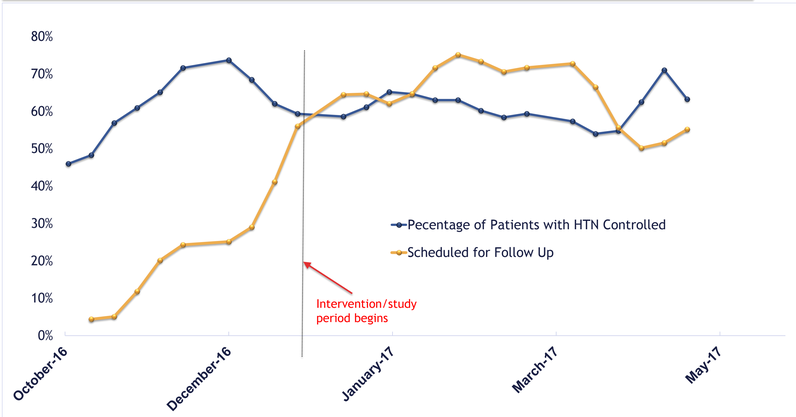
METHODS

PLAN Beginning in January 2017 we instituted a process for assessing, treating blood pressure and evaluating Tuesday JHAP's hypertensive population.

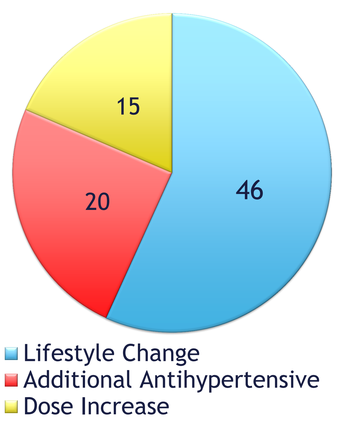
DO



RESULTS



Interventions



Pre/Post Descriptive Statistics of Patient Population

Variables, % (n)*	Cohorts: Pre-Intervention	Cohorts: Post-Intervention
Mean Age, Years (±SD)	57.1 (±12.8)	58.0 (±12.0)
Sex, Female	59.7 (71)	67.2 (121)
Obese	48.7 (58)	62.8 (113)
Overweight	29.4 (35)	21.7 (39)
Hypertension	93.3 (111)	92.8 (167)
Lifestyle Change	15.7 (19)	17.2 (31)
Insurance Status		
No	6.6 (8)	1.1 (2)
Medicare/Medicaid	30.6 (37)	22.8 (41)
Others	57.0 (69)	75.6 (136)
No. of Antihypertensive Meds		
None	14.3 (17)	8.3 (15)
One	32.8 (39)	34.4 (62)
Two	32.8 (39)	30.0 (54)
Three or more	20.2 (24)	27.2 (49)

*Less than 1% data were missing thus percent may not add-up to 100%

Implementation of Intervention

Variables, % (n)	Cohorts: Pre-Intervention	Cohorts: Post-Intervention	P value
Patients	N= 119	N= 181	
Blood Pressure ¶			
<140/90	57.1(68)	65.2(118)	0.07
≥140/90	42.8(51)	34.8(63)	
Process Measure			
Follow Up	13.7(7)	73.1(68)	
Appointment	100(7)	88.2(60)	
Phone Call	0(0)	8.8(6)	
Clinical Pharmacist	0(0)	2.9(2)	
Attended Follow Up Appointment	0 (0)	48.3(29)	
Average till Follow Up, week(±SD)	NA	4.3(±2.4)	
Interventions ⍰	28	81	
Balance Measures			
Complications†	0(0)	1.2(1)	
Acute Kidney Injury	0(0)	1.2(1)	
Cough	0(0)	1.2(1)	
Orthostatic Hypotension			

¶ Blood pressure taken at most recent clinical visit
⍰ Addition of antihypertensive, Dosage increase or lifestyle change
† As reported by resident physician

Methods

STUDY

- A thorough chart review was undertaken to review demographics, blood pressure readings, interventions, and follow up visits beginning in October 2016 to April 2017.
- Statistical analysis: Descriptive characteristics of patient populations in the pre and post-intervention cohorts were summarized and data were expressed as means ± standard deviations for interval variables and as proportions for categorical variables. Proportion of patients whose hypertension were controlled and patients scheduled for follow-up by visit date were represented graphically.

DISCUSSION

- Although the effects of our intervention did not reach the level of statistical significance, we are encouraged by the increase in average hypertension control from 57% to 65% during our intervention.
- Our intervention led to a nine fold increase in close follow up for patients with untreated hypertension.
- A significant barrier to treatment was that only 48% of patients attended follow up visits.
- The complexity of our algorithm led to confusion about proper follow up.
- Less familiar follow up methods were under utilized, i.e. clinical pharmacist and phone calls.
- Limitations on interpretation of the data includes the small patient cohort, limited time frame studied and inability to randomize or blind which introduced the Hawthorne effect. In fact, the Hawthorne effect likely had a large role in decreasing provider inertia to change hypertension management.

Future

ACT

- Tuesday JHAP plans on continued active management of our patients' hypertension utilizing a simplified version of our current intervention. MA's will alert residents verbally when an increased blood pressure is measured, and residents will focus on making interventions with close follow up.
- Continued monitoring of performance will be analyzed on a annual basis utilizing the electronic medical record.

REFERENCES

1. James PA, Oparil S, Carter BL, Cushman WC, Dennison-Himmelfarb C, et al. 2014 evidence-based guideline for the management of high blood pressure in adults: report from the panel members appointed to the Eighth Joint National Committee (JNC 8). JAMA. 2014 Feb 5;311(5):507-20. PubMed PMID:24352797.
2. Egan BM, Zhao Y, Axon RN. US trends in prevalence, awareness, treatment, and control of hypertension, 1988-2008. JAMA. 2010 May 26;303(20):2043-50. PubMed PMID: 20501926.
3. Jaffe MG, Lee GA, Young JD, Sidney S, Go AS. Improved blood pressure control associated with a large- scale hypertension program. JAMA. 2013 Aug 21;310(7):699-705. PubMed PMID: 23989679; NIHMSID: NIHMS531072; PubMed Central PMCID: PMC4270203.
4. Santschi V, Chiolero A, Colosimo AL, et al. Improving blood pressure control through pharmacist interventions: a meta-analysis of randomized controlled trials. J Am Heart Assoc. 2014;3(2):e000718.