

Original Article

APPLICATION OF THE "RULE OF HALVES" FOR HYPERTENSION AS AN ASSESSMENT TOOL IN AN URBAN SLUM AT DAVANGERE

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ABSTRACT

Background: The 'rule of halves' for hypertension states that: 'half the people with high blood pressure are not known ("rule 1"), half of those known are not treated ("rule 2") and half of those treated are not controlled ("rule 3")'**Aim:** To evaluate the applicability of 'rule of halves' as an assessment tool for detecting the status of awareness, management and control measures for hypertension in the community.**Methodology:** A community-based cross-sectional study was conducted among adults aged 30 years and above residing in urban field practice areas of S.S Institute of Medical Sciences, Davangere. A sample of 1000 individuals who were aged 30 years and above was selected by systematic random sampling. Using a structured questionnaire, the basic information and history regarding diagnosis and treatment of hypertension was collected. Blood pressure, height and weight were recorded.**Result:** The overall prevalence of hypertension in this population was 36.7% (367/1000). Of these 367 individuals with hypertension, only 127 (34.6%) were known hypertensives. Of the 127 known hypertensives, 87 subjects (68.5%) were under any kind of antihypertensive therapy. Of these 87 individuals, only 21 (24.1%) had blood pressure under control.**Conclusion:** The 'rule of halves' when taken as a standard of measurement showed that the studied population had poor awareness, comparatively better treatment and inadequate control of Hypertension.**Keywords:** Hypertension, Rule of halves, assessment tool

INTRODUCTION

"High blood pressure", the theme of World Health Day 2013, is an apparent warning by the World Health Organization towards the global public health issue; 'hypertension'.¹ Hypertension is a silent, invisible killer that rarely causes symptoms. Complications of hypertension account for 9.4 million deaths worldwide every year. It is responsible for at least 45% of deaths due to heart disease and 51% of deaths due to stroke. Increasing public awareness is a key to early detection.¹ The 'rule of halves' for hypertension states that: 'half the people with high blood pressure are not known ("rule 1"), half of those known are not treated ("rule 2") and half of those treated are not controlled ("rule 3")'.² Throughout the rest of this paper we refer to these statements as rules 1, 2 and 3, respectively. The overall prevalence of Hypertension in India ranges between 17 to 21%.² A community based study done on Hypertension in rural villages of Davangere

Taluk in 2010 revealed a prevalence of 18.3% in Davangere Taluk.³ The aim of the present study was to evaluate the applicability of 'rule of halves' as an assessment tool for detecting the status of awareness, management and control measures for hypertension in an urban population of Davangere. Such evaluation would aid in generating a clear picture of magnitude of the disease (Hypertension) in terms of detection and control, thereby help to plan strategies for improving health care towards tackling this global public health issue.

METHODOLOGY

A community-based, cross-sectional study was conducted in urban field practice area of S.S Institute of Medical Sciences, Davangere from May to July 2014 after approval from the Institutional Ethics Committee. A previous study in Davangere Taluk estimated

an overall prevalence of 18.3% and 94.1% of the hypertensives were above 30 years of age. ³Considering that prevalence (p) of 18.3%, an absolute precision (d) of 3%, the design effect as 1, the sample size was calculated to be 575. But to benefit the community with a screening-oriented approach, a larger sample of 1000 individuals was included and screened.

Systematic random sampling was used to select the 1000 study participants to be screened and interviewed. The selected study area comprised a total population of 9375, predominantly Muslims, residing in 1800 households (calculated average family size= 5.2). Based on a national average of 60% adult population per family, the number of people aged 30 years and above expected per house was approximately estimated to be 3.5 (3) and accordingly to fetch a sample of 1000 individuals, 334 (1000/3) houses were to be visited. The sampling interval was calculated by dividing the total number of houses in the study area by the number of houses to be visited (i.e 1800/ 334 = 5.4) and rounded off to 5.

As per the above mentioned calculation, the first house adjacent to the urban health center was selected and then on every 5th house was visited. In each house all individuals aged 30 years and above present during the time of the survey were selected and screened. The sampling was done till the desired sample size was attained excluding non-residential and locked houses.

A pre-designed, structured questionnaire was used to collect basic information and history regarding diagnosis and treatment of hypertension, after obtaining informed consent, followed by measurement of blood pressure by using mercury Sphygmomanometer.

Blood pressure (BP) Measurement: Blood pressure was recorded in the sitting position in the right arm to the nearest 2 mm Hg with a mercury sphygmomanometer. Two readings were taken 5 minutes apart and the mean of the two was taken as the blood pressure. The first and the fifth Korotkoff's sounds were used to define systolic blood pressure (SBP) and diastolic blood pressure (DBP), respectively. Variation in blood pressure (BP) measurements was minimized by (a) ensuring 10 minutes rest before BP recording, (b) using standard cuffs for adults fitted with standard mercury sphygmomanometer, (c) placing the stethoscope bell lightly over the pulsatile brachial artery and (d) the same observer recording the blood pressure.

Diagnostic criteria: Hypertension was defined according to 7th report of "Joint National Committee (JNC VII) for detection and evaluation of BP." Accordingly, any individual who had systolic blood pressure (SBP) of 140 mmHg or greater and/or diastolic blood pressure (DBP) of 90 mmHg or greater or was a known hypertensive and taking antihypertensive medication was diagnosed as Hypertensive.⁴ Controlled hypertension was defined as those who were on treatment and had a BP of < 140/90 mmHg.

Statistical Analysis

Data was entered into Microsoft Excel 2010 and analysed using STATA (trial version 13.1) computer software. Continuous data are expressed as mean \pm SD, and Categorical data are expressed as proportions. The statistical significance level was fixed at $p < 0.05$

RESULTS

The clinical profile of the study subjects is shown in Table 1. The overall prevalence of hypertension in this population was 36.7% (367/1000). Of these 367 individuals with hypertension, 240 (65.4%) were not aware of their hypertensive status. Of the 127 known hypertensives, 87 subjects (68.5%) were under any kind of antihypertensive therapy. Of these 87 individuals, 66 (75.9 %) failed to have their blood pressure under control. Among the 87 participants who were under treatment, 46 (52.9%) were on medical management alone, 30 (34.5%) were on medical management as well as practiced salt restriction and 11 (12.6%) were on medical management, salt restriction and physical exercise.

Table 1: Clinical and demographic characteristics of study participants:

	Sample (n=1000)	Normotensives (n=663)	Hypertensives (n=367)
Age in years			
30-45	529 (52.9)	361 (57)	168 (45.8)
46-60	345 (34.5)	196 (31)	149 (40.6)
>60	126 (12.6)	76 (12)	50 (13.6)
Mean*	46.5 \pm 11.3	45.7 \pm 11.3	47.9 \pm 11.2
Sex			
Male	463 (46.3)	290 (45.8)	173 (47.1)
Female	537 (53.7)	343 (54.2)	194 (52.9)
BMI*	27.2 \pm 4.1	27.4 \pm 4.2	26.9 \pm 3.8
Diabetes	58 (5.8)	28 (4.4)	30 (8.2)

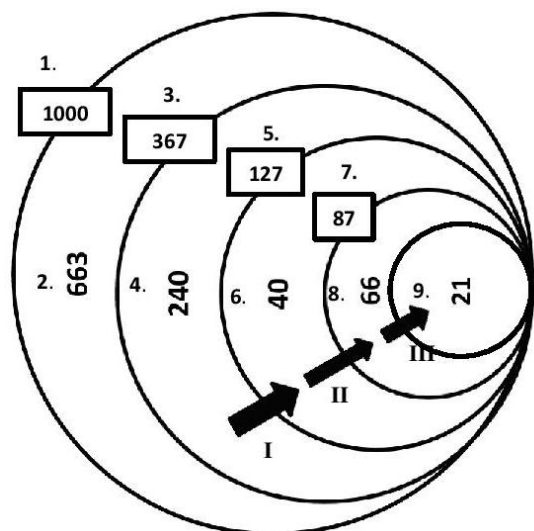
Figures in parenthesis indicate percentage; *Values are in Mean \pm SD

DISCUSSION

Hypertension was addressed as a "silent killer, global public health crisis" during World Health day 2013, by World Health Organization.⁵ The "rule of halves" for Hypertension is just not an arbitrary statement but a statistical conclusion depicting the trend of hypertension in various developed countries worldwide. So it would serve as a useful tool to deduce whether any community of interest followed the same trend or had marked deviations and thereby draw conclusions.

"Rule 1" portrays the status of awareness regarding the disease and the efficacy of prevailing screening programs in diagnosing the disease early. In our study, among the 367 individuals diagnosed as hypertensives as per JNC VII criteria, 240 (65.4%) were not aware of their hypertensive status [figure 1]. Comparing with the normal trend of 50% undiagnosed cases as per the "rule of halves", the percentage of undiagnosed cases in this study was higher.

Figure 1: Depiction of “rule of halves” for Hypertension in the study population



	Total	Percentage
1 The whole community	1000	
2 Normotensive subjects	663	63.3% (n=1000)
3 Hypertensive subjects	367	36.7% (n=1000)
4 Undiagnosed hypertension	240	65.4% (n=367)
5 Diagnosed hypertension	127	34.6% (n=367)
6 Diagnosed but untreated	40	31.5% (n=127)
7 Diagnosed and treated	87	68.5% (n=127)
8 Inadequately treated	66	75.9% (n=87)
9 Adequately treated	21	24.1% (n=87)

A study at Peru by Lerner et al⁶ suggested that the 48.3% were aware of their disease in a population with a prevalence of 24.1%. In this study, the presence of

co-morbid conditions like diabetes and obesity was also less among hypertensives. This could have been a probable reason for a poor health seeking behaviour towards a stand-alone ‘Essential Hypertension’, which remained hidden under, showing just an iceberg outside. A study by Hameed et al⁷ showed that 74.6% of hypertensives had diabetes in contrast to just 8.2% [Table 1] in our study.

“Rule 2” depicts the status of treatment for hypertension among those diagnosed and the awareness about self-care in prevention of impending complications. In the present study, proportion of people (68.5%) opted to treat themselves was comparatively better. A study by Deepa et al⁸ in Chennai, Tamil Nadu concluded that only 50% among the diagnosed hypertensives were on treatment which was in line with the “rule of halves”

“Rule 3” addresses the status of adequacy in treatment for hypertension. In the present study, only 12.6% (11/87) among those treated hypertensives proclaimed to have practiced salt restriction in their diet and regularly exercised in addition to anti-hypertensive therapy and all of them (100%) had their BP under normal limits. But only 5 (10.9%) out of the 46 who were on medical management alone were measured to have normal BP. Smith et al⁹ detected in Scotland that 50% of those receiving any kind of treatment for hypertension were not having their BP under control which showed drastic difference from our study (75.9%), indicating inadequate control of BP [Table 2]. Reliability on drugs alone and poor compliance to life-style modification can be a possible explanation, but various other factors interplaying to bring this picture of inadequate control need further exploration.

Table 2: Application of “rule of halves” for Hypertension and interpretation:

	I(rule 1) Undiagnosed	II(rule 2) Not treated	III(rule 3) Not controlled
Rule of halves	50%	50%	50%
Study population	65.4%	31.5%	75.9%
Inference	Poor awareness	Better treatment	Inadequate control

CONCLUSION

The ‘rule of halves’ when taken as a standard of measurement showed that the studied population had poor awareness; comparatively better treatment and inadequate control of Hypertension. It also delivered knowledge to triage the area needing immediate action among the three: awareness, treatment or adequate control of hypertension in the community.

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