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## Research Article

# Knowledge, Attitudes, Practices and Blood Pressure Control of Hypertensive Patients at a South African Primary Health Care Centre

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## ABSTRACT

Hypertension is a serious global and South African public health problem. The high prevalence of uncontrolled hypertension is related to a patient's lack of knowledge and healthy practices. The study aimed to assess the knowledge, attitudes and practices of hypertensive patients and their blood pressure control at a rural community health centre. This was a prospective cross-sectional study conducted on diagnosed cases of hypertension at the centre. Binary logistic regression analysis was conducted to determine the factors for the control of hypertension. Two hundred and ninety-seven known hypertensive patients were recruited, the majority of which were female. Eighty-eight percent were older than 45 years, and almost all had a monthly income of less than R3000 (USD 190). More than half controlled their blood pressure. It was found that 46% had poor knowledge, 64% had good attitudes and 60% were practising positively regarding the control of hypertension. Hypertensive patients attending the centre had poor knowledge but good attitudes and practices towards hypertension. The study revealed an urgent need for improved health promotion and educational efforts to increase the knowledge of hypertension in rural communities and to address poverty as a major obstacle to healthy lifestyle choices.

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## Introduction

Hypertension (HPT) is a non-communicable disease considered as a major risk factor for cardiovascular disease, which leads to high morbidity and mortality [1]. In 2000, it was estimated that 26.4% of the adult South African population had hypertension and that the total number of adults with hypertension was approximately 1 billion people worldwide. This number was predicted to increase to 30% by the year 2025 [2]. Stats SA (2016) revealed that 44.82% of South Africans (45.53% females and 43.73% males) are hypertensive among the adult population. This prevalence rate was higher than the rate estimated in 2012 (34% and 35% for men and women respectively) [3, 4]. Therefore, hypertension has become a major cause of morbidity and premature mortality in South Africa (SA) [5]. Uncontrolled hypertension increases the risk of myocardial infarction, cardiac failure, cerebrovascular accidents, and renal diseases [6]. The prevalence of uncontrolled

hypertension can be partially explained by a patient's lack of knowledge, attitude and healthy practices [7].

Studies found that knowledge amongst hypertensive individuals is low with figures ranging from 19.0 to 56.0% in low- and middle- income countries, compared to awareness of hypertensive patients in high-income countries with figures reported to be as high as 82% [8-10]. Apart from a lack of knowledge, studies from low- and middle-income countries found that a major obstacle in achieving blood pressure control is the absence of primary healthcare services [11-12]. Appropriate public health interventions are needed to improve the prevention of hypertension and to decrease the burden of controlling it. The implementation of such interventions requires an understanding of modifiable lifestyle factors. A study conducted in Germany in 2019 identified six well-recognised high-risk, modifiable lifestyle factors for hypertension [13]. General and abdominal adiposity, smoking and physical inactivity play important roles in increasing the risk of

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incidence and lack of control of hypertension. Known non-modifiable risk factors for primary hypertension include age, a positive family history of hypertension, and gender [14].

In SA the National Standard Treatment Guideline for the management of hypertension at different levels of health facilities is followed to prevent and control hypertension and to optimise available resources [15, 16]. An Essential Drug List (EDL) is established nationally to promote rational drug use, selection of drugs and the utilisation of drugs through the use of Standard Treatment guidelines. Anti-hypertensive drugs that are included in the national hypertensive guidelines form part of the EDL [17]. However, adherence to a treatment guideline is poor, as observed by healthcare workers. For example, it was found that diagnosis based on clinical guidelines was followed by 56% and 75% nurses and doctors respectively. Drug management by doctors was less adherent to guidelines (56.6%) than that of nurses (63.6%) [16]. The Kwadabeka Community Health Centre (KCHC) is a primary health care (PHC) facility that offers the first level of care to hypertensive patients and comprises of preventive, promotive and curative care. Within this context, there have been no previous studies on hypertension in the black township of Kwadabeka in SA. The objectives were to assess the knowledge, attitude and practice of hypertensive patients and their blood pressure control.

## Method and Materials

### I Setting and Population

The KCHC provides comprehensive services free of cost for those who attend the health facility. The catchment population is over 133,000 black people. These residences are located within the municipal boundaries of Durban. Most of the dwellers are poor, unemployed and living in formal and (mainly) informal types of dwellings. The KCHC runs a large out-patient department with over 20,000 patients per month. It also offers 36 in-patients (short stay) wards. HPT and all other chronic diseases are managed at the KCHC on a 24-hour basis (after hours are for emergencies only) and is run by trained and skilled Clinical Nurse Practitioners (CNP) and Medical Officers (MO). Patients with known HPT are reviewed monthly in accordance with the National Standard Treatment Guideline [17]. The review of patients is undertaken on a booking basis at the out-patient department. There are about 4000 diagnosed HPT patients registered for receiving chronic medications. These patients are attending the KCHC out-patient department daily on a booking basis.

### II Screening and Management of Hypertension Practices

For newly diagnosed hypertension cases following the national guidelines lifestyle modification is commenced first [17]. Drug therapy is introduced when lifestyle modification has failed to achieve blood pressure (BP) control, (systolic 140 and diastolic of 90 mmHg respectively), in the stipulated period, or when major risk factors have hampered the lowering of the BP over a few days. The stepwise drug treatment is commenced using the Standard Treatment Guidelines and Essential Medicines List 2018 [17, 18]. The first step is to introduce Hydrochlorothiazide at a dose of 12.5mg once daily. If BP control is not achieved in one month, step two requires a second antihypertensive (a

long-acting calcium channel blocker such as Amlodipine or an ACE-inhibitor such as Enalapril). The starting dose of Amlodipine is 5 mg once daily or Enalapril 10 mg once daily respectively. If the BP is still not optimised after one month, despite the above-mentioned interventions, step three involves increasing the dose of the second antihypertensive drug chosen in step two (Amlodipine 10 mg daily or Enalapril 20 mg daily in divided doses). Step four is considered following the failure in achieving BP control in step three. Step four requires the addition of a third antihypertensive drug.

The choice of the drug must be one that was not selected in step 2. If Amlodipine was chosen in step two, then Enalapril should be taken in step four. Enalapril should be commenced at a dose of 10 mg daily. If Enalapril was chosen in step two, then Amlodipine should be commenced at 5 mg daily. If BP control has not been achieved despite the above steps, then step five requires increasing the dose of the third antihypertensive drug chosen in step four. Enalapril must be increased to 20 mg daily. Amlodipine must be increased to 10 mg daily. Step six requires an increase in the dose of hydrochlorothiazide from 12.5 mg daily to 25 mg with the addition of Spironolactone 25 mg also once a day. Step six is implemented following the failure of the first five steps in achieving BP control. If control is still not achieved following the six steps, the patient is then referred to a hospital.

The patient's BP is measured using digital or manual instruments at least twice according to the standard HPT national protocol [17]. If BP is found to be high (e. g., >160/110 mmHg), the patient is then escorted to the short-stay ward for stabilisation of BP. Biochemical tests (serum cholesterol, creatinine, and or other necessary tests), are done on a six-monthly basis at a designated hospital laboratory using standard procedures. The MO will determine if the patient is undergoing his or her two-yearly retinal screening. The review after six months also provides an opportunity for the MO to counsel the patient on lifestyle modifications.

### III Study Design, Sample Selection and Data Collection

This cross-sectional descriptive study was conducted as part of a routine clinical audit of diagnosed cases of HPT attending the KCHC between July and December 2018. Patients were selected using a systematic random sampling method (only four patients per day) and interviewed and their clinical records were reviewed using a medium length, three-part patient questionnaire. Patients were selected from those HPT patients attending during the study period. From the selected patients, all adult HPT patients who were diagnosed and managed over a period of 12 months were included in the study. Two trained social workers employed at the facility collected demographic, knowledge, attitude and practice (KAP) data while the patients were waiting for a consultation with the MO and handed the questionnaire to the MO. The designated MOs (co-investigators) collected the clinical data from the patients' clinical records after finishing the consultation. The socio-demographic and clinical outcome questions were developed by the researchers, whilst (KAP) questions were obtained from other study questionnaires [6-8, 13, 14].

Section A of the questionnaire dealt with patients' socio-demographic information (age, sex, income, employment etc.), while section B dealt

with knowledge, attitude and practice on hypertension. Section C of the questionnaire dealt with the clinical conditions (duration of receiving treatment, co-morbidity, assessing renal and coronary complications and control of BP). Pregnant women with HPT and patients attending the emergency room with complications of HPT were excluded.

#### IV Scoring of the Questionnaires

The lifestyle modification KAP questionnaire had eight questions on knowledge regarding HPT, BP control (normal BP), complications of high BP, risk factors for hypertension, the benefits of exercise and weight loss, smoking as a risk factor which can worsen hypertension and extra salt intake which increases BP. Six questions on attitudes toward lifestyle modifications were: diet control being essential for BP control, green leafy vegetables being good against HPT, avoiding extra salt in the diet being effective against HPT, regular physical exercise helping to control BP, avoiding extra cooking oil in the diet advisable against HPT and excess alcohol use perhaps worsening HPT. The questions on lifestyle modification practice were: measuring BP at least once a week, exercise or walking of minimum 90 minutes per week, regularly taking prescribed medication, attending regular follow-up for at least one year, not taking herbal medication, not taking extra salt in the diet, not consuming alcohol and controlling red meat in the diet. Each correct answer on a question earned a score of '1' and each incorrect answer earned a score of '0'. The total cholesterol level was determined to assess the cardiovascular risk and serum creatinine level was used to determine renal function. HPT control was assumed when the respondent's BP was equal or less than 140/90 mm of Hg.

#### V Data Analysis

Data were recorded in a Microsoft Excel 2010 spreadsheet and imported to SPSS 22.0.1 for analysis. The demographics and baseline outcome variables were summarised using descriptive summary measures: expressed as a mean (SD) for continuous variables and a percent for

categorical variables. Pearson's correlation test was carried out to determine the relationship between knowledge, attitudes, and practices. Binary logistic regression analysis was performed to determine the factors for the control of HPT. P-values less than 0.05 were considered statistically significant.

#### VI Ethical Consideration

Institutional approval was obtained before conducting the study. Participants who agreed to participate in the study signed informed consent. Participation in the study was voluntary and respondents had the right to stop partaking in this study without any penalty. Their confidentiality was assured throughout the study. No name of any patient was used in presenting data.

#### Results

Data were collected from 297 known HPT patients. Demographic and HPT management outcome indicators are shown in (Table 1). Most of the participants were female 226 (76.6%) and belonged to the age group of 45 years and over (88%). Nearly all (97.3%) earned a household income of less than R3000 (USD 18) per month (including social grants), and 49.7% the respondents had no formal education, whilst only 4.5% of study subjects completed the 12 years of schooling, 79.4% of study subjects were unemployed, 47.7% of respondents were married, while 31.2% were single. The household income of the respondents was mainly acquired from different types of social support grants: 46.1% old-age pension, 18.2% disability, 38.4% child support, and 2.7% foster care support grants. It was evident that some households received multiple grants. Among these HPT patients, nearly half (49%) had one or more comorbidities, a majority had diabetes (40%), and 20% had HIV infection (all of them were on (ART) anti-retroviral treatment), and 16% had more than one comorbidity. The mean duration of treatment for HPT was 8.4 years (SD 4.1), while the majority (52.8%) of the study subjects were receiving treatment for HPT in the last six to ten years.

**Table 1:** Demographic characteristics, duration of treatment, comorbidity and management of hypertension of the respondents.

| Variables                   |                           | Frequency | Percent |
|-----------------------------|---------------------------|-----------|---------|
| Age groups (n=295)          | 35-44 Years               | 17        | 5.8     |
|                             | 45-54 Years               | 93        | 31.5    |
|                             | >=55 Years                | 166       | 56.3    |
| Gender (n=295)              | Male                      | 69        | 23.4    |
|                             | Female                    | 226       | 76.6    |
| Income per month (n=288)    | No income                 | 1         | .3      |
|                             | R 1 to R3000              | 176       | 61.1    |
|                             | >R3000                    | 8         | 2.8     |
| Education (n=290)           | No education              | 144       | 49.7    |
|                             | 3- 11 years of schooling  | 131       | 45.0    |
|                             | Completed 12 years/Matric | 13        | 4.5     |
|                             | Post matric education     | 2         | .6      |
| Relationship status (n=279) | Married                   | 133       | 47.7    |
|                             | Single                    | 87        | 31.2    |
|                             | Divorced or separated     | 59        | 21.1    |
| Receiving social grant      | Old-age pension           | 137       | 46.1    |
|                             | Disability grant          | 54        | 18.2    |
|                             | Child support grant       | 114       | 38.4    |

|                               |                   |     |      |
|-------------------------------|-------------------|-----|------|
|                               | Foster Care grant | 8   | 2.7  |
| Duration of Treatment (n=199) | 0-5 years         | 62  | 31.2 |
|                               | 6-10 years        | 105 | 52.8 |
|                               | >=11 years        | 32  | 16.0 |
| Comorbidities (n=260)         | Any comorbidity   | 127 | 49.0 |
|                               | Diabetes mellitus | 104 | 40.0 |
|                               | HIV with ART      | 52  | 20.0 |
|                               | Others            | 18  | 7.0  |

The biochemical investigation reports, (total cholesterol and serum creatinine), were assessed if it was done over the last year. Total blood cholesterol level was used to determine cardiovascular risk. Results revealed that from 211 (71%) patients only 136 (64.5%) had a normal result (<5.0 mmol/L was considered as normal). Serum Creatinine test was found among 258 (87%) patients, and of them, 205 (79.5%), were found within the normal range. Serum creatinine was used to establish renal impairment in HPT patients. The normal range for creatinine was considered between 60 and 110  $\mu$ mol/L. BP was measured in all subjects and 154 (51.9%) were found within the normal range, (BP of 140/90 mmHg and below), and thus considered stable with the treatment.

Table 2 depicts the respondents' knowledge, attitudes and practices on HPT. Most (63.3%) of the respondents did not know the normal BP or

target control value of BP. Regular exercise and diet control as important factors for BP control were known to 15% and 31.5% of the respondents respectively. More than one third (34.7%) and 38.4% did not know any risk factors and complications of HPT respectively. The total score for knowledge, attitudes and practices were 45%, 64% and 60% respectively. Some of the indicators regarding attitudes towards BP control measures were good such as avoiding extra cooking oil 97%, doing regular physical exercise 95%, and knowing that excess alcohol usage can worsen HPT 97%. On the other hand, attitudes towards diet control were low (27%). The total score for attitude (64%) and practice (60%) was considered good. Healthy practices for controlling BP were low: measuring BP at least once a week - 23.5%, exercise or walking minimum of 90 minutes per week - 36%.

**Table 2:** Respondents' knowledge, attitude and practice on hypertension.

| Variables                                                                  | Frequency       | Percent |
|----------------------------------------------------------------------------|-----------------|---------|
| <b>Knowledge</b>                                                           |                 |         |
| Normal BP known (n= 297)                                                   | 109             | 36.7    |
| Symptoms of hypertension known (n=296)                                     | 197             | 66.9    |
| Smoking is a risk factors and worsen hypertension (n=297)                  | 190             | 64.0    |
| Any complication of hypertension known (n=297)                             | 181             | 60.9    |
| Extra salt intake increases BP (n=296)                                     | 144             | 48.6    |
| Regular exercise helps to control BP (n=291)                               | 44              | 15.1    |
| Diet control helps to control BP (n=289)                                   | 91              | 31.5    |
| Some cancer is associated with hypertension (n=287)                        | 66              | 23.0    |
| Mean knowledge score                                                       | 3.81 (SD=0.507) |         |
| <b>Attitudes</b>                                                           |                 |         |
| Diet control is essential for BP control (n=296)                           | 79              | 26.7    |
| Include green leafy vegetables in daily diet (n=293)                       | 210             | 71.7    |
| Good to avoid extra salt in the diet (n=297)                               | 215             | 71.4    |
| Good to avoid extra cooking oil in the diet (n= 297)                       | 289             | 97.3    |
| Excess alcohol can worsen hypertension (n=297)                             | 289             | 97.3    |
| Regular physical exercise is essential in controlling hypertension (n=296) | 282             | 94.9    |
| Mean attitude score                                                        | 5.13 (SD=0.507) |         |
| <b>Practices</b>                                                           |                 |         |
| Measure BP at home once a week (n=297)                                     | 70              | 23.5    |
| Taking prescribed medication regularly (n=297)                             | 242             | 85.5    |
| Attending regular follow-up last 1 year (n=296)                            | 242             | 82.0    |
| Don't take herbal medication (n=297)                                       | 137             | 46.0    |
| Do not take extra salt in diet (n=296)                                     | 224             | 75.7    |
| Doing regular exercise more than 90 min/ week (n=295)                      | 105             | 35.6    |
| Do not consume alcohol (n=290)                                             | 249             | 64.4    |
| Control red meat diet (n= 295)                                             | 192             | 65.1    |
| Mean practice score                                                        | 4.86 (SD=1.087) |         |

The correlation is estimated through bivariate analysis which explored the relationship between the KAP scores (Table 3). Knowledge had a significant fair positive correlation with practice ( $r=+0.350$ ;  $p<0.01$ ) and

attitudes a negative correlation with practice ( $r=-0.197$ ;  $p<0.01$ ). However, there was no significant correlation between knowledge and attitudes.

**Table 3:** Correlation between knowledge, attitude and practice regarding hypertension using Pearson Correlation test ( $n=297$ ).

| Variables              | r-value | p-value | Interpretation            |
|------------------------|---------|---------|---------------------------|
| Knowledge and Attitude | +0.016  | 0.788   | No correlation            |
| Knowledge and Practice | +0.350  | 0.000   | Fair positive correlation |
| Attitude and Practice  | -0.197  | 0.001   | Negative correlation      |

The binary logistic regression analysis showed that the employment situation was a significant predictor for the control of HPT (Table 4). It was found that participants who had full-time employment were 2.7

times more likely to have BP control compared to those who were unemployed (OR = 2.727,  $p = 0.018$ ). No other variables were found to be significantly associated with the control of BP.

**Table 4:** Multiple logistics regression output for control of BP (HPT).

| Variables                       | B      | Wald  | df | Sig. | Odds Ratio (OR) | 95% C.I. for OR |         |
|---------------------------------|--------|-------|----|------|-----------------|-----------------|---------|
|                                 |        |       |    |      |                 | Lower           | Upper   |
| Age                             |        | 9.016 | 4  | .061 |                 |                 |         |
| 26 – 35 years                   | 2.544  | 2.169 | 1  | .141 | 12.735          | .431            | 376.369 |
| 36 – 45 years                   | -.566  | .118  | 1  | .731 | .568            | .022            | 14.340  |
| 46 – 55 years                   | .726   | .220  | 1  | .639 | 2.067           | .100            | 42.923  |
| > 55 years                      | 1.097  | .535  | 1  | .464 | 2.996           | .158            | 56.656  |
| Gender                          | .265   | .798  | 1  | .372 | 1.303           | .729            | 2.331   |
| Income                          |        | 2.322 | 3  | .508 |                 |                 |         |
| <= R1000                        | -.825  | 1.202 | 1  | .273 | .438            | .100            | 1.915   |
| R1001 – R2000                   | .287   | .409  | 1  | .523 | 1.333           | .552            | 3.216   |
| R2001 – R3000                   | 21.438 | .000  | 1  | .999 | 2044494676.054  | .000            | .       |
| Education                       |        | 3.752 | 4  | .441 |                 |                 |         |
| 1-5 years schooling             | .204   | .432  | 1  | .511 | 1.226           | .667            | 2.254   |
| 6-11 years schooling            | -1.210 | 2.901 | 1  | .089 | .298            | .074            | 1.200   |
| Matric                          | 21.003 | .000  | 1  | .999 | 1322387848.687  | .000            | .       |
| Post Matric or Higher education | -.058  | .010  | 1  | .919 | .944            | .311            | 2.870   |
| Employment Situation            |        | 5.602 | 2  | .061 |                 |                 |         |
| Full-time employed              | 1.003  | 5.562 | 1  | .018 | 2.727           | 1.185           | 6.278   |
| Part-time employed              | .535   | 1.584 | 1  | .208 | 1.707           | .742            | 3.924   |
| Total Practice                  | .134   | 1.109 | 1  | .292 | 1.143           | .891            | 1.466   |
| Total attitude                  | .279   | 1.346 | 1  | .246 | 1.322           | .825            | 2.118   |
| Total Knowledge                 | .103   | 1.700 | 1  | .192 | 1.109           | .949            | 1.295   |
| Constant                        | -4.367 | 3.213 | 1  | .073 | .013            |                 |         |

a. Variable(s) entered on step 1: Age, Gender, Income, Education, Employment Situation, Total Practice, Total attitude, Total Knowledge.

## Discussion

The objective of this study was to assess the knowledge, attitudes and practices of HPT patients and their BP control in a PHC setting. It was found from a similar rural community-based study that a higher proportion (75%) of patients attended public health facilities when they became sick [19]. Thus, we can expect a higher proportion of HPT patients to attend the KCHC from the catchment population and that is the national goal to improve the population coverage for the poor of the country.

The majority of participants in this study were >55 years of age (56.3%) and received an old-age pension (46%). This reflects the fact that HPT usually has its onset after the age of 40 years [20]. The trend of HPT is found to increase with increasing age (age over 55 years). Findings in

other studies also supported that advancing age is a risk factor for developing and having HPT [21-23]. The preponderance of this age group is also consistent with the findings of the 2016 South African Demographic and Health Surveys (SADHS) and a recent hospital-based HPT study from another province of SA [4, 22].

A higher (76.6%) proportion of the respondents were female. It seems females are overrepresented in our study. It could be true as more males die earlier than female and female HPT patients are found to be overrepresented in several other studies, while women use more health care facilities than men [24-27]. Female adult life expectancy was found to increase in SA as a result of antiretroviral treatment from 51.3 in 2003 to 64.5 years in 2011. On the contrary, male adult life expectancy was increased from 46.9 in 2003 to 55.9 years in 2011 [28]. The difference in the prevalence of HPT in different sexes is attributed to both biological

and behavioural factors [29]. Biological factors include sex hormones and chromosomal differences which offer a protective effect in women at an earlier age [20]. The oestrogen levels have a vascular protective effect on premenopausal women, hence it is found that the prevalence of HPT increases in females over 60 years of age [30-32]. Known behavioural risk factors for HPT in women are also in favour of a higher proportion in our study including obesity, physical inactivity and to a lesser degree smoking. Women are more likely than men to be physically inactive [15].

Patients in this study who received no education, or only up to three years of schooling, accounted for 84.5% of the study population. The role of educational level in cardiovascular disease varied in different studies [33]. Monthly household income < R3000 (>60%) and the education level, (only 5% got a matric or higher education), indicate poverty-stricken respondents from a poor socio-economic background. Our findings also suggest that the prevalence of HPT is inversely proportional to the income level. This could be as a result of socio-economic inequalities present in low to middle-income countries [33].

The increased prevalence of HPT in low-income areas can be attributed to various factors, of which psychosocial stress and the unavailability of healthy food options are paramount contributing factors to the high prevalence of HPT in rural and poor communities in SA. Healthy food stores to promote good nutritional habits are non-existent in such areas [34]. Thus, it is important to address poverty as a major obstacle to healthy lifestyle choices. Psychosocial stress can be attributed to an excessive burden that leads to disproportionate worry as an alarming number of orphans and other vulnerable children are being taken care of by the grandmothers as the children's parents are either deceased from HIV/Tuberculosis, or parents have left the rural area in search of employment [35]. This burden of care is known to accentuate mental and physical health risks for carers being older women [36].

HPT is a chronic condition and usually co-exists with other comorbidities. Comorbidities were present in half (49%) of our study population in total, and diabetes (40%) alone was found to be the most prevalent. This finding aligns with the study carried out by a group of researchers in the USA [37]. The other common comorbidity is HIV infection (20%). All of the respondents with HIV were receiving ART from the health clinic. The SADHS (2016) also found a similar HIV prevalence among the older population in SA [4].

The total cholesterol and serum creatinine level were found within a normal range for 64.5% and 79.5% respondents respectively. These findings are consistent with other findings of a similar setup [24, 38]. The total blood cholesterol level test was determined to assess the cardiovascular risk in 71% of the respondents. This is consistent with the findings of a similar study undertaken in the North-West Province of SA, where 64.5% of the results were within the normal range [39]. Serum creatinine tests to establish renal impairment in HPT patients were performed in a higher proportion (87%) of the respondents and of them, 79.5% were found within a normal range level. Thus, the programme manager should regularly train the practitioners on the biochemical assessment of HPT patients so that these critical blood tests are done to optimally assess the risks for HPT patients at this PHC facility.

The BP test was measured in all subjects of which half (51.9%) were found normal and thus considered as controlled with the treatment. This is similar to the findings of a national cross-sectional survey conducted by the South African Human Sciences Research Council in 2011–2012 where they found 52% of those receiving HPT treatment indeed had BP control (BP < 140/90 mmHg) [40]. However, control of BP was much better in the KDCHC compared to a Nigerian study (14.5%) in a secondary care hospital [24]. Better BP control could be achieved through the implementation of a national HPT management protocol at the clinic. Staff training (Continued Medical Education), monitoring and supporting strategies to health professionals can be considered useful.

In our study, respondents' average knowledge score towards HPT was considered to be poor (45%). However, studies in respondents from similar socio-economic backgrounds also showed a poor level of knowledge among HPT patients [24]. It was disheartening to know that most (63.3%) of the respondents did not know the normal BP or target control value for their BP. Regular exercise (15%) and diet control (31.5%) for BP control were known to few respondents. Unfortunately, this can be potentially inimical to treatment measures as the first step to BP control is lifestyle modification through diet and exercise. This finding is consistent with other studies in Africa [24, 41].

The total score for attitude was good (64%). Some of the indicators regarding attitudes concerning BP control were very good. For example, good to avoid extra cooking oil (97%), regular physical exercise (95%), and excess alcohol use can worsen HPT (97%). On the other hand, attitudes towards diet control were low (27%). The overall practice of the respondents can be considered as good (60%). Although, only a quarter of them (23.5%) answered they were checking their BP once a week but the majority honoured appointments (82%) with the KCHC and most respondents reported adherence to their prescribed medication. This paucity of knowledge may in part explain the reasons why a higher proportion (nearly half) of the patients had their blood pressure poorly controlled.

Knowledge revealed a significant positive correlation with practice ( $r=+0.350$ ;  $p<0.01$ ). It is also evident that these respondents had shown positive attitudes. It is therefore important that the programme manager of the clinic emphasizes the education of patients on lifestyle modification, especially on diet and exercise. Positive attitudes can thus be harnessed by improving the knowledge and positive practices to optimally control HPT in the KCHC. Furthermore, the results of multiple logistic regression showed that full-time employment (OR = 2.727,  $p = 0.018$ ) was a significant predictor for the control of HPT. This could be related to education levels, knowledge and positive practices to control BP. People who are full-time employed are younger with more opportunities to go to school for longer periods. Although some studies found contrary findings [24].

## Conclusion

HPT patients attending the Kwadabeka CHC are mostly female with a low socio-economic status. They had poor knowledge but good attitudes and practices towards HPT. Only half of them had good BP control. There is an urgent need for improved health education and promotion

efforts to increase the knowledge of HPT in rural communities, and to address poverty as a major obstacle to healthy lifestyle choices.

### Limitations

The study had limitations. It was conducted with data from a PHC facility which deals with uncomplicated hypertensive cases and thus does not reflect all HPT cases of the South African population. Since the data about knowledge, attitudes and practices of HPT were self-reported, there may be a recall bias. Respondents may reply with what they believe to be socially acceptable responses which could influence the results. The study was conducted on all HPT patients without considering any HPT past or current complications during the data collection period. This could have positively or negatively affected their attitudes and practices. It should be noted that patients who were severely ill were excluded.

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### Competing Interests

The authors declare that they have no financial or personal relationship(s) that may have inappropriately influenced them in writing this article.

### Author Contributions

AMH, SB, NN (KCHC, Durban) was involved in the conceptualisation of the study, data collection and writing of the manuscript. MEH (University of KwaZulu-Natal) was involved in the recording, analysis of data and review of the manuscript for important intellectual content. MH was involved in the data capture, coding, verification, analysis and writing of the manuscript. GVH was involved in the review of the manuscript for important intellectual content. All authors approved the final version of the manuscript.

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