THE RELATIONSHIP BETWEEN PRIMARY HYPERTENSIVE PATIENTS' KNOWLEDGE ON HYPERTENSION AND COMPLIANCE WITH SODIUM RESTRICTED DIET THERAPY, AT A REFERRAL HOSPITAL IN SWAZILAND

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ABSTRACT

One of the major health concerns in the healthcare field is the increasing number of primary hypertensive patients. Primary hypertension is a condition that occurs without underlying health problems, it is an asymptomatic, chronic, debilitating, and silent killer disease if it is uncontrolled. However, primary hypertension can be prevented and successfully controlled. This descriptive correlational study assessed: the primary hypertensive patients' knowledge about hypertension, level of compliance with sodium restricted diet therapy, and the relationship between the primary hypertensive patients' knowledge and compliance with sodium restricted diet therapy. The study was conducted at the Mbabane Government Hospital. The systematic probability sampling method was utilized to obtain a sample of N = 90 primary hypertensive patients. The researchers selected every fifth participant. There were 74 (82%) females and 16 males (18%), between 35 and 65 years of age. Subjects' knowledge scores on hypertension was 58%, and compliance with sodium restricted diet therapy was 64% among both males and females. The correlation coefficient indicated a relationship that was not statistically significant

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(r = .09, p > .05).between knowledge and compliance. The findings suggest that there may be other factors that influence self-care on compliance, besides knowledge on hypertension.

Keywords: hypertension, knowledge, compliance, sodium-restricted.

INTRODUCTION

One of the major concerns in the healthcare field is the increasing number of primary hypertensive patients. The ultimate goal in the nursing care of primary hypertensive patients is to work together with them on self-care actions that could control hypertension. Hypertension, commonly known as high blood pressure is an asymptomatic, chronic, controllable 'silent' killer disease (American Heart Association, 2005). Two or more consecutive daily or weekly high blood pressure readings reveal the diagnosis (World Health Organization [WHO], 1999). Blood pressure refers to the force that is exerted by blood on the arterial walls when the heart beats (systolic pressure) and when the heart is at rest (diastolic pressure). Hypertension refers to a systolic and diastolic pressure, which consistently measures at or above 140 and 90 millimeters mercury [mm Hg], respectively (American Heart Association, 2005).

Types and prevalence of hypertension

 There are two types of hypertension, primary (essential) and secondary (American Heart Association, 2005; Brunner and Suddarth, 2005). Primary hypertension is the most common type, which affects ninety percent (90%) to ninety five (95%) of all the hypertensive patients (Kneisl, 2003). The onset of primary hypertension is insidious with a slow, progressive increase in blood pressure over a period of years (American Heart Association, 2005). The cause of

elevated blood pressure in primary hypertension is unknown, although there may be many contributing factors such as inheritance or high sodium intake or both (Brunner and Suddarth, 2005). High dietary sodium intake refers to adding salt to food during preparation and at table (Godlee, 2001). The most common source of sodium is table salt (American Heart Association, 2005). According to the American Heart Association (2005) the average individual consumes about six (6) to 18 grams (approximately three teaspoons) of salt per day. Whereas, the person's body requires about 0.5 grams of salt each day (American Heart Association, 2005).

Secondary hypertension affects approximately five percent (5%) to ten percent (10%) of all hypertensive patients. Furthermore, it occurs following an underlying and identifiable disease such as renal artery stenosis, chronic renal disease, primary hyper-aldosteronism, stress, sleep apnea, aortic coarctation and hypo- or hyperthyroidism (Brunner and Suddarth, 2005). This study focused on primary hypertension.

Primary hypertension is the most prevalent medical condition that affects many populations of the world, and is responsible for much mortality and morbidity. It is estimated that one (1) in six 6) people has primary hypertension (WHO, 1999). The United States of America [USA] has a population of 260, 6 million people (Shea *et al,* 2000). Primary hypertension affects 50 million people or more than twenty percent (20%) of the adult population (Shea *et al*. 2000) in the USA. According to Centers for Disease Control (1999), in the USA, primary hypertension annually contributes to the death of 16,968 (1,413 per month, 326 per week, 46 per day, 1 per hour, 0 per minute, 0 per second) Americans through stroke, and causes serious illness and disability in millions of Americans. Stroke is the third leading cause of death in the USA.

However, in Swaziland, Southern Africa, the rate of stroke as a sequel of primary hypertension is unknown.

Primary hypertension affects all races, but in multiracial communities, it is more common in Blacks in which the disease carries unfavorable prognosis (Brunner and Suddarth, 2005). The prevalence of primary hypertension in the African continent is two percent (2%) to thirty-three percent (33%) in males aged 30 to 55 years, and two percent (2%) to forty-one percent (41%) in females of the same age, with stroke as the most common complication (Cappuccio *et al*., 2004).

Primary hypertension is a common disease in Southern Africa, and an important cause of mortality and morbidity (Medical Research Council, 2000). The 1991 census estimated that approximately 3.2 million South Africans were primary hypertensive (Medical Research Council, 2000). Swaziland, with a population that is slightly over one million, has figures of primary hypertensive patients that have been gradually increasing over the years. The statistics reflect an annual average increase of eighteen percent (18%) of the primary hypertensive population in Swaziland (Ministry of Health and Social Welfare, 2008). This is an indication that primary hypertension is one of the major health problems in Swaziland.

Clinical manifestations and control primary hypertension

Primary hypertension is unusually asymptomatic until significant organ damage has occurred (WHO, 1999). Symptoms that are often attributed to primary hypertension include headache, epistaxis (nose bleed), tinnitus (ringing in ears), dizziness, fainting, blurred vision, shortness of breath, and angina (Brunner and Suddarth, 2005). Since primary hypertension is usually

asymptomatic in the early stages, this implies that there is need for early detection and control. The long-term goal for detection and control of primary hypertension is to reduce premature morbidity and mortality (Lewis *et al*., 2006). In order to achieve control of primary hypertension, the patient is advised to comply with the recommended sodium restricted diet therapy, medication therapy, and life style modifications (Brunner and Suddarth, 2005). Lifestyle modifications include limiting alcohol intake, increasing physical activity, reducing weight, ceasing cigarette smoking, and reducing sodium intake to less than six (6) grams of sodium daily. However, seventy-nine percent (79%) of primary hypertensive patients do not comply with antihypertensive medication therapy (Pick *et al*., 2000), and risk suffering stroke (Lewis *et al*., 2006), and other serious cardiovascular, renal, and visual complications.

According to Lewis *et al*. (2006) uncontrolled primary hypertension is annually responsible for stroke in five percent (5%) of all primary hypertensive patients, globally. The incidence of developing stroke is almost halved by remaining compliant with antihypertensive medications (Lewis *et al*., 2006). Most previous research studies have focused on primary hypertensive patients' compliance with antihypertensive medication, but little is known regarding primary hypertensive patients' compliance with sodium restricted diet therapy. Sodium in the diet has been implicated in the development of primary hypertension (Thelle, 1996). Thelle (1996) conducted a study on chimpanzees and found that adding 100 millimole sodium to their food increased their systolic blood pressure by 12 millimeters. The blood pressure increased further with the addition of more sodium, and declined when sodium was stopped.

Thelle's (1996) findings indicate that sodium in the diet contributes to the development of primary hypertension. The findings by Thelle (1996) could relate to human beings, since most experiments are performed with animals and the results are inferred to human beings. According to Shea *et al*. (2000) the reduction of sodium intake commencing from infancy prevents the development of primary hypertension in later life.

Achieving a sustained lowered blood pressure in primary hypertension by taking a sodium-restricted diet might protect the patient from developing uncomfortable side-effects that occur as a result of taking antihypertensive medications (Crane *et al*., 1996). The preference of sodium in the diet is possibly a major behavior that contributes to the high prevalence of primary hypertension in Swaziland (Nadir *et al*., 1994). Once the patients are diagnosed with primary hypertension, health professionals advice them to begin taking sodium restricted diet therapy (American Heart Association, 2005), in order to attain control of primary hypertension. Since sodium is a preferred spice in meals, Swazis could find it difficult to comply with sodium restricted diet therapy (Nadir *et al*., 1994). Nadir *et al*. (1994) in a study on "lack of difference in blood pressure between urban and rural population in Lesotho, Africa" reported that dietary sodium intake was consistently high among the rural and urban Basotho dwellers. Sodium was added to food during preparation and at table. The food practices in Lesotho with regards to sodium intake are unlikely to vary much from those practiced by Swazis, as the two populations are in close proximity within the Southern African Region.

Uncontrolled primary hypertension as a result of non-compliance with sodium restricted diet therapy is a widespread phenomenon in the health care field (Shea *et al*., 2000). The

chronicity and asymptomatic nature of primary hypertension might be associated with non-compliance with sodium restricted diet therapy. According to Shea *et al*. (2000) uncontrolled primary hypertensive patients are an economic drain. If a primary hypertensive patient develops stroke as a result of uncontrolled primary hypertension, immediate death may occur, or the patient may need prolonged hospitalization and rehabilitation (Brunner and Suddarth, 2005). According to Brunner and Suddarth (2005) the cost of hospitalization following stroke requires efficient delivery of health care, and in the case of rehabilitation, the efficient use of patient time. Lewis *et al*. (2006) observed that non-compliant primary hypertensive patients had increased absenteeism from work and their annual income was less than that of employees who had normal blood pressure. The possible explanation was that primary hypertensive patients worked less overtime or they were given fewer promotions, as their supervisors considered them to be less healthy compared to the employees who had normal blood pressure (Lewis *et al*., 2006).

According to Lewis *et al.* (2006) non-compliance with sodium restricted diet therapy is costly both to the national health services, the patients themselves, and their families. The national health service costs are incurred in terms of the general practitioner time, practice nurse time, medications, and relevant diagnostic tests. Costs to the patients include travel time and money, medication costs, and time in the clinic or hospital (Lewis *et al*., 2006). Prevention of stroke might be achieved by primary hypertensive patients' compliance with sodium restricted diet therapy (Shea *et al*., 2000).

Since primary hypertension is a chronic debilitating and killer disease, it is essential that the problem of controlling primary hypertension be addressed in research. Previous research

studies have focused on the primary hypertensive patients' knowledge and compliance with medication (Crane *et al*, 1996) unlike this study which assessed the primary hypertensive patients' knowledge and compliance with sodium restricted diet therapy among primary hypertensive patients, and examined the relationship between the primary hypertensive patients' knowledge and compliance with sodium restricted diet therapy.

Purpose of the study and research questions

The purpose of this study was to: assess the primary hypertensive patients' knowledge, asses the level of compliance with sodium restricted diet therapy among primary hypertensive patients, and examine the relationship between the primary hypertensive patients' knowledge and compliance with sodium restricted diet therapy. Three research questions were generated to address the purpose:

i) What knowledge do primary hypertensive patients have on hypertension?

ii) What is the level of compliance with sodium restricted diet therapy, among primary hypertensive patients?

iii) What is the relationship between primary hypertensive patients' knowledge and compliance with sodium restricted diet therapy?

METHODOLOGY

This was a descriptive correlational study. Specifically, the variables knowledge and compliance were described and used in the analyses.

Setting and sample

The study utilized the significance level of $p \leq .05$, effect size of .45, and power of .80. According to Lipsey the sample size was supposed to be $N = 90$ (Lipsey, 1990). The inclusion criteria was being medically diagnosed with primary hypertension, aged between 35 and 65 years, had suffered from primary hypertension for one year and above, Swazi citizens, and spoke siSwati. Primary hypertensive patients who were not Swazi citizens or were Swazi citizens by naturalization were excluded from the study. Since it was possible that they were from cultural settings that differed from those of Swazi citizens, particularly, with regards to sodium intake. Furthermore, patients suffering from stroke, cardiac, renal, and visual complications as a sequel of primary hypertension, and those who were diagnosed with secondary hypertension were excluded from the study. These were excluded from the study to reduce extraneous variables, attain sample homogeneity, and to be assured of the target population to which the research findings may be generalized.

These participants were recruited for the study during follow-up hypertensive clinic visits at Mbabane Government Hospital. The Mbabane Government Hospital serves as a referral hospital for the whole country and is situated in the capital city in the Hhohho region. However, primary hypertensive patients who come to the clinic are from the periphery of the hospital and not referred. The Mbabane Government Hospital also serves as a teaching facility for nursing (University of Swaziland, Faculty of Health Sciences), dental, and other paramedical students. The hospital has a 1 000-bed capacity, which includes medical, Intensive care unit (ICU), surgical, orthopedic, gynecologic, ophthalmic, maternity, renal, burns and pediatric wards, a psychiatric unit, and a voluntary counseling and testing (VCT) unit.

Procedure

To ensure participant protection, the Swaziland Ministry of Health approved the research. Furthermore, the senior matron and administrator for Mbabane Government Hospital and senior nurse at the hypertension clinic were made aware of the study and its nature was explained to them. Informed consent was obtained from the participants through a predetermined and approved procedure. The investigator read the questions to the participants and recorded their answers. This method was used to make certain that the participants understood the questions being asked and enhanced accuracy of recorded data.

Instruments

A questionnaire was utilized in the study. Broad areas covered by the questionnaire included: Sociodemographic data, Knowledge on Hypertension Questionnaire, and Compliance with Sodium-restricted Diet Therapy Questionnaire. Available empirical literature was utilized for the identification of the content. These questionnaires were formulated in English and then translated to siSwati by the Linguistic Department at the University of Swaziland. The questionnaire underwent back translation to ensure language adequacy and accuracy. To ensure content validity the instrument was reviewed by a panel of experts in hypertension at the Faculty of Health Sciences (University of Swaziland).

The Knowledge on Hypertension Questionnaire had 40-items which were in five sections. The subjects were assigned two for a correct response, a one for a wrong response, and a zero for responding by don't know. The Knowledge on Hypertension Questionnaire enquired from the participants about predisposing factors of hypertension (8-items), clinical manifestation

of hypertension (9-items), ways of controlling hypertension (9-items), products that contain sodium (8-items), complication of uncontrolled primary hypertension (6-items). The highest possible score on the Knowledge on Hypertension Questionnaire was 40, which denoted that the participant was highly knowledgeable about hypertension. The lowest score of zero, denoted low knowledge on hypertension.

Compliance with Sodium-restricted Diet Therapy Questionnaire asked the participants about compliance, and had 7-items. The subjects were awarded a two for responding by always, one for responding by sometimes, and zero for responding by never. The lowest score of zero, denoted non-compliance with sodium restricted diet therapy.

Pilot test

The instrument was pilot tested on a random sample of ten primary hypertensive patients at the Raleigh Fitkin Memorial Hospital, in Manzini. The results of the pilot test determined the questionnaire reliability. The Cronbach's coefficient alpha ranged from 0.74 to 0.92. The pilot test results were incorporated into the revised instrument.

Data analysis

Using the Statistical Package of Social Sciences (SPSS, 12.0), descriptive statistics and Pearson's' correlation coefficient were applied in analyzing the data.

RESULTS

Sample sociodemographics

The participants were in the age groups that ranged from 35 to 65 years, with the highest percentage (32%) in females in the age group 56 – 65 years, and 46 – 55 years in males (9%). The mean age for females was 52.10 years, while the mean age for the males was 52.00 years. The percentage of females who participated in the study was higher (82%) than that of males (18%). The highest percentage of subjects for both males (16%) and females (60%) had primary education as compared to secondary education. Subjects varied in employment status. The highest percentage in both males (16%) and females (45%) were employed. Most subjects were employed in unskilled jobs, among both males (44%) and females (62%). About 88% males and 62% female participants were married. The participants reported that they resided both in the urban (62%) and rural (41%) areas around Mbabane. Fifty four percent (54%) of the female participants reported that were responsible for preparing their own food. About 38% of the male participants had their wives prepare food for them. The sample sociodemographic data is summarized in Table 1.

Table 1. Sample sociodemographics (N = 90)

Variable	Females		Males	
	n	%	n	%
Age				
35 – 45	19	21	3	3
46 – 55	26	29	8	9
56 – 65	29	32	5	5
Sex	74	82	16	18
Education				
Primary	54	60	14	16
Secondary	20	22	2	2
Employment status				
Employed	42	45	14	16
unemployed	32	36	2	2
Marital status				
Never married	10	11	1	1
Married	54	60	14	16
Widowed	10	11	1	1
Residence				
Rural	29	39	5	6
Urban	45	50	11	12

Most participants (males, 63% and females, 45%) had been diagnosed primary hypertension between the period of one to five years (Table 2). The mean duration of the diagnosis in males was 139.20 months (about $5\frac{1}{2}$ years), and 196.80 months (about 8 years) in females.

Table 2. Duration of diagnosis with hypertension (N = 90)

Duration (years)	Females		Males	
	n	%	n	%
1 – 5	33	37	10	11
6 - 10	20	22	4	4
11 - 15	9	10	1	1
16 - 20	9	10	1	1
21 - 25	3	3	0	0
Total	74	82	16	17

Knowledge on hypertension:

Predisposing factors: on excessive worry as a predisposing factor to hypertension, the male participants scored 88% and the female participants obtained 82%. Whereas, on adding too much salt in food as a predisposing factor to hypertension, the male participants scored 94% and the females obtained 76%.

Manifestations of hypertension: The female participants scored 100% on headache, 95% on blurred vision, 84% on dizziness, 84% on feeling tired or weak, and 92% on shortness of breath, as clinical manifestations of hypertension. On the other hand, the male participants obtained 88% on headache, 81% on blurred vision, 81% on dizziness, 88% on feeling tired or weak, and 81% on shortness of breath, as clinical manifestations of hypertension (Table 3)

Table 3. Knowledge on the manifestations of hypertension.

Manifestation	% obtained (females)	% obtained (males)
Headache	100	88
Blurred vision	95	81
Dizziness	84	81
Shortness of breath	92	81
Feeling tired or weak	84	88
Average	91.0	83.8

Hypertension control measures: The female participants obtained 87% on low sodium diet, 89% on low fat diet, and 91% on taking anti-hypertensive medication, as ways of controlling hypertension (Table 4). While male participants scored 88% on low sodium diet, 100% on low fat diet, and 100% on taking anti-hypertensive medication as ways of controlling hypertension.

Table 4. Knowledge on the measures to control hypertension.

Manifestation	% obtained (females)	% obtained (males)
Low sodium diet	87	88
Low fat diet	89	100
Antihypertensive medication	91	100
Excercise	95	80
Average	72.4	73.6

Compliance with sodium restricted diet therapy

About 58% female and 63% male participants reported that they sometimes had sodium added to their food during food preparation, such that the amount of salt (sodium) in the food would be the same as the period before they were diagnosed with primary hypertension. About 54% of the female and 63% of the male participants reported that they sometimes forgot to take their sodium-restricted diet. Interestingly, 50% female and 69% male participants reported that they never missed taking their sodium restricted diet therapy when they were feeling sick. About 64% male participants and 53% female participants reported that they sometimes had salt added to their food at table. However, 66% male participants reported that they always took their recommended sodium restricted diet therapy. The male participants were more responsible for their self-care as they scored 72% on compliance with sodium restricted diet therapy. On the other hand, the female participants obtained 57% on compliance with sodium restricted diet therapy.

Pearson correlation coefficient analysis

Pearson correlation coefficient was used to examine the relationship between knowledge on hypertension and compliance with sodium restricted diet therapy of primary hypertensive

patients who participated in the study. The correlation between knowledge on hypertension with sodium restricted diet therapy was low and showed no statistical significance ($r = .09$, $p > .05$).

DISCUSSION

Similar to Nyoni (1994), the study findings showed that more female compared to male Swazis were affected by primary hypertension. There seems to be a need for further research to determine factors contributing to higher incidence of primary hypertension among Swazi females. The largest group that was affected by primary hypertension among female participants was between the ages of 56-65 years, and 46-55 years in male participants. Most individuals in these age groups are approaching the retirement stage, or have retired, or have been retrenched and are staying at home with their spouses, alone or with their grandchildren. The presence of primary hypertension in these individuals may therefore, be related to stress of being retired or approaching the retirement stage, or being retrenched (Kneisl and Ames, 2003).

The study findings revealed that the married participants were the most affected by primary hypertension. It could be that their medical diagnosis is related to the stresses related to marriage (Kneisl and Ames, 2003). The educational level of both male and female participants was basically primary education. With primary education, these participants were most likely to be employed in unskilled jobs that usually pay less, and are stressful (Kneisl and Ames, 2003). Stress could contribute to the development of primary hypertension. However, further research is necessary to discover the relationship between the individual's educational level and primary hypertension.

The highest percentages of both male and female patients were diagnosed for a period of one to five years. It may be possible that with progression of time, the primary hypertensive patients gradually die from complications related to hypertension. Pick *et al*. (2000) reported that primary hypertensive patient's compliance with sodium restricted diet therapy, decreased with age. Lan and Justice (2004) also reported that compliance with sodium restricted diet therapy was difficult for older people. Older people were found to be less responsible for their self-care, in terms of compliance with sodium restricted diet therapy. Reduction in self-care actions could result in rapid deterioration in the condition as a result of the onset of complications related to primary hypertension, as a consequence of non-compliance with sodium restricted diet therapy. Further research is needed to determine what makes compliance with sodium restricted diet therapy to decrease with increasing age.

The level of self-care was found to be lower among female participants, than among males. This could account for the higher incidence of primary hypertension among females in Swaziland (Nyoni, 1994). Similar to Stockwell *et al*. (2000) females were found to be less responsible for their self-care in terms of compliance with sodium restricted diet therapy, compared to their male counterparts. Mull *et al.* (2002) reported that males were non-compliant with sodium restricted diet therapy. However, the male participants in this study were found to be more compliant with sodium restricted diet therapy, than their female counterparts. Further research is essential to determine factors that influence compliance with sodium restricted diet therapy among female and male primary hypertensive patients.

According to Hunglerbuhler *et al.* (1999) literacy improves compliance; however, most participants in this study had primary hypertension, which possible had a negative influence on their compliance with sodium restricted diet therapy. Similar to Kochar and Woods (2000) primary hypertensive patients had a tendency of complying with sodium restricted diet therapy when they were not feeling well.

Both male and female participants had high level (78%) knowledge on certain clinical manifestations of hypertension, such as headache and blurred vision. Knowledge on clinical manifestations of hypertension may assist the patients in assuming self-care activities, for instance, adhering with sodium restricted diet therapy, and also reporting early the clinical manifestations to the nearest health facility.

Implications for nursing practice

Nurses and other healthcare providers need to become informed about factors that contribute to women being more concerned about their husbands' well-being more than their own well-being. Nurses and other health care providers should persist on educating and motivating females to comply with their sodium restricted diet therapy.

Implications for research

There is need to explore what makes knowledge about hypertension not to translate into self-care behaviors. In addition, there is need for further study to determine factors contributing to the higher incidence of hypertension among females. Research is needed to determine factors that influence compliance with sodium restricted diet therapy, among primary hypertensive patients.

Implications for education

Media programmes need to be established and these should share information on hypertension with the general populace. Nurses should intensify their health education programmes on the importance of compliance with therapy. Furthermore, continuing or in-service programs should be put in place to update nurses on the management of hypertension.

SUMMARY AND CONCLUSION

This was a descriptive-correlational study. The study assessed primary hypertensive patients' knowledge and compliance with sodium-restricted diet therapy. The sample consisted of 74 females and 16 males, between 35 and 45 years of age. Both males and females evidenced knowledge adequacy about hypertension. Correlation coefficients analyses ($r = 0.09$, $p > .05$) showed no statistical significance in the relationship between knowledge and compliance. The findings revealed that there might be other factors that influence compliance besides knowledge. Knowledge about hypertension did not translate into self-care behaviors.

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