Psychological Stress among Patients with Hypertension in Bhutan

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Abstract

Understanding the relationship between psychological stress and blood pressure is a key in helping patients with hypertension control their blood pressure. The objective of this study was to examine the level of psychological stress among patients with hypertension and the differences in psychological stress level by gender, family history of hypertension, blood pressure control, and duration of hypertension. The descriptive design used simple random sampling to recruit 120 patients with hypertension at Jigme Dorji Wangchuk National Referral Hospital in Bhutan. Data were collected using a demographic data questionnaire and a perceived stress scale. Descriptive statistics and t-tests were used to analyze the data.

The results found that the majority (75.83%) of the sample reported moderate levels of psychological stress ($\bar{x}$ = 20.23, SD = 5.58). Only 12.50% of participants reported high psychological stress, and 11.67% reported low stress levels. The mean score of psychological stress was significantly different by duration of hypertension (more vs. less than 60 months [t_{118} = -4.21, $p < .001$]), controlled vs. uncontrolled blood pressure (t_{118} = -2.42, $p < .05$), and family history vs. no family history of hypertension (t_{118} = 2.18, $p < .05$). However, mean stress scores were not significantly different between the males and females (t_{118} = 1.85, $p > .05$). In conclusion, interventions for Bhutanese people with hypertension to manage psychological stress should be developed with a sensitivity to duration of diagnosis, family history, and ability to control blood pressure.

Key words: family history, duration of diagnosis, blood pressure control, hypertension

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ความเครียดทางจิตใจของผู้ป่วยความดันโลหิตสูงในภูฏาน

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บทคัดย่อ

ความเข้าใจเกี่ยวกับความเครียดที่มีผลต่อการควบคุมความดันโลหิตสูงเป็นสิ่งสำคัญในการช่วยเหลือให้ผู้ป่วยโรคความดันโลหิตสูงสามารถควบคุมความดันโลหิตได้ การศึกษาครั้งนี้มีวัตถุประสงค์เพื่อศึกษาระดับความเครียดของผู้ป่วยโรคความดันโลหิตสูงและศึกษาความแตกต่างของระดับความเครียดตามปัจจัยที่มีผลต่อความเครียดในผู้ป่วยโรคความดันโลหิตสูง ได้แก่ เพศ ประวัติโรคความดันโลหิตสูงในครอบครัว การควบคุมความดันโลหิต ระยะเวลาที่เป็นโรคความดันโลหิต กลุ่มตัวอย่างในการวิจัยเชิงพรรณาครั้งนี้ ได้แก่ ผู้ป่วยโรคความดันโลหิตสูง จำนวน 120 คน ที่ได้จากการสุ่มตัวอย่างอย่างง่าย จากผู้ที่มารับบริการที่โรงพยาบาลแห่งชาติจิกมี ดอจิ วังชุก ประเทศภูฏาน รวบรวมข้อมูลโดยใช้แบบสอบถามข้อมูลทั่วไปและแบบสอบถามการรับรู้เกี่ยวกับความเครียด วิเคราะห์ข้อมูลโดยสถิติพรรณาและการทดสอบค่าที (t-test)

ผลการศึกษาพบว่ากลุ่มตัวอย่างส่วนใหญ่ ร้อยละ 75.8 มีความเครียดระดับปานกลาง ($\bar{x}$ =20.2, *SD* = 5.6) กลุ่มตัวอย่างร้อยละ 12.5 มีความเครียดอยู่ในระดับสูง ขณะที่กลุ่มตัวอย่างเพียงร้อยละ 11.7 มีความเครียดระดับต่ำ ผลการทดสอบความแตกต่างของปัจจัยที่เกี่ยวข้องกับความเครียด พบว่า กลุ่มตัวอย่างมีความเครียดแตกต่างกันในคนที่มีและไม่มีประวัติครอบครัวเป็นโรคความดันโลหิตสูง (t_{118} = 2.18, p < .05) ผู้ที่ควบคุมความดันโลหิตได้และไม่ได้ (t_{118} = -2.42, p < .05) ระยะเวลาที่เป็นโรคความดันโลหิตสูงมากและน้อยกว่า 60 เดือน (t_{118} = -4.21, p < .001) แต่ไม่พบความแตกต่างระหว่างเพศหญิงและเพศชาย (t_{118} = 1.85, p > .05) ข้อเสนอแนะจากการวิจัยครั้งนี้ ได้แก่ การพัฒนาวิธีการจัดการความเครียดสำหรับผู้ป่วยโรคความดันโลหิตสูงในภูฏานโดยคำนึงถึงระยะเวลาที่เป็นโรคความดันโลหิตสูง ประวัติโรคความดันโลหิตสูงในครอบครัวและ ความสามารถในการควบคุมความดันโลหิต

คำสำคัญ: ประวัติโรคความดันโลหิตสูงในครอบครัว ระยะเวลาที่เป็นโรคความดันโลหิตสูง การควบคุมความดันโลหิต โรคความดันโลหิตสูง

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Introduction

Hypertension is a global public health problem and a major cause of morbidity and mortality worldwide. World Health Organization (2019) estimated that 1.13 billion people worldwide have hypertension of which two-third live in low- and middle-income countries. Cardiovascular diseases are the leading cause of death globally, and in 2016 it was responsible for 31% of all mortalities in the world (WHO, 2019). In Bhutan, 36% of the population in 2014 was reported to have high blood pressure and cardiovascular diseases alone accounted for 36% of all deaths in the country (WHO, 2016).

Both genetic and environmental factors play a role in the development of hypertension. Psychological stress is well documented as a factor attributed to hypertension (Almas, Ghouse, Iftikhar, & Khursheed, 2014; Liu, Li, Li, & Khan, 2017). Beside its causal role, psychological stress when it coexisted with hypertension was also reported to increase the severity of hypertension and worsen its outcomes (Malan, Schutte, Alkerwi, Stranges, & Malan, 2017; Sarkar et al., 2019). There are reports of increase negative cardiac outcomes and mortality associated with increased blood pressure due to psychological stress (Gallo et al., 2014; Richardson et al., 2012). A study has reported an increased risk to cardiovascular diseases in patients with post-traumatic stress disorder (Kibler, Joshi, & Ma, 2009). Studies have also linked psychological stress with blood pressure variability and sustained high blood pressure (Rothwell et al., 2010), which are associated with progressive organ damages, such as strokes, myocardial infarctions, and coronary heart diseases (Inoue, 2014; O'Donnell et al., 2016). For this reason, evidence suggests to consider psychological stress in cardiovascular disease prevention and control strategies (Chamik, Viswanathan, Gedeon, & Bovet, 2018).

Several factors are reported to be associated with psychological stress in hypertension including blood pressure level, gender, family history, and duration of illness (Sadeghi et al., 2019; Sarkar et al., 2019). While high or uncontrolled blood pressure may induce higher stress, some studies argued that stress was not associated with high blood pressure (Chamik et al., 2018). Stress is reported to lead to poor compliance with treatment and blood pressure control (Sarkar et al., 2019). Longer duration of hypertension or its chronicity was also reported to be associated with stress (Hsiao, Chang, & Chen, 2012). However, another study reported that more years of illness provides opportunity to learn and understand about the disease (Duwe, Holloway, Chin, & Morrow, 2018), and therefore may decrease the stress. Therefore, research evidence regarding association of factors attributed to psychological stress in hypertension is inconclusive and needs further study.

In Bhutan, Gross National Happiness or the GNH is the developmental strategy adopted since 1970s (Verma & Ura, 2018). Psychological wellbeing and health are accorded great importance under GNH policy. Moreover, while GNH is studied and operationalized from several angles- social, cultural, economic, political, environmental, philosophical, and spiritual -there has been little discussion regarding gender differences in Bhutan (Verma & Ura, 2018). In previous studies, significant difference in stress level was reported between the two genders (Chamik et al., 2018; Kim et al.,2018). Kim and colleagues (2018) suggested for further study to

investigate gender differences in stress level. This study seeks to better understand psychological stress differences between the two genders.

With rapid modernization and urbanization taking place, a wide array of challenges related to migration, occupation, education, finance and health may contribute to psychological stress. A systematic review and meta-analysis (2017) reported that patients with hypertension had higher incidence of mental stress than normotension persons (Liu et al., 2017). However, there are limited studies on the level of psychological stress experienced by patients with hypertension in Bhutan. Moreover, there are several factors identified which are relevant to BP control and can prevent complications of hypertension. Therefore, this study aims to examine the level of psychological stress and explore the differences in psychological stress between gender, family history of hypertension, duration of hypertension since diagnosed and the hypertensive control among Bhutanese patients with hypertension.

Objectives of the study

1. To examine the level of psychological stress among patients with hypertension.

2. To examine the difference in psychological stress level between gender, family history of hypertension, blood pressure control, and duration of hypertension.

Conceptual framework

The Common Sense Model of Self-Regulation (Leventhal, Philips, & Burns, 2016) was used as a conceptual framework to guide this study. The model outlines the processes underlying individuals' lay management of health threat. This model assumes that the people has a natural desire to understand their illness in order to cope and adjust to the role of patient. The model includes three main constructs of (i) illness representation, (ii) coping responses, and (iii) the outcomes. Also important in the model are the moderating effects of socio-cultural and personal variables, labelled as the 'self-system'. This 'self-system' influence the interpretation of, and response to illness stimuli. Therefore, this study considered the socio-cultural and personal variables such as gender, family history of hypertension, blood pressure control, and duration of hypertension which can be subsumed under 'self-system' to see the difference in psychological stress level (the illness outcome) between these variables.

Methods

Research Design

A comparative descriptive design was used to study the difference in psychological stress level between the groups.

Population and Participants

All adults diagnosed with hypertension by a registered medical doctor in Bhutan were considered as the population for the study.

The study participants included 120 adults with hypertension who visited medical out-patient department of Jigme Dorji Wangchuk National Referral Hospital. The participants were recruited using a simple random sampling technique. This hospital is the country's largest referral hospital and provides care for patients from all over Bhutan. The study was done between March 2020 and April 2020. The inclusion criteria were 1) diagnosed with hypertension for at least 6 months at the time of our study, 2) aged

between 20 and 60 years and 3) able to read and write in English because the English language competency of Bhutanese people are as good as their national language 'Dzongkha', and therefore can adequately represent the study population. While Dzongkha is the national language, English is Bhutan's language of education, technology, business and diplomacy. The sample size for this study was calculated using the G*Power software.

Research Instruments

The Demographic record form was used to collect the socio-demographic data of the participants. General patient characteristics included age, gender, marital status, education level, occupation and income, and the health information including body mass index, blood pressure, family history of hypertension, duration of hypertension, antihypertensive medication, and comorbidities.

The Perceived Stress Scale (PSS-10)

The 10-item Perceived Stress Scale (PSS-10) was used to measure the participants' psychological stress in this study. The PSS-10 was developed to measure how predictable, controllable, and manageable a person views his or her life (Cohen, Kamarck, & Mermelstein, 1983). Participants are asked about their feelings and thoughts during the last month. Items are rated on a 5-point scale ranging from 0 (never) to 4 (very often). The items 4, 5, 7, and 8 are positively stated items and are reverse scored. Psychological stress score was calculated by summing across all 10 items with scores ranging between 0 to 40; the higher the score the greater the psychological stress. Scores between 0-13 were considered as low stress level, 14-26 as moderate stress, and 27-40 as high perceived stress. The Cronbach's alpha of PSS-10 in this study was .76.

Ethical consideration

The study protocol was approved by the institutional review board (IRB) of Burapha university vide approval number 004/2020 and the Research Ethical Board of ministry of Health, Bhutan (REBH/Approval/2019/107). Participants were explained about the study aims and the procedures including their right to withdraw from the study at anytime without any penalty. Informed consents were obtained, and confidentiality and anonymity were assured.

Data collection Procedure

Permission to collect data was sought from the medical superintendent of the Jigme Dorji Wangchuk National Referral Hospital. Registration numbers of the participants were accessed from the register maintained at the out-patient department. Participants who met the inclusion criteria and were willing to participate completed the study questionnaires. Informed consents were taken prior to administering the questionnaires. 10 participants were recruited each day and the data collection was continued until the required sample size was reached. Each participant took 20-30 minutes to complete the questionnaires.

Data analysis

Minitab 17 software program was used to analyze the data. Descriptive statistics were used to describe the demographic characteristics of the participants and the level of psychological stress. T-tests were performed to examine the difference in psychological stress level between gender, with and without family history of hypertension, duration of hypertension more than and less than 60 months, and with controlled and uncontrolled

BP. An alpha value of 0.05 was considered for the level of statistical significance.

Results

Majority of participants were females (59.2%), mean age was 47.13±10.85 years. About 40% completed high school education and the average monthly family income was Nu. 26,727±14,029 (Approximately $391.32). Furthermore, the results found that 55.8% of participants had family history of hypertension and the mean duration since diagnosis was 111.15 ± 82.47 months. More than half of the participants (55%) had uncontrolled BP (Table 1).

Table 1 Characteristics of study participants (n = 120)

Characteristics	Number (n)	Percentage (%)
Gender		
Male	49	59.2
Female	71	40.8
Age (years) ($\bar{x}$ = 47.13, *SD* = 10.85, Min = 21, Max = 60)		
21-30	13	10.8
31-40	19	15.8
41-50	34	28.4
51-60	54	45.0
Education		
Primary school	44	36.7
High school	48	40.0
College and higher	28	33.3
Monthly family income ($\bar{x}$ = 26,727, SD = 14,029, Min = 3,000, Max = 74,200) (Ngultrum, where Nu. 68.3 = 1 USD)		
< 15,000	28	22.5
15,001 - 25,000	36	30.0
25,001 - 35,000	20	16.7
> 35,000	25	20.8
No answer	12	10.0
Family history of hypertension		
Yes	67	55.8
No	53	44.2
Number of antihypertensive drugs used		
1	50	41.7
≥ 2	53	44.2

Table 1 (Cont.)

Characteristics	Number (n)	Percentage (%)
Comorbidities		
Yes (Diabetes mellitus, heart disease, hyperlipidemia, arthritis)	41	34.2
No	79	65.8
Blood pressure		
Controlled (BP < 140/90 mmHg)	54	45.0
Uncontrolled (BP ≥ 140/90 mmHg)	66	55.0
Duration of hypertension (months) ($\bar{x}$ = 111.15, *SD* = 82.16, Min = 12, Max = 336, Median = 84)		
<12	5	4.2
12-60	41	34.2
61-120	30	25.0
>120	44	36.6

The level of psychological stress

Majority (75.83%) had reported moderate level of psychological stress ($\bar{x}$ = 20.23, *SD* = 5.58, Min = 4, Max = 32). Only few participants had either high or low psychological stress, with 12.50% and 11.67% of the participants respectively (table 2).

Table 2 The level of psychological stress (n = 120)

Characteristics	Number (n)	Percentage (%)
Psychological stress level ($\bar{x}$ = 20.23, *SD* = 5.58, Min = 4, Max = 32)		
Low	14	11.67
Moderate	91	75.83
High	15	12.50

Comparison of psychological stress between selected variables

Assumptions testing

Data were checked if they met all the necessary assumptions of a t-test. Assumption for randomness is assured as sample was recruited using simple random sampling technique. Anderson-darling test indicated normal distribution of the data. Levene's tests were non-significant (p > .05), indicating equal variance among groups. All independent variables were dichotomized as gender (Male/female), duration of hypertension (≥ 60 months/< 60 months), family history (yes/no), and BP control (controlled/uncontrolled).

Table 3 Psychological stress between selected variables (N=120)

Group	*N*	*M*	*SD*	*T*	*p-value*
Gender					
Male	71	19.10	5.81	1.85	.07
Female	49	21.00	5.32		
Duration of a diagnosis of hypertension					
≤ 60 months	46	17.67	4.74	-4.21	.001
> 60 months	74	21.81	5.51		
Blood Pressure Control					
Controlled BP	54	18.89	4.96	-2.42	.02
Uncontrolled BP	66	21.32	5.86		
Family history of hypertension					
Yes	67	19.25	5.40	2.18	.03
No	53	21.45	5.62		

df = 118

From Table 3, the results found that the mean score of psychological stress was significantly different between duration of hypertension more and less than 60 months (t_{118} = -4.21, p = <.001), controlled and uncontrolled BP (t_{118} = -2.42, p = .02), with and without family history of hypertension (t_{118} = 2.18, p = .03). However, there was no significant difference in psychological stress level between and male and female (t_{118} = 1.85, p = .07).

Discussions

A moderate level of psychological stress was reported in our study. This was contradictory to the findings from previous studies which reported high level of psychological stress in people with hypertension (Lu et al., 2019; Palagini et al., 2016). Lower psychological stress reported in this study can be accounted to most participants (45%) having passed the early adulthood stage as most stress generating problems, like marriage, divorce, starting new jobs, or having children are more prevalent in younger age groups.

Our study was conducted in an urban setting and this could be one reason for comparatively lower psychological stress reported. There are 92.5% of the study participants were urban dwellers and only 7.5% were farmers. The Average family income per month in our study was Nu. 26,727 ± 14,029 which was far higher than the average family income per month for farmers which was Nu 12,200 ± 5,459. Higher socioeconomic status was reported to predict less stress in a previous study (Milas, Klarić, Malnar, Šupe-Domić, & Slavich, 2019). Sarkar and colleagues (2019) have found that psychological stress was lower in patients living in urban areas compared to those living in rural areas. Health care service in Bhutan including medicines, as enshrined in the constitution of the kingdom of Bhutan, are provided completely for free by the

government. This could also account for lower level of psychological stress as financial burden from cost of treatment is also one of the stressors. Bhutan's developmental philosophy of Gross National Happiness (GNH) might also explain lower psychological stress level in this study.

Another possible reason for moderate level of psychological stress in this study can be lower comorbidity reported in this study. The findings of this study revealed that only 23.3% of the participants had diabetes as comorbidity whereas previous study reported as high as 69.36% (Wang et al., 2017). Similarly, our study found that only 0.8% had heart disorder, 2.5% had arthritis, and 3.3% had hyperlipidemia as the comorbidities whereas the study in China reported 57.32% with hypertension had heart disease and 77.39% had hyperlipidemia as the comorbidities (Wang et al., 2017). Our study also found most of the participants (61.7%) had duration of hypertension more than 6 years. This could be also one reason for lower level of psychological stress reported in our study. Patients experience more psychological stress when they are diagnosed with a disease for the first time or during first few years after the diagnosis (Sadeghi et al., 2019). As the duration of disease increase, patients learn to cope and live with the disease.

Our study findings also indicated that psychological stress experience differed between those having and not having family history of hypertension. It could be because positive family history lends experience about the disease and therefore learns about how to manage and live with the disease thereby alleviating the stress level. The psychological stress of those with controlled blood pressure was different from those with uncontrolled blood pressure. Possible explanation can be those with uncontrolled blood pressure viewed the disease as more threatening thereby increasing stress level. This is similar to the previous study where perception of an illness as a threatening event induced psychological stress (Sadeghi et al., 2019). Those with duration of hypertension more or less than 60 months also differed in their psychological stress measure. With time people learn to manage and live with the illness (Vasunilashorn, Lynch, Glei, Weinstein, & Goldman, 2015). This can be the possible reason for difference in psychological stress experience between the two groups. However, there was no statistically significant difference in psychological stress between male and female. This is contradictory to a previous finding where gender difference in perceived stress was reported (Kim, Lee, Lee, Noh, & Kwon, 2018). A possible reason for no difference in psychological stress level between male and female could be Bhutan's developmental philosophy of gross national happiness where all sections of people are treated equal.

Implication for Nursing

Providing psychological support to patients is an integral part in nursing care. The findings of this study will provide insights to nurses in designing nursing interventions to manage psychological stress among people with hypertension with a sensitivity to duration of diagnosis, family history, and ability to control blood pressure.

Conclusion

A moderate level of psychological stress was reported among adults with hypertension in Bhutan. Psychological stress level was different

between groups with and without family history of hypertension, with controlled and uncontrolled blood pressure, and with those whose duration of hypertension was more than 60 years and less. Although the level of psychological stress among people with hypertension in this study is lower than previous studies (Lu et al., 2019; Palagini et al., 2016), it is suggested that healthcare providers develop intervention to manage stress by considering family history of hypertension, duration of hypertension and BP control.

There are limitations in this study. Firstly, older age group (>60 years) were excluded from the study. Secondly, the study was done in an urban setting, and therefore might not represent the rural population. Including only those who can read and write English is also one of our limitations. Generalization of result to illiterate population should be done with caution.

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