Original Article

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Predictors of Psychological Stress in Bhutanese Hypertensive Adults

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Abstract:

Objective: To examine the prediction of illness perception, religiosity, and social support on psychological stress among adults with hypertension in Bhutan

Material and Methods: A predictive correlational design was used, from 120 adults with hypertension; recruited from Jigme Dorji Wangchuk National Referral Hospital, using the simple random sampling technique. Data were self-reported through a demographic data questionnaire, Perceived Stress Scale (PSS, Cronbach's α=0.76), Brief Illness Perception Questionnaire (Brief IPQ, Cronbach's α=0.81), Belief into Action Scale (BIAC, Cronbach's α=0.87) and Multidimensional Scale of Perceived Social Support (MSPSS, Cronbach's α=0.91); between March, 2020 and April, 2020. Data were analyzed using descriptive statistics, Pearson's product moment correlations and Standard Multiple Regression.

Results: Regression analysis revealed that psychological stress was predicted by illness perception (β=0.70, p-value< 0.001) and social support (β=-0.15, p-value<0.037). Religiosity was not a significant predictor of psychological stress (β= -0.02, p-value>0.738). The model explained 67.0% of the total variance for psychological stress. (R^2=0.67, p-value< 0.001). The mean scores were; psychological stress (20.23±5.58), illness perception (44.50±12.31), religiosity (53.48± 16.01), and social support (61.61±12.08).

Conclusion: The findings support the role of illness perception and social support in explaining psychological stress among hypertensive people. Therefore, illness perception and social support may be considered in interventions to manage psychological stress in hypertension patients.

Keywords: hypertension, illness perception, psychological stress, religiosity, social support

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Introduction

Hypertension is an important public health problem worldwide, with the World Health Organization (WHO) reporting that high blood pressure is responsible for 9.4 million deaths annually.[1] Hypertension or high Blood Pressure is a major modifiable risk factor for heart diseases, stroke, renal failure and peripheral vascular disease which are among the leading causes of morbidity and mortality worldwide.[2] An increasing trend in the prevalence of hypertension has also been reported in low- and middle-income countries over the years.[3] The incidence rate of hypertension was 600 million in 1980, and has increased to 1 billion by 2008.[1] Furthermore, it has been projected to reach 1.56 billion by 2025.[4] In Bhutan, 16.0% of the population, in 2012, were reported to have hypertension.[5] In 2014, the project of Stepwise Approach to Surveillance reported hypertension as a common medical disorder in Bhutan with 36.0% of the population having raised blood pressure.[6] It was estimated that Non-communicable diseases accounted for 69.0% of all deaths in Bhutan in 2016, with cardiovascular diseases alone accounting for 28.0% of the total mortality rate.[7]

Emerging evidence suggests that high psychological stress can increase the severity of hypertension and worsen its outcomes.[8] Studies have reported high levels of psychological stress in hypertensive patients.[9,10] Additionally, high psychological stress has been associated with higher risks of negative cardiac outcomes and mortality in previous studies.[11-13] Psychological stress is also well known for blood pressure variability[14], with studies having reported that consistently high blood pressure coupled with its variability are a risk factor for cardiovascular events.[14,15] This indicates that hypertension control should focus on achieving less variability of blood pressure.as studies have reported poor blood pressure control among people experiencing higher psychological stress.[9,16] Furthermore, psychological stress is involved in the causation of masked hypertension, which is high out-of-office blood pressure, but normal office blood pressure as well as white coat hypertension; which is high blood pressure in a clinic but normal blood pressure.[15] Psychological stress is associated with a long-lasting allostatic load, contributing to sustained blood pressure elevation. Most hypertensive patients have psychological problems, and have been shown to have symptoms of depression.[17] In addition to these factors, psychological stress has also shown to act as the barrier to treatment adherence and lifestyle changes.[18] One study also reported that patients with higher psychological stress would have more difficulty in understanding, encoding and remembering the treatment instructions.[18]

Identifying risk factors of psychological stress helps in paving the way towards adopting preventive strategies, such as the stress-management programs for high-risk targets.[19,20] Psychological stress may be influenced by both internal and external factors[9], and there are many factors influencing psychological stress in hypertension; such as: illness perceptions, religiosity, perceived social support, physical activity, health literacy, hope, resilience, and coping behaviors.[10,21,22] As in the Common-Sense Model of Self-Regulation, psychological distress was one of the distinct categories of illness outcomes, and has been predicted by illness perceptions and coping strategies.[23] Previous studies reported illness perception as a predictor of psychological stress (R^2=0.48, p-value<0.001).[24,25] An illness perception viewing an illness as a threatening factor including chronicity, serious consequences, high concern, low control and negative emotional representation, were reported to increase psychological stress.[24]

Coping with psychological stress varies between individuals, beliefs, cultures and contexts[26], in that people use various coping strategies to achieve positive illness outcomes, with social support and religiosity being reported as common strategies in the control of psychological stress.[26] Social support was found to directly affect and

predict illness outcomes[23], with a prior study reporting that social support was a strong predictor of psychological stress (SE=0.03, p-value<0.001).[27] Social support was reported to reduce psychological stress by acting as a stress buffer.[28] Furthermore, a review of literature also indicated associations between religiosity and psycho-logical stress.[29,30] People often turn to religion to deal with stress during negative life events, and in Bhutan, social support and religiosity are two of the most used coping strategies during stressful times. In Bhutan, 90.2% of the population are Buddhist[31], and religiosity plays a very pertinent role in the everyday lives of the Bhutanese people. At all times, either during times of wellness or during negative life events, people in Bhutan seek divine help. It is therefore highly likely that religiosity of the Bhutanese people may have a significant association with psychological stress.

Given their strong association with psychological stress, and growing scientific evidence of their role in explaining psychological stress, illness perception, religiosity and social support were considered for this study. These selected factors are subsumed under the internal and external factors, which literatures indicated to influence psychological stress. Presently, there are limited studies on psychological stress, and its factors among the hypertensive population of Bhutan. Hence, the objective of this study was to examine the prediction of illness perception, religiosity and social support on psychological stress among adults with hypertension in Bhutan.

Material and Methods

This study used a predictive correlational design. A simple random sampling technique was used to recruit 120 adults, with essential hypertension, visiting medical out-patient department of Jigme Dorji Wangchuk National Referral Hospital; between March, 2020 and April, 2020. This hospital is the country's only national referral hospital, and sees patients from all over Bhutan. Participants were eligible for study if: they were diagnosed with hypertension for at least 6 months at the time of our study, aged between 20 and 60 years, and able to read and write in English.

The sample size for this study was calculated using G*Power software. A power of 0.80 and an alpha value of 0.05 were considered for this study. The lowest R^2 from previous studies was 11.2%[32]; thus, an effect size of 0.126 was considered. G*Power software suggested a sample size of 91. However, a sample size of 120 was considered to compensate for missing data and ensure data quality for Multiple Regression.[33]

Research instruments

Following research instruments were used for data collection. Except for the demographic data questionnaire, which was developed by the researchers, prior permission was sought from the authors to use the research instruments.

Demographic data questionnaire

The demographic data questionnaire was developed by the researcher. The socio-demographic data of the patients included general patient characteristics such as age, gender, marital status, education level, occupation and income. The health information of the participants included: body mass index, blood pressure, family history of hypertension, duration of hypertension, antihypertensive medication, and comorbidities. General patient characteristics were self-reported, health information, such as body mass index, blood pressure, medication and comorbidities; were recorded from the patient's health record book.

Perceived Stress Scale (PSS)

The PSS was used to measure the degree to which situations in life were perceived as stressful: PSS was developed by Cohen and colleagues.[34] The PSS shows

how predictable, controllable, and manageable a person views his or her life, with the items in this scale asking about the participant's feelings and thoughts during the last month. Items are rated on a 5-point scale, ranging from 0 (never) to 4 (very often). Items 4, 5, 7, and 8 are positively stated items, and are reverse scored. Responses to the 10 items were summed to get the psychological stress score. Scores range from 0 to 40, with higher scores indicating greater psychological stress. Scores ranging from 0–13 were considered low stress, 14–26 as moderate stress, and 27–40 as high perceived stress. The Cronbach's alpha of PSS when tested among Bhutanese hypertensive adults was 0.76.

Brief Illness Perception Questionnaire (Brief IPQ)

Illness perception of hypertension was measured by the Brief IPQ, a brief version of the Illness Perception Questionnaire-Revised: the Brief IPQ was developed by Broadbent and colleagues.[35] The term "illness" in the original questionnaire was replaced with "your high blood pressure" for this study. The Brief IPQ comprises of nine items in total, with five of the items assessing cognitive illness perceptions: consequences (Item 1), timeline (Item 2), personal control (Item 3), treatment control (Item 4), and identity (Item 5); Two of the items assess emotional perceptions: concern (Item 6) and emotions (Item 8), and one item assesses illness comprehensibility (Item 7); as the last item was qualitative it was therefore, omitted in this study. All items are rated on a 0–10 Likert-type response scale. Higher values of scores reflected higher values on the variable of interest. The total illness perception score is calculated by summing the reverse scores for personal control, treatment control and illness understanding, and then adding it to the scores of the other items. Scores ranges between 0 and 80, with a higher score reflecting a more threatening view of the illness and vice versa. Adequate reliability and validity were reported of the Brief IPQ.[35] The Cronbach's α coefficient was 0.81, when tested among Bhutanese hypertensive adults.

Multidimensional Scale of Perceived Social Support (MSPSS)

MSPSS was used to measure the perceived social support: MSPSS was developed by Zimet and colleagues.[36] This has twelve items, rated on a seven-point Likert scale, with scores ranging from 'very strongly disagree' to 'very strongly agree' (1 to 7). MSPSS is designed to measure the perceived adequacy of social support from three sources: Significant Others (SO) (Items 1, 2, 5, and 10), Family (FA) (Items 3, 4, 8, and 11) Friends (FR) (Items 6, 7, 9, and 12). The total scale scores are derived by summing across all items, with higher scores reflecting higher social support. A high internal consistency was indicated by Cronbach's alpha of 0.91 among Bhutanese hypertensive adults.

Belief into Action Scale (BIAC)

BIAC scale was developed by Koenig and colleagues.[37] The BIAC questions assess organizational and non-organizational religious activities, as well as degree of personal (intrinsic) devotion or commitment to one's religious faith as the three major dimensions of religiosity. Organizational religious activities are religious community activities with a desire to socialize; whereas, non-organizational religious activities are the religious practices that are usually performed alone; such as, watching religious television, reading religious scriptures, praying or meditating.[37] The BIAC consists of 10 questions, with time of completion less than two minutes. For item 1, a score of 10 is given if the response is 'Relationship with god' and a score of 1 for all other answers. The rest of the items are rated on a 1–10 scale. The total score ranges

from 10 to 100, with higher scores indicating a higher level of religiosity. The Cronbach's alpha coefficient of the BIAC scale in this study was 0.87.

Procedures

The study was approved by the Institutional Review Board of Burapha University, Thailand (Approval Number 004/2020) and the Research Ethics Board of Health, Bhutan (REBH/Approval/2019/107). Consent to collect data was provided by the medical superintendent of the Jigme Dorji Wangchuk National Referral Hospital. Registration numbers of the prospective participants were accessed from the register maintained at the out-patient department. Patients meeting the inclusion criteria were recruited through simple random sampling technique. A total of 10 participants were recruited per day. Participation were on a voluntary basis. The study objectives and the data collection procedures were explained to the participants. Following informed consent, data were collected between 9:00 a.m. in the morning and 4:00 p.m. in the evening, every day, until 120 participants were obtained. Each participant took about 20-30 minutes to complete the questionnaires.

Data analysis

Data analysis was conducted using Minitab 17 software program. Descriptive statistics were used to describe the demographic characteristics of the participants, and data were tested for assumptions of Multiple Regressions. Pearson's product correlation analysis was performed, to examine the relation of psychological stress with illness perception, religiosity and social support. Standard multiple regression was performed to examine the predicting factors of psychological stress, with an alpha level of 0.05 being adopted as the level of statistical significance.

Results

The participants included 49 males (40.8%) and 71 females (59.2%), with the mean age being 47.13±10.85 years, and most (45.0%) were in the age group of 51-60 years. The majority of the participants (90.0%) were married, and had a high school education (40.0%). The average monthly family income was Nu. 26,727±14,029 (Approximately US$ 391.32) (Table 1).

Table 1 Characteristics of study participants (n=120)

Characteristics	Number	%
Gender		
Male	49	40.8
Female	71	59.2
Age (years); mean 47.13±10.85		
21-30	13	10.8
31-40	19	15.8
41-50	34	28.4
51-60	54	45.0
Marital status		
Single	6	5.0
Married	108	90.0
Divorced	3	2.5
Widowed	3	2.5
Occupation		
Government service	33	27.5
Private sectors	32	26.7
Retired	11	9.2
Farmer	9	7.5
Others	35	29.1
Education		
Primary school	44	36.7
High school	48	40.0
College and higher	28	23.3
Monthly family income; mean 26,727±14,029 (Ngultrum, where 68.3 Ngultrum=1 United States Dollar)		
≤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

Health information of the participants

The mean body mass index was 28.66±5.44 kilogram/square meter, and the majority of parti-cipants (79.1%) were in the overweight (40.8%) and obese categories (38.3%). More than half of the participants (55.8%) reported having a family history of hypertension. The mean duration, since diagnosis, was 111.15±82.47 months. Most participants were taking one antihyper-tensive drug (41.7%), and more than half of the participants (55.0%) had uncontrolled BP as well as diabetes (23.3%) as the most common, comorbid condition. The majority (75.8%) reported a moderate level of psychological stress, with a mean score of 20.23±5.58 (Table 2).

It was revealed that psychological stress was significantly positively correlated with illness perception (r= 0.81, p-value<0.001), and significantly negatively correlated with religiosity (r=-0.31, p-value<0.01) and social support (r=-0.62, p-value<0.001) (Table 3).

Table 2 Health information of the participants (n=120)

Characteristics	Number	%
BMI (kg/m^2); mean 28.66±5.44		
Underweight (BMI<18.5)	2	1.7
Normal (18.5-24.9)	23	19.2
Overweight (25.0-29.9)	49	40.8
Obese (≥30.0)	46	38.3
Family history of hypertension		
Yes	67	55.8
No	53	44.2
Duration of hypertension (months); (mean 111.15±82.47, min=12, max=336)		
<12	5	4.2
12-60	41	34.2
61-120	30	25.0
>120	44	36.7
Number of antihypertensive drugs used (min=0, max=3)		
1	50	41.7
2	47	39.2
≥3	6	5.0
Blood pressure		
Controlled (BP<140/90 mmHg)	54	45.0
Uncontrolled (BP≥140/90 mmHg)	66	55.0
Comorbidities		
Yes	41	34.2
No	79	65.8
Diabetes	28	23.3
Hearted disease	1	0.8
Arthritis	3	2.5
Hyperlipidemia	4	3.3
Others (hypothyroidism, CKD, ITP)	5	4.2
Psychological stress level; mean 20.23±5.58		
Low	14	11.7
Moderate	91	75.8
High	15	12.5

BMI=body mass index, BP=blood pressure, CKD=chronic kidney disease, ITP=idiopathic thrombocytopenic purpura, kg/m^2=kilogram/square meter, mmHg=millimeter of mercury

Note: BMI categorization was based on the WHO classification

Table 3 Correlation between predictors and psychological stress (n=120)

Studied variables	Illness perception	Religiosity	Social support
Religion	-0.33***		
Social support	-0.65***	0.39***	
Psychological stress	0.81***	-0.31**	-0.62***

**p-value<0.010, ***p-value<0.001

Standard, multiple regression analysis showed that psychological stress was significantly predicted by illness perception (β=0.70, p-value<0.001) and social support (β=-0.15, p-value=0.037) but not by religiosity (β=-0.02, p-value=0.738). Illness perception, religiosity, and social support together explained 67.0% of the variance of psychological stress in adults with hypertension (R^2=0.67, $F_{3, 116}$=78.82, p-value<0.001) (Table 4). The predictive equation could be shown as follows:

Psychological stress = 10.71+0.32 (illness perception) -0.01 (religiosity)-0.07 (social support)

Table 4 Predicting factors of psychological stress among adults with hypertension (n=120)

Predicting variables	B	SE	Beta	T	p-value
Illness perception	0.32	0.032	0.70	10.01	<0.001
Religiosity	−0.01	0.020	−0.02	−0.34	0.738
Social support	−0.07	0.033	−0.15	−2.11	0.037

R^2=0.67, $F_{3, 116}$=78.82, p-value<0.001, B=unstandardized regression coefficient, SE=standard error, t=t test

Discussion

The participants in this study were predominantly female patients (59.2%). This might be attributed to the maximum patients (45.0%) being in the older age group (51–60 years), during which: because of menopause, the risk of having hypertension is higher than in males.[9] Similar to the finding of this study, previous studies have also observed a higher number of female patients.[9,21] The majority of the participants in this study were either overweight or obese (79.1%). This may be because being overweight is a risk factor for hypertension.[6] Our study found diabetes as the most common comorbidity (23.3%). Similar to our study's finding, Rai and Deenan (2018) found in their study, conducted in Bhutan, diabetes was observed as the most common comorbidity.[38] Most patients in this study (36.7%) had a duration of hypertension of more than 10 years. This may have been because most of our study participants (45.0%) were in the older age group.

Psychological stress was found to be significantly predicted by illness perception and social support, but not by religiosity. Illness perception was the most powerful predictor of psychological stress. This could be explained by the fact that people generally hold negative perceptions about their illness, resulting in psychological stress. Hypertension is widely known amongst the Bhutanese community as a lifelong illness, and relates to high blood pressure, headaches, strokes, heart diseases, kidney failure, and even sudden death. Thus, understandably, participants were frightened, anxious or worried about disability or premature death from hypertension[39], and this might have contributed to their stressful responses. Our results were consistent with the results of previous research; wherein, illness perception was found to predict psychological stress.[25]

Social support was another significant predictor of psychological stress (β=−0.15, p-value=0.037). The negative correlation ascertains that, if the patient had high social support from family members, friends and others, then he or she would experience lower psychological stress. The reason for social support as a predictor of psychological stress is well substantiated by large, existing literature; which reflects social support as a buffer or protective shield against stress.[40] This indicates that social support has neutralizing and even counterbalancing effects on psychological stress. A high level of social support (mean=61.61, S.D.=12.08) was reported in this study, which indicated the presence of strong, supportive social networks (family members, friends and significant others); which could have buffered as well as shielded them from higher psychological stress. A possible explanation for this could be the deeply ingrained, unique Bhutanese values of 'Tha-Dam-Tshig' (personal integrity or moral rectitude), and the noble values of sublime trust and bond that emanates from it. Another value, highly regarded in Bhutanese society, is the 'Le judre' (the law of cause and effect), which is one of the most fundamental concept in Buddhism. The compounding effect of the dual, powerful values of 'Tha-Dam-Tshig and Le judre' in Bhutanese society cements the bonding and support among family members and friends. Therefore, during times of sickness and troubles, people in Bhutan might have received both high social support and help from families and friends. In this study, it was revealed that 90.0% of the participants were married, which indicated that the majority had social

support from spouses and family members: this result was consistent with results from several other studies. Rai and Deenan (2018) found that people in Bhutan received adequate levels of social support;[38] moreover, previous studies found that strong social support systems could reduce psychological stress during times of negative events and enhance resilience to stress.[40]

Although, Pearson's correlation revealed that psychological stress was significantly correlated with religiosity ($r=-0.31$, p-value<0.010), Multiple Regression found that religiosity was not a predictor of psychological stress. The possible explanation could be accorded to the nature of Bhutanese people, and the scale we used to measure religiosity. Most people in Bhutan are strong believers in religion, and its practice. Most of the time they are engaged in chanting, praying and meditating, so as to either avoid or decrease stress. The Buddhism practiced in the country is still vibrant, and permeates almost all facets of Bhutanese lifestyles. Religiosity might not have predicted psychological stress, because participants were engaged in religious practices in their everyday life, therefore it did not affect psychological stress. Furthermore, the BIAC Scale might not be a valid tool for the Buddhist population. Bhutanese people are predominantly Buddhist, approximately, 90.2% of people in Bhutan believe and practice Buddhism[32], a religion which is neither monotheistic nor polytheistic. As the original validation study was conducted in the U.S., wherein the caregiver sample who were mostly Christian: a monotheistic religion[37], when the scale was tested in a more diverse, Chinese population the exact nature of the factor construct was called into question, and remained as a question for future studies in other religious populations.[37]

We acknowledge several limitations in this study. The cross-sectional design of the study limits from drawing upon the cause-and-effect relationship between the variables. Future studies could be conducted using a longitudinal design. Also, the study included only participants who could read and write English. Therefore, generalization of the results to an illiterate community should be made with caution. We did not have data on religious backgrounds of the participants. This is also one of the limitations of our study.

Conclusion

The findings of our research indicated illness perception and social support as predictors of psychological stress, with illness perception being a stronger predictor of psychological stress. Illness perception and social support may be considered in interventions to manage psychological stress for hypertension patients. Although, religiosity was highly expected to predict psychological stress, the result was otherwise. The validity of the tool used to measure religiosity in this population is questionable. Future research is therefore recommended to confirm these results.

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Conflict of interest

We declare no conflict of interest.

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