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Hypertension and Parathyroid Hormones Relationship between the Populations of Pakistan and China

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ABSTRACT

Depression is major issue nowadays. Around the world depression is main factor that affects over 0.35 billion people with 7% of lifetime risk. In this study a questionnaire-based survey was performed in the medical wards of different hospitals with the permission and signature of patients in Pakistan. In this survey of 80% patients were unemployed and 95% were married. Their monthly income was ≥ 1500 PKR and were in 85% of the socioeconomic status in middle class category. In the collected data 35% patients had secondary education (high school) and rest of the patients had no education. 45% patients have high blood pressure, and 30% patients were taking proper medications to overcome the hypertension. 30% of the people have high blood pressure issue in our data and other 20% was taking proper medicines to overcome the hypertension. But for China we had taken several case-studies. In the case-studies, it found that in year 2021 China has prevalence of 4.2% and having cases of 54,815,739 in the total population of 1,444,216,107. The Main purpose is to study and analyze the relationship of hypertension and parathyroid hormone in people of Pakistan and Mainland China. In this questionnaire-based survey, we reached to conclusion that main causes of depression must need to be controlled and addressed. Specially in hypertension patients, awareness must be raised about long-last complexities in untreated depression.

Keywords

Parathyroid hormone, Blood pressure, Hypertension, Depression, Hyperthyroidism

Introduction

Depression is major issue nowadays. Around the world depression is main factor that affects over 0.35 billion people with 7% of lifetime risk. In year 2020 depression was expected to increase the diseases global burden by 5.7% and it would be leading disability cause in year 2030 globally. Magee et al. 2019a in Pakistan (9.3%) pregnancy hypertension incidence decreased compared to India (10.3%) and other countries like Mozambique (10.9%), and Nigeria (10.2%). In Pakistan, India,

Mozambique and Nigeria most hypertension was diastolic as 72.7%, 46.4%, 61.3%, 63.3% respectively. If we look at global mortality and disability, then hypertension is most leading cause [Everts et al., n.d.](#)

31.1% population globally were estimated as hypertensive according to 2010 research. Due to hypertension, it is estimated that annually 9.4 million died. Diseases like cardiovascular, renal failure and stroke are due to hypertension [Davis et al., 2009](#). Several human and experimental models propose that calcium homeostasis modifications and cardiovascular concerns at high risks are linked to each other. Particularly, in blood pressure (BP) regulation systemic calcium metabolism changes play a very important role [Fommei & Iervasi, 2002](#).

In embryology there is very close relation in between thyroid gland, heart and parathyroid glands. [Streeten et al., 1988](#) states that migration of heart and thyroid happens together in ontogeny. The two organs have a tight physiological link, as seen by predictable changes in functions of cardiovascular across the thyroid illness states' whole range. Because of variations in thyroid hormone in vascular system and heart, patients with hypothyroidism and overt hyperthyroidism respectively have a variety of signs and symptoms [Nilsson et al., 2005](#). Changes in tone of vascular and the system of renin-angiotensin have link to increase in parathyroid hormone – PTH. Although a causal relationship has yet to be demonstrated, disorder of the hyper-functioning parathyroid glandular have long been linked to a higher risk of hypertension [Bergus et al., 1999](#).

There are many cases in Pakistan and Mainland China, and many people committed suicide because of the depression. What are the symptoms? Like think speak slowly, lose interest in enjoyment, disturbed sleep, poor appetite, lack of energy, self-harm, self-blame, suicide ideas, despair worthlessness. Actually, people even don't know what depression is and how it can be cured. There are many factors that cause the depression are work, character, biochemistry, environment, illiteracy and awareness and govt. policies. According to the survey 35% people claimed that they would like to consult for the help from professional consultant and go to specialist if they are depressed.

Ways to overcome the depression: like self-regulation, psychological counseling and psychotherapy, antidepressant medication and integrated ways. There are some practical therapies like get outside, aerobic exercise, omega-3 fatty acids, sleep, socialize, watch your thinking. It is cured and it's not terrible.

In China, the incidence of high blood pressure diseases is significantly greater as compared to U.S. Particularly in China, the findings of these studies indicate that the relationship between parathyroid hormone and elevated blood pressure contributes to an higher incidence of hypertension. Another

research indicates that a family history of elevated blood pressure/Diabetes Mellitus; poor dietary habit, intake of high salted foods, mental discomfort are primary factors of hypertension in China [Hu et al., 2015a](#); [N. Li et al., 2020](#); [Sun et al., 2008](#); [Yi et al., 2017](#); [Zhuang et al., 2019](#).

While, In Pakistan there is a strong urban development level. Although few of studies reported that people in Pakistan eat a high saturated fat, high salted diet, low intake of fruits and vegetables and intake high calories [Shamsi et al., 2010](#). A few research have proposed that these modifications lead to a greater incidence of high blood pressure disorders in urban communities than in rural ones. Therefore, Pakistan requires to develop hypertension preventive measures that include a detailed implementation strategy for the reduction and enhancement of existing hypertensive disease regulations [Khowaja et al., 2016](#). There is no national research on the severity of high blood pressure and parathyroid hormone [Magee et al., 2019b](#); [Nisa et al., 2019](#), but few researchers have demonstrated several limited to reports across the nation that measured the incidence of high blood pressure.

Our main purpose is to study and analyze the relationship of parathyroid hormone and high blood pressure in people of Mainland China and Pakistan. According to the study during COVID-19 epidemic depression affected on the lives of the people all over the world. Because during these days there is a massive change in the world and there is large increment in an unemployment in just 2 years of epidemic. Lives of many under developing countries like Pakistan, Iran, Bangladesh, Nepal, Sri Lanka etc. had big negative impact due to low economy, their government policies, poverty, lack of counseling and proper management for the population in the south area. But as compared to China, China had played a best role in the world and they become the first one to kill the poverty in a best way. And China is number one in economy net globally.

Related work

Several research studies had explained the pros and cons and their effects on the health, like subclinical hyperthyroidism effects on heart has been investigated and they made it clear that with mostly cardiac function and structure's abnormalities are interlinked with the condition of heart. Disorder of Cardiovascular interlinked with subclinical hyperthyroidism could be a direct result of thyroid hormone imbalances or a reflection of these patients' elevated arterial pressure [Allon et al., 1990](#). In these kind of patient there is no any congruous research studies that proves that arterial blood pressure – BP increases. Recently, a research analyses on 5 big studies investigated the occurrence of hypertension in these patients found that people with suppressed serum TSH levels and free thyroid hormones within the standard range did not have higher blood pressure [Skowsky & Kikuchi, 1978](#).

In patients the most common seen abnormalities are heart-rate, LV-mass, supraventricular arrhythmias prevalence, and dysfunction of endothelial with subclinical hyperthyroidism. This rise in LV-mass is frequently accompanied with an increase in systolic function and a reduction of myocardial relaxation. The LV-mass rise is because of the concentric remodeling and relates to subclinical-hyperthyroidism duration instead of regulating thyroid-hormone's level [Bergus et al., 1999](#). In this study 40.1% with depression is found that is a huge percentage of hypertensives and in opposite to depression 21.2% with hypertension is found and depression is more expected to occur as a comorbid of hypertension in South Africa than vice versa [Franklin et al., 2001](#). The significant mental implications to be able to identify quite a lifelong condition, as well as the vicious cycle of economic constraints in low socio - economic setups, cost of healthcare, the resulting pressures, and further impairment, are deductible factors propelling the growth rates of depression within and between hypertensive patients [Gifford & Prisant, 2005](#).

According to the large population of China in the worldwide, disorder of hypertension is on peak than in US. A case study was proposed, and they recruited the participants in the year 2008-2014 in Hubei and Henan provinces and this case study was implemented on hypertensive cases of 373 and normotensive controls of 507. In the result, history of family was in the order of cardiovascular diseases, educational level of low maternal, pregnancy-induced hypertension history, and poor relationship with in-laws relatives, proved by multivariate logistic regression analysis and all had sequential link with disorders of hypertensive in pregnancy [Hu et al., 2015b](#).

Disorders of hypertensive in pregnancy are linked with fetal adverse and maternal outputs that has been rising with great alarming threat in pregnant women of China. A meta-analysis was conducted on this issue and also estimates the more subtypes in China [F. Li et al., 2021](#). They performed it on studies of 92 with percipients of 13,77,448 that were capable to participate in systematic review and for the meta-analyses. According to their 95% pooled prevalence of hypertensive disorders of pregnancy [6.60%-8.00% = 7.30%], gestational hypertension [2.90%-3.70% = 3.30%], preeclampsia [4.00%-5.00% = 4.50%], mild preeclampsia [1.70%-2.30%=2.00%], severe preeclampsia [2.10%-3.00% = 2.60%], eclampsia [0.08%-0.15% = 0.11%], chronic hypertension [0.30%-0.90% = 0.60%], and chronic hypertension (with)+ superimposed preeclampsia [0.40%-0.80% = 0.60%]. As heterogeneity I^2 statistics: 92.0%-99.3% was high. Hypertensive disorders of pregnancy with High prevalence and the subtypes were often found in Northern and Western China. In this meta-analysis ages of pregnant women were ≤ 35 years and had Hypertensive disorders of pregnancy with High prevalence and subtypes. In this study they had found that in women who were obese and overweighted had preeclampsia, Hypertensive disorders of pregnancy with High prevalence,

gestational and hypertension. Hypertensive disorders of pregnancy with prevalence and the subtypes changes in every different area including China and Pakistan. Strategies for women who live in northern and western China need to be modified and need to be managed to prevent them from these factors with high prevalence like obesity, overweight and advance maternal age. [Yang et al., 2021](#) study shows the preeclampsia prevalence rate in China and Sweden and that was similar but according to their conclusion there is more severity in disease and worse outcomes in pregnancy in China than Sweden. Obesity and nulliparity are linked to preeclampsia, implying a significance for living and factors of healthcare, but this could be attributable to differing in pathophysiology. These proposed identifications are related to the currently efforts of identified higher risks of pregnancies and serum markers of early stage because the effectiveness of risk prediction models and biomarkers might have been population specific.

[Brown et al., 2018](#) family planning is important because that is what women want to accept and receive if it is comprehensive. [Cgtn.com, n.d.](#) explained the action plan for the secondary schools and universities level to enhance the important mental health courses and conferences to spread the action plan's prevention knowledge about the depression in young national and international people, that is claimed by the National Health Commission. while on the other hand Pakistan has no any action plan to overcome or to acknowledge the nation and there is no any interest to prevent from mental disorder even in epidemic. 0.1 billion people in China are suffered from the mental disorder and 16 million are serious in their conditions [Chinadaily.com.cn, n.d.](#) . Meanwhile 0.25 billion people need to go for proper consultation from psychological consultant and 0.08 billion are serious and need of treatment is required. 75% people even don't know about the disease of mental problem, depression and anxiety.

Depression has become a leading cause for suicides in China. Globally, 0.7 billion people are suffering from mental disorder. 30% US national have different problems of their psychological problem. [Sixthtone.com, n.d.](#) to measure the mental health, and it's screening is possible but it's not difficult. It necessary to minimize the numbers to better mental health. It was estimated in 2010 that 1 billion of people are hypertensive having [$>140/90$ mmHg] globally, and it would be increased to 1.56 billion in year 2025 [Saleem et al., 2010](#). In 2010 Pakistan's National Health Survey identified that adults are 18% and above 45 years of ages adults are 33% hypertensive positive. And it is increasing day by day. Riaz et al., 2021 identified that many factor that are associated with hypertension like social-demographic, health relation, lifestyle, and psychological factors. Their findings can help out the public health workers, researchers and doctors to point out the higher risk groups and specific strategies with preventions. Further research is interlinked to interrogate these

aspects widely and prove the evidence to the global world. In [Nyirenda & Padfield, n.d.](#) it's proved that hypertension has been shown to increase calcium excretion in the urine and that a primary renal calcium leak causes a transitory drop in serum ionized calcium, which is followed by a compensated surge in PTH. Surgery for primary hyperparathyroidism helps to lower blood pressure (BP) and lowers plasma renin activity [Jacob et al., 2011](#). [Un Nisa et al., 2019](#) hypertensive disorders associated with pregnancy are widespread and have a negative influence on maternal and fetal health. The outcomes of the study of [Havoshki et al., 2020](#) backed up the theory that hyperparathyroidism, high serum calcium levels, and PAH in HD patients are linked. The pulmonary arterial hypertension's prevalence was very high in the study of [Eskandarian et al., 2021](#), indicating the importance in hemodialysis patients of monitoring pulmonary hypertension. According to the available evidence in China [Y. Zhang & Zhang, 2018](#), a rise in circulating PTH levels is linked to an increased risk of HTN. Although, more well-designed large prospective research is required to further expand the concerns investigated in this analysis due to the small number of studies involved.

Method and material

In this study a questionnaire-based survey was performed in the medical wards of different hospitals. In medical wards, patients of different disease were admitted. The files and test reports of the patients were checked. Then the hypertension positive patients we sorted out and 24 hours recall, and dietary history of the patient was taken. Questionnaire was filled with the permission and signature of patients.

Results

The collected data consist of almost 170 patients who were hypertensive positive patients. The age of the patients was above 30 years. In this survey 80% patients were unemployed and 95% were married. Their monthly income was ≥ 1500 PKR and were in 85% of the socioeconomic status in middle class category. In the collected data 35% patients had secondary education (high school) and rest of the patients had no education. 45% patients have high blood pressure, and 30% patients were taking proper medications to overcome the hypertension. 30% of the people have high blood pressure issue in our data and other 20% was taking proper medicines to overcome the hypertension.

For China we had taken several case-studies and we concluded that as China populated and there is no factor of poverty. But there is proper policies at describes in the previous work and then have proper health care consultation system. China is economically strong in every single field. China has worked well last years to overcome the mental and physical disorders to prevent the population from the disease like hypertension. China has worked on the development and implementation of

appropriate measures to prevent and efficient treatments for hypertension in different areas. Worldpopulationreview.com 2021, n.d. in year 2021 China has prevalence of 4.2% and having cases of 54,815,739 in the total population of 1,444,216,107. Pakistan and China have same prevalence even in big gap in total number of populations.

Table 1: Depression rate by Country

Country	Prevalence	Total Population	Cases
Pakistan	4.20%	7,436,224	225,199,937
China	4.20%	54,815,739	1,444,216,107
India	4.50%	56,675,969	1,393,409,038
Afghanistan	3.30%	1,038,610	39,835,428
Bangladesh	4.10%	6,391,760	166,303,498

Table 2: Hypertension Prevalence rate in patients according to various studies

Paper References	Country	Prevalence (%)		
			Urban	Rural
Shah et al., 2018	Pakistan	25.93%-26.75%: 26.34%	21.80%-31.42%: 26.61%	10.18%-31.87%: 21.03%
M. Zhang et al., 2021; Yu et al., 2021)	China	26.6%-28.4%: 27.5%	24.4%-27.1%: 25.7%	28.4%-30.3%: 29.4%
Samanic et al., 2020; Whelton et al., 2021	USA	47%	29.4%	40%
Anchala et al., 2014	India	32.5%	25%	10%

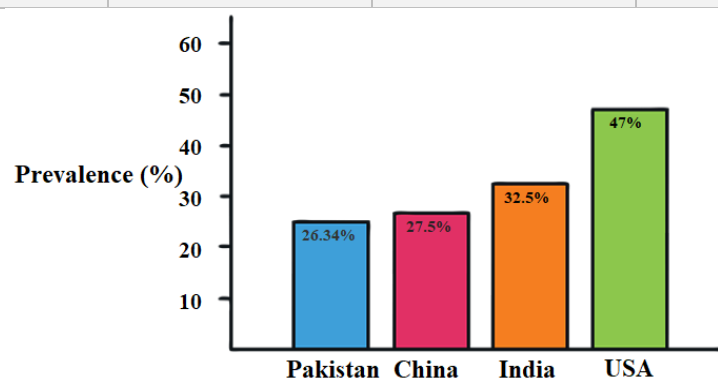


Figure 1: Country Wise Prevalence (%)

Conclusion

In this questionnaire-based survey, we reached to conclusion that half of the population of Pakistan is suffering from hypertension and half of them even don't know that they are hypertension positive.

As compared to Pakistan, China has worked on the development and implementation of appropriate measures to prevent and to improve the treatments for hypertension in different areas. The main causes of depression must need to be controlled and addressed. Specially in hypertension patients, awareness must be raised about long-last complexities in untreated depression.

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