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# Co-enzyme Supplements Effects on Blood Pressure: A Comparative Study

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## Abstract

**Background:** Blood pressure (BP) is a common and classic problem globally. Co-enzyme Q10 (Co-Q10) are organic molecules that have the ability to maintain the continuous oxidation-reduction cycle. The study aimed to assess the Co-Q10 effect in cases with pre-hypertension (pre-HTN).

**Methods:** A case-control study done in Al-Basrah teaching Hospital from 22nd Nov 2022 to 23rd of October 2023. In this study, 100 subjects were enrolled (60 males and 40 females) with age ranged between 28 and 71 years. Their BP ≥ 140 and ≤ 90 mmHg. The cases were detected clinically by a practitioner doctor as pre-HTN. Features for the diagnosis of pre-HTN upon the ACC/AHA guidelines in 2017 for different HTN phases. Three-month follow-up of 50 cases that underwent diet control and lifestyle modifications whereas 50 cases received Co-Q10 (ubiquinone, Liquidsun, Stamford, UK, Cat. No. 320274) 200 mg per day. Both systolic and diastolic BP were measured and recorded for all cases at base line of the study and post 3 months of administrator of Co-Q10.

**Results:** The data showed a significant statistical difference in systolic and diastolic BP ($p < 0.01$), between both arms. A massive drop in the systolic and diastolic BP at the end of 3 months when compared with base-line records in the Co-Q10 group.

**Conclusion:** The daily administration of Co-Q10 enhance the reduction of both systolic and diastolic BP within pre-HTN cases.

**Keywords:** Co-enzyme Q10, Blood pressure, Hypertension

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## Introduction

Raising BP is a common and classic problem globally. HTN and pre-HTN raise the incidence of CVD [1]. Pre-HTN is defined as an intermediary stage between HTN and normal BP [2]. Pre-HTN and HTN have significant health challenges in developing countries [3].

In 2017, ACC and AHA recommend the rules for different phases of HTN to: Normal (< 120/80 mmHg); high (≥ 120 and ≤ 129/< 80 mmHg); stage-I (≥ 130 and ≤ 139/≥ 80 and ≤ 89 mmHg); and stage-II (≥ 140/≥ 90 mmHg) [4].

Individuals with a higher BMI have more pre-HTN occurrence (greater systolic and diastolic BP, greater cholesterol and TG concentrations, dropped eGFR, raise FBS and greater homeostasis model assessment-insulin resistance [5-7]. In India, the commonest risk factor are family history, obesity and sedentary lifestyle [5].

Co-Q10 is an organic molecule which described firstly by Frederick Crane of Wisconsin (US) in 1957 [8]. They are present in all membranes of cell and in mitochondria as 2 forms reducing (ubiquinol) and oxidizing (ubiquinone). They consist of a benzoquinone group and a poly-isoprenoid side chain. In humans, it consists of 10 units (Co-Q10 or ubiquinone) [9]. It has the ability to maintain the continuous oxidation-reduction cycle and has great electron bearers. Co-Q10 concentrations are specifically larger in some organs as kidneys, heart and liver due to requirement of productive energy transfer molecules that support high metabolic rate [10].

The work aimed to assess the effects of Co-Q10 in cases with high BP.

## Methods

### Design and setting

A case-control study was done in Ibn-Sina Hospital from 22nd November 2022 to 23rd of October 2023. In this study, 100 subjects were enrolled (60 males and 40 females) with age ranged between 28 and 71 years. Their BP ≥ 140 and ≤ 90 mmHg.

### Participants

The cases were detected clinically by a practitioner doctor as pre-HTN. Features for the diagnosis of pre-HTN upon the ACC/AHA guidelines [4] in 2017 for different HTN phases.

### Screening

- Physical and clinical examination.
- CBC, RFT, LFT, TFT, electrolytes and urinalysis.
- ECG and echo-study.

### Follow-up and supplementation

Three-month follow-up of 50 cases that underwent diet control and lifestyle modifications whereas 50 cases received Co-Q10 (ubiquinone, Liquidsun, Stamford, UK, Cat. No. 320274) 200 mg per day.

### Inclusion criteria

All stabilized individuals on medical treatment.

### Exclusion criteria

- Unstable angina.
- MI.
- Major surgery.
- Endocrine diseases.
- Plasma creatinine >2 mg/dl.
- Raise liver enzymes.
- Abnormalities of electrolytes levels.

### Ethics

The study was approved by the Institutional Review Board of the hospital. In apparently healthy and cases' groups, the mean ± SD for systolic and diastolic BP was calculated.

### Data collection

Both systolic and diastolic BP were measured and recorded for all cases at base line of the study and post 3 months of administrator of Co-Q10.

### Statistics

Statistics was done by SPSS ver.24 (IBM, NY, US). An unpaired independent t-test was used to compare the baseline characters between the healthy and pre-HTN cases' group. The mean and SD are used for quantitative variables. The statistical significance was set at a p value < 0.05.

## Results and Discussion

The data showed a significant statistical difference in systolic and diastolic BP ($p < 0.01$), between both arms (Table 1). A massive drop in the systolic and diastolic BP at the end of 3 months when compared with base-line records in the Co-Q10 group (Table 2).

Co-Q10 noticed to applied with direct effects on the endothelium tissues which provoking vasodilation and decline BP [11, 12]. These effects are a result of the abilities to boost nitric oxide (NO) bioavailability and the induction of vasodilation of vessels mostly in HTN [12].

Moreover, Co-Q10 alter the angiotensin effects within Na retention and drop the levels of aldosterone [13, 14].

In spite of exciting BP data found within pre-liminary trials (both systolic and diastolic BP dropped by 6 mmHg) [15].

**Table 1:** Comparison of pressure parameters among groups of the study.

| Pressure parameters (mmHg) | Mean ± SD | | P value |
|---|---|---|---|
| | Cases | Control | |
| **Systolic** | 141.56 ± 0.89 | 120.54 ± 0.82 | 0.01 |
| **Diastolic** | 90.34 ± 0.88 | 82.66 ± 0.67 | 0.01 |

**Table 2:** Systolic and diastolic BP post Co-Q10 supplementation.

| Pressure parameters (mmHg) | | Mean ± SD | |
|---|---|---|---|
| | | $Co\text{-}Q_{10}$ | Control |
| **Systolic** | 3 months | 123.88 ± 1.12 | 135.59 ± 0.97 |
| | SE | 16.28 ± 0.62 | 5.15 ± 0.22 |
| **Diastolic** | 3 months | 80.68 ± 0.99 | 86.37 ± 1.13 |
| | SE | 8.44 ± 0.56 | 2.88 ± 0.03 |

The positive findings shown by old meta-analyses of 17 random clinical trials revealed that Co-Q10 supplements declined systolic BP by a great margin. Furthermore, when deal with cases that are detected with DM and IHD, and LVD, the supplement of Co-Q10 did not change the BP [16].

Authors concluded that antihypertensive effect of Co-Q10 is still unknown in cases investigated with primary HTN [17].

Nitin and colleagues concluded that the antioxidant enzymes super-oxide dis-mutase (SOD), catalase and glutathione per-oxidase get a role to catalyze the reduction of oxidants in cells and give effect by counter-acting oxidative processes that lead to the reason of the chronic illnesses. The reduction in catatonia by Co-Q10 is because of the antioxidant activity. They indicated that Co-Q10 must be recommended as adjuvant treatment in cases who are utilizing chlorpromazine for chronic durations of time [18].

Pahari et al. [19] and Kumar et al. [20], concluded that Co-Q10 played a major role in human life. It helped to scavenge the free radicals. It has many important functions against the management of stress. Co-Q10 is helpful to prevent stress in modern hectic life.

## Conclusion

The daily administration of Co-Q10 enhances the reduction of both systolic and diastolic BP within pre-HTN cases.

## Acknowledgements

None.

## Conflict of Interest

None.

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