

# A Study on Health Impairments due to Regular Standing Posture of Indian Urban Women

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**Abstract:** *Objective:* This study was conducted to assess the health impairments due to regular standing posture of Indian urban women during their household works. *Methods:* A questionnaire based survey was carried out at specific local areas of district Muzaffarnagar of Uttar Pradesh, India, during the period between October and December, 2022. In this survey, urban women were involved from four age groups, group (A): 25-35 years with 6.1 h/d standing period, group (B): 36-45 years with 5.2 h/d standing, group (C): 46-55 years with 4.8 h/d standing, group (D): 56-65 years with 3.3 h/d standing. *Results:* In four age groups, women were very commonly suffered from the lower back pain, arthritis and joint pain, hypothyroidism, low blood pressure, and the hypotension problems. The working standing period decreased in aged women, however, the degree or extent of health risks were elevated in these women with the age-dependent manner. Notably, the percentage of urban women was enhanced for each health issue, age-dependently. Also, all the urban women suffered from calcium and vitamin D3 deficiency. Moreover, the feet swelling problem or edema were reported in older age women. *Conclusion:* This study concludes that the health risks enhance with the increase in the age of women.

**Keywords:** Indian urban women; Health impairments; Hypothyroidism; Lower back pain; Calcium and Vitamin D3 deficiency

## 1. Introduction

In Indian urban women, the health risks primarily associated with the position of regular standing. Today's life style in urban region, the women do various house hold works in standing posture as spending time in kitchen, for cooking food, washing utensils, in laundry, cleaning and other works. The general health problems noticed in women as lower back pain, legs and feet pain and circulatory disorders. Also, the continuous standing position causes the various physiological and musculo-skeletal disorders leading to mild to severe pain in muscles of lower and upper limbs. Women engage in routine house hold activities from wake-up time to sleeping time at night. Nowadays, the kitchens are designed in such a way that the women use to work in standing. In rural areas of India, this is traditionally a general working practice, to do various household works in sitting posture. The burden of medication expenditures due to such musculo-skeletal and circulatory disorders associated with standing posture in urban houses can lead to financial constrain and other health issues. McCulloch (2002) described the health related observations from several studies in which long term standing working hours are included. Major health risks involved the musculo-skeletal pain of lower back and feet, spontaneous abortions (Best et al., 2002).

The prolonged standing in work place led to a number of negative health outcomes. The studies consistently reported increased reports of low back pain, physical fatigue, muscle pain, leg swelling, tiredness and body part discomforts. Also, EMG recordings of trunk muscles, centre of pressure (COP) measurements using force platforms (posturography) and body kinematics have been used and the most promising outcome seems to be involving in research. The studies of prolonged standing and measurements of physical fatigue have shown some significant changes with the biochemical/physiological measurements, but again there

has been inconsistency. The present study aims to assess the health risks associated to regular standing position and also to find out deficiency of calcium and vitamin D in Indian urban women. Another important aspect of this study is to connect the health risks with age, deficiency of calcium and vitamin D, and use of reverse osmosis based drinking water in urban houses.

## 2. Materials and Methods

A questionnaire was designed to collect the data regarding the health impairments like lower back pain, arthritis and joint pain, hypothyroidism, low blood pressure (hypotension) and calcium deficiency along with the daily working time (h/d) due to regular standing position from 225 Indian urban women aged between 25 to 65 years. The collected data was analyzed and results were interpreted.

**Data Collection:** All Indian urban women in the age group 25-65 years selected from local areas of district Muzaffarnagar of Uttar Pradesh, India.

**Data sampling time period:** October 2022 to November 2022.

**Study design:** The health related data was collected from Indian urban women in randomized manner.

**Sample size:** 225 Indian Urban Women

**Sampling Criteria: Inclusion Criteria-**

- The age of Indian urban women ranged between 25 and 65 years.
- Indian urban women who give consent for this study.
- Those urban women were selected who worked in standing posture.

**Exclusion Criteria**

- Women with any kind of surgery.

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- Women having respiratory problems.
- Pregnant and lactating urban women
- Women with anxiety, hypertensive and any kind of mental disorders.
- Women with neuro-degenerative diseases.

**Table 1:** Description of age and standing time period of Indian urban women during daily routine household works

Sl. No.	Groups	Age range of Urban Women (Years)	Average daily standing working time (h/d)	Intake of Reverse Osmosis (RO) Water
1	A	25-35	6.1	Yes
2	B	36-45	5.2	Yes
3	C	46-55	4.8	Yes
4	D	56-65	3.3	Yes

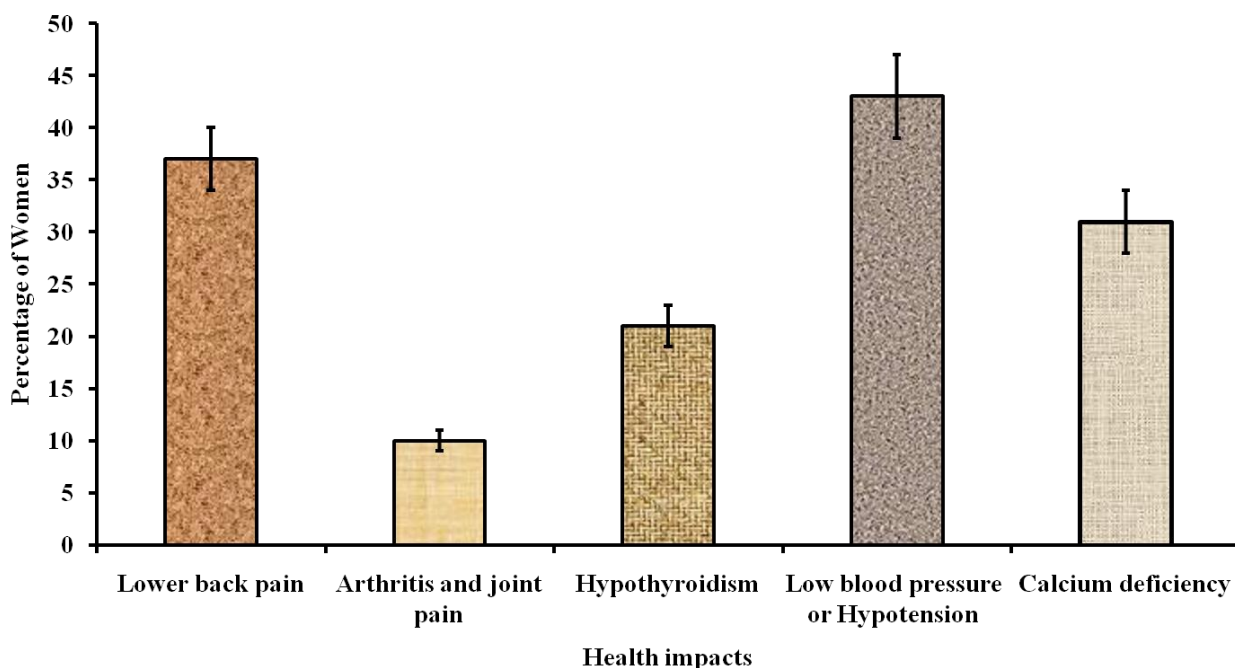
**Statistical analyses**

The data were expressed as mean ± S. E. M. and n = 225 samples of women were surveyed. All the collected data were analyzed using SPSS software (version 20.0, SPSS

Company, Chicago, USA). Also, Microsoft word and Excel have been used to generate graphs.

**3. Results and Observations**

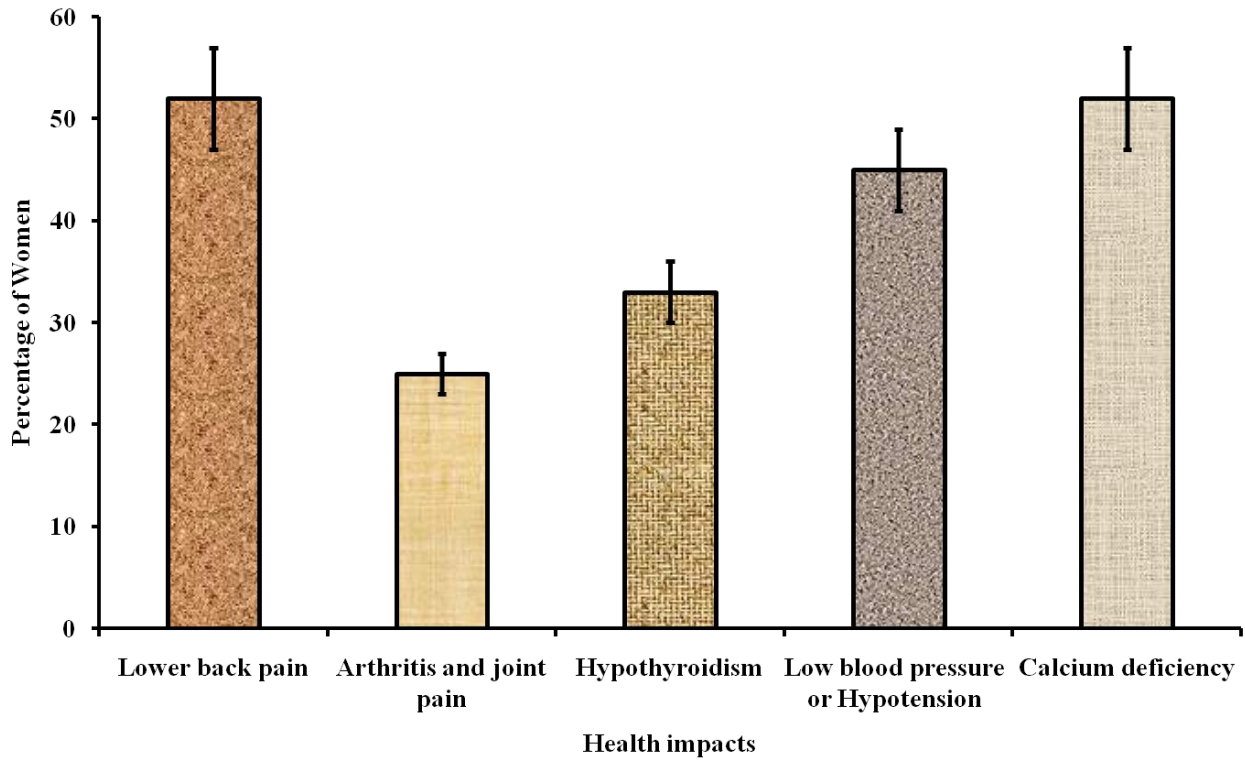
The present study results indicated some significant facts regarding Indian urban women; those are doing various household works in standing posture as a routine activity. All the urban women were using reverse osmosis (RO) filtered drinking water. After the analysis of collected data, that in age group 25-35 years, the average working time period in standing posture was 6.1 hours per day. In this age group, 37% women were found suffering from lower back pain, 10% women were found suffering from arthritis and joint pain, 21% were found with hypothyroidism, and 43% women were found suffering from low blood pressure or hypotension. About calcium deficiency, 31% women were advised for taking calcium supplements by their physician (Fig.1).



**Figure 1:** Graphs showing the percentage of women (age group 25-35 years) affected with the various health disorders under 6.1 hours per day of average standing posture for doing household works (Values represented as mean ± S. E. M., n = 225 samples of Indian urban women).

In women of age group 36-45 years, the average time period in standing posture was 5.2 hours per day. In this age group, 52% women were found suffering from lower back pain, 25% were suffering from arthritis and joint pain, 33%

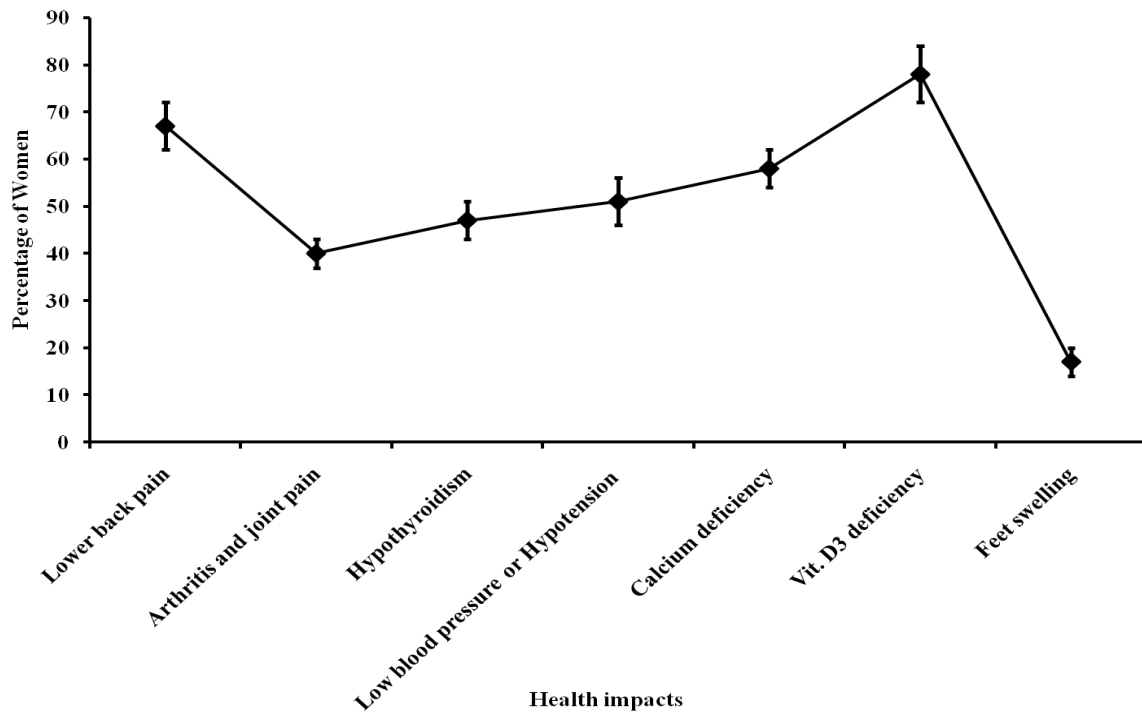
women with hypothyroidism, and 45% with complained of low blood pressure. The calcium deficiency condition noticed in 52% women, as they were taking calcium supplements (Fig.2).



**Figure 2:** Graphs showing the percentage of women (age group 36-45 years) affected with the health disorders under 5.2 hours per day of average standing posture for doing household works (Values represented as mean  $\pm$  S. E. M., n = 225 samples of Indian urban women).

In women of age group 46-55 years, the average standing posture time period was 4.8 hours per day. 67% women were complained of lower back pain, 40% were of arthritis and joint pain, 47% were of hypothyroidism, 51% were of low

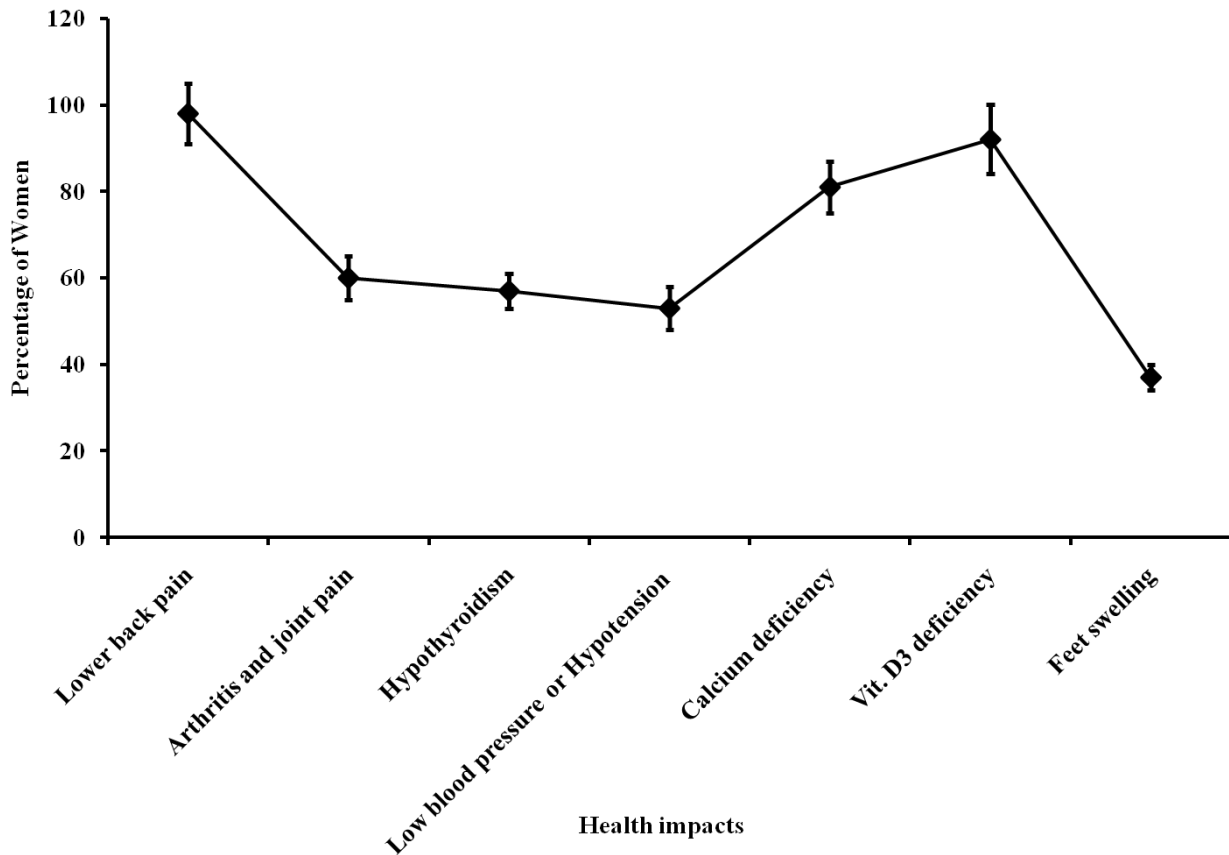
blood pressure and 17% were with feet swelling. Also, 58% women were advised to take the calcium supplements along with 78% women were taken the vitamin D3 on their doctor's advice (Fig.3).



**Figure 3:** Line curve illustrating the percentage of women (age group 46-55 years) having the different health impairments due to 4.8 hours per day of average standing posture for doing household works (Values represented as mean  $\pm$  S. E. M., n = 225 samples of Indian urban women).

In 56-65 years of age group, the average standing posture time was recorded 3.3 hours per day, the complaint of lower back musculo-skeletal pain was observed in 98% women, arthritis and joint pain in 60%, thyroid disorder in 57%, low

blood pressure in 53% and calcium deficiency was observed in 81% surveyed women. Also, 92% women were found with vitamin D3 deficient and 37% with feet swelling problem (Fig.4).



**Figure 4:** Curve showing the percentage of women (age group 56-65 years) affected with the health disorders due to 3.3 hours per day of average standing posture for doing household works (Values represented as mean  $\pm$  S. E. M., n = 225 samples of Indian urban women).

#### 4. Discussion

In this study, the potential health consequences engendered after the prolonged standing posture at work places were documented and the effective measures or interventions are taken for reducing these health risks in Indian urban women. There may be backbone related problems due to regular standing position during various household works. In this context, the long term standing conditions during works primarily increased the risks of lower back pain, cardiovascular and pregnancy related problems. These adverse health outcomes effectively reduced by taking the dynamic movements and designed interventions in daily routine life. In current scenario, the operational definitions of prolonged standing time duration (e. g., hours/day, week and month) scientifically improved and the designed protocols are considered to determine the biochemical/physiological measures. These actions are reliable or valid and correlate best with the subjective reports of effects due to prolonged standing postures. The health outcomes due to regular standing are correlated with the findings of Reid et al., (2010) who have described the improper occupational body postures affected the lower extremity body regions and developed the lower extremity discomforts. Notably, more than two hours per incident

standing affected the hip and more than three hours affected the overall lower extremity. Previously, the prolonged standing strain index (PSSI) was developed in order to evaluate the extent of the health risks during standing jobs and other workplace factors (Halim and Omar, 2012). Several studies have reported the lower back problems and greater body parts discomforts after long period of standing (Drury et al., 2008; Roelofs & Straker, 2002). The risks of lower back problems increased due to excessive co-activation of muscles involved in postural stability during prolonged standing (Nelson-Wong et al., 2008; Marshall et al., 2011). Specifically, Nelson-Wong et al., (2008) have reported the prolonged standing postures significantly increased the co-activity of the gluteus medius (GM) muscles. Also, the acute biomechanical responses examined during a set of functional movements following the prolonged standing tasks (Nelson-Wong & Callaghan, 2010). In present study, the all age groups excessively illustrated the higher degree of lower back pain as compared to other health issues. In this context of lower back pain, many researchers have reported this health problem due to constant standing conditions in day to day life (Andersen et al., 2007; Tissot et al., 2009). The effects of prolonged standing also evaluated as the self-reported orthostatic symptoms, heart rate and blood pressure changes in workers who stand for significant period during their working

duration (i. e., average of 84–95% of the working day) (Ngomo et al., 2008). In workers, a prospective study was conducted for examining the differences in the risks of chronic venous disorders (CVD) (Sudol-Szopinska et al., 2007). In a follow-up study, the similar findings were also reported in different workers with same methodology (Sudol-Szopinska et al., 2011). The outcomes related to the 8 hours of standing were the significant increment in most of the physiological measures and discomfort ratings. On the basis of questionnaire survey of several companies, the elevated risks of varicose veins and nocturnal leg cramps were significantly reported in workers those standing period was greater than 4 hours per day (Bahk et al., 2012). Moreover, a number of studies have shown that the exposure to prolonged standing tasks can increase the physical fatigue and discomforts in several body regions of workers (Drury et al., 2008; Balasubramanian et al., 2009). An updated study described a meta-analysis of work activities and birth outcomes (Palmer et al., 2013). In this study, the old age groups also showed some extent of feet swelling and edema problems relative to other physical discomforts. In this context, Partsch et al., (2004) evaluated the evening edema occurring after prolonged standing. Also, they explained the significant reduction in evening edema with compression stockings. A comparative study between nurses and factory workers who stood for greater than 4h/d was done for three weeks while alternatively wearing or not wearing stockings (Mosely et al., 2006). It is well known that the leg fluid volume is significantly lowered with stockings. After wearing the compression hosiery by nurses, it did not find that the physiological/biomechanical measurements were significantly changed but only discomfort ratings were reduced (Chiu and Wang, 2007). Previously, a study explained the reactive oxygen species (ROS) in workers wearing compression stockings during their jobs requiring prolonged standing (Flore et al., 2007). Remarkably, the compression stockings showed the limited effects on ROS level in nurses compared to the other workers. Earlier, a study included insoles for the prevention of back pain (Sahar et al., 2007). Notably, the wearing of non-heeled shoes reduced the prevalence of varicose veins but not the prevalence of nocturnal leg cramps (Bahk et al., 2012). As compared to different body postures like sitting, standing and sit-stand chair, the later one condition increased the leg volume or edema (Chester et al., 2002). Recently, several studies and review articles have been published that have described the intervention effectiveness of sit-stand work station, but not necessarily with prolonged standing but not also with prolonged sitting. In this context, a randomized control trial (RCT) involving a sit-stand workstation (50% sitting, 25% standing, 25% break-office task) decreased the physical and psychological complaints compared to a control group (75% sitting, 25% break-office task) (Husemann et al., 2009). This RCT study was also conducted to evaluate the sit-stand workstations in ergonomics pre-training (Robertson et al., 2013). Moreover, a systematic study reported an intervention of sit-stand workstation on prolonged sitting, prolonged standing or a combination of both types (Karakolis and Callaghan, 2014).

## 5. Conclusion

In conclusion, there is significant evidence that the prolonged standing at work, primarily at one place engaged in household works, increases the risks of lower back pain, arthritis and joint pain, hypothyroidism, low blood pressure (hypotension), calcium and vitamin D3 deficiency. The study can suggest that the various ways including sufficient nutrition and regular health check-ups can effectively be helpful in reducing risks of health problems after the prolonged standing. On the basis of these observations, it can be suggested that the work places in houses should be designed and modified to do various household works in sitting position.

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## Conflict of Interests

The authors declare that there is no conflict of interests.

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