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Research Article

# Evidence of health risks associated with prolonged standing at work for health care professionals

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## Abstract

Standing for a long time can lead to various physical as well as psychological health related issues, such as stress, anxiety, backaches, leg cramps, fatigue, plantar fasciitis, and varicose veins, to name a few. The most affected individuals in the health care community with this problem are the nurses as well as the related staff that assists the nurses. **Aim**: The research paper is focused on these particular aspects of nursing health since it has a major impact of nurses everywhere. **Methods**: A total of 20 participants were divided into two different age groups. All participants were allowed to do standing work of six hours with 10 minutes rest breaks and 25 minutes lunch break. During the course of their activity, participants did standing work with light manual tasks on the workbench. Other tasks included reading, frequent computer work. For the ease of the participants, any forceful exertion was not done. During the rest period, comfortable rest chair was provided to the participants for improving the accuracy of the results. **Results:** Problems were mainly physical and psychological health issues, as well as poor quality health care that was delivered to the patients. It has been identified that when nurses do a 12-hour shift, the chances of patient error increases with that, and the quality of work gets compromised. By accompanying the techniques of postural stability and subjective evaluation of discomfort of individuals after 40 minutes of standing work, the study showed evidence suggesting long-term neuromuscular fatigue and abnormal physiological effect associated with health care professionals that constantly stand while working.

**Keywords:** Long term standing, Nurse, Back Pain, Varicose veins, Plantar Fasciitis

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## 1. Introduction

When studying health in the workplace, the focus has always been on the negative effects of sitting for a very long period on the job and is considered harmful from the health perspective. However, it has been found that standing for too long is as bad as sitting for an extended period of time. The research has also implied the long term effects of standing will occur if you stand more than 75% of the day. It is important to note that half of the world's working population demands a prolonged standing position for their occupation. There are also long-term as well as short-term health related issues that are connected to prolonged standing, such as backaches, leg cramps, fatigue, plantar. Fasciitis, and varicose veins, to name a few. In short, walking and standing for a long period of time without any rest can be dangerous for the health [1]. Standing for too long is hazardous for all, however, the ones that are most effected in the health care settings are the major health care providers involved with patient care such as nurses. We also cannot deny the assistance of the other hospital workers that have similar work shifts and style of care that may lead to the same type of injury. When compared to the multitude of different professions in the world, the disorder and injuries above occur to the health care providers and hospital workers because the constant and same routines cause (repetitive trauma). The most common disorders/ injuries/ symptoms that present to

these professions are pain and discomfort in back, hips, knees, feet, ankles, and legs. One of the most common causes of lower extremity issues, is the long working hours mainly experienced by hospital workers. For the past few years, a trend has been set that nurses are working a longer hour, which leads to dangerous health conditions for the provider as well as for the patient being treated [2]. Longer shifts and working overtime positively correlated with lower quality of care, substandard patient safety reports and inadequate care ($p<0.05$). Compared with nurses who were working eight hours or fewer, the odds of nurses who worked 12 hours or more on their most recent shift describing the quality of nursing care in their unit as “poor” or “fair” increased by 30% and the odds of them reporting “failing” or “poor” patient safety in their units increased by 41%.Nurses working shifts of 12 hours or more also reported 13% higher rates of care left undone than those working shifts of eight hours or fewer. All shifts longer than eight hours were associated with statistically significant increases in the rate of care left undone ($p<0.05$). Nurses working overtime on their most recent shift were 32% more likely to report poorer quality of care, 67% more likely to report poorer patient safety, and reported a 29% higher rate of care left undone than was reported by those nurses who were working shorter shifts [3].Mechanical low back pain (LBP) is a very common, expensive, and significant health issue in the western world. Functional musculoskeletal conditions are widely thought to cause mechanical low back pain. The role of foot posture and leg length discrepancy in contributing to abnormal biomechanics of the lumbopelvic region and low back pain is not sufficiently investigated. There is a body of evidence to support the notion that foot posture, particularly hyperpronation, is associated with mechanical low back pain. Mechanisms that have been put forward to account for this finding are based on either mechanical postural changes or alterations in muscular activity in the lumbar and pelvic muscles [4].

Letvak et al., (2012) gives significant finding that nurse presenteeism was significantly associated with nursing sensitive quality-of-care indicators. Specifically, presenteeism was associated with an increase in medication errors and patient falls, and with lower self-reported quality of care. In part prompted by efforts to improve patient safety, there has been more research into nursing sensitive quality-of-care indicators. Needleman and colleagues considered a range of factors believed to influence nursing performance and determined that they fall into four broad categories: “nurse training and competencies, physical plant and structure, nursing organization, and work environment and culture [5]. The BMAT (Bedside Mobility Assessment Tool) and unit specific Equipment Options Tool increased the use of mechanical lift equipment among nursing staff, and thus decreased the risk of work-related injuries. Future evaluation will indicate an increased utilization of lift equipment and team assistance, a sustained decrease in reported injuries, number of lost/restricted work days, and hospital costs related to patient handling activities [7]. A study revealed that failure to characterize prolonged static standing and to apply gender-sensitive analysis can confuse assessment of musculoskeletal and circulatory effects of working postures. Further suggesting that prolonged static sitting and standing postures can and should be avoided by changes to workplace organization and environments [8]. Research is needed to define optimal walking speeds and arrive at optimal ratios of sitting, standing, and walking in the workplace. The purpose of this article was to provide information about health risks and interventions for health care professionals that are involved in occupations requiring prolonged standing.

## 2. Methodology and statistical analysis

A total of 20 participants were divided into two different age groups. All participants were allowed to do standing work of six hours with 10 minutes rest breaks and 25 minutes lunch break. During the course of their activity, participants did standing work with light manual tasks on the workbench. Other tasks included reading, frequent computer work. For the ease of the participants, any forceful exertion was not done [6]. During the rest

period, a comfortable rest chair was provided to the participants for improving the accuracy of the results.

| | Hips Area ($r^2_{adj}$ = .42) | | Knees ($r^2_{adj}$ = .66) | | Lower Legs Area ($r^2_{adj}$ = .49) | |
|---|---|---|---|---|---|---|
| Source | F Ratio | p | F Ratio | p | F Ratio | p |
| Time | 15.13 | **<.0001** | 6.66 | **.0003** | 40.71 | **<.0001** |
| Age | 2.40 | .13 | 3.13 | .09 | 7.32 | **.013** |
| Gender | 0.61 | .44 | 0.001 | .97 | 0.39 | .54 |
| Age × Time | 0.21 | .89 | 1.57 | .20 | 8.46 | **<.0001** |
| Gender × Time | 2.78 | **.04** | 1.29 | .28 | 0.63 | .60 |
| Age × Gender × Time | 0.71 | .54 | 0.90 | .44 | 1.27 | .28 |

Table 1: Subjective discomfort ratings

Table 1: An increase of center of pressure (COP) displacement as indicated by the showing fatigue persistence after 6 hours of standing work [9]. Furthermore, it was found that there was a significant increase in lower limb fatigue soon after standing work, and fatigue was only developed when standing time increased beyond 2 hours.

## 3. Results

The results suggest that long-term effects of fatigue only develop after five to six hours of standing work. Even after twenty-five minutes of rest, the fatigue persists. However, subjective evaluation of discomfort is a reasonable technique but it is suggested to use specific objective tests for determination of long-term muscle fatigue, preferably muscle twitch force test or MTF. Along with the physical health issues, the research has proposed that standing for a long period, is also responsible for the stress and anxiety among the nurses. Standing for a long period of time exhausts a person and physical exhaustion leads to anxiety and stress. It has also been observed that the quality of the healthcare being delivered to the patients can get compromised because of the physical exhaustion. Healthcare providers, especially nurses, usually fail to deliver the best quality health care to the patients when they are tired. Nurses are practically trained to deal with such situations, but because of standing for too long, they have to face various health related issues, which ultimately lead towards the stress and poor performance [1].There are many injuries that can be related to prolonged standing; however, due the constraints of this paper, I have only addressed the most common affected physical injuries/issues plaguing nurses and the related healthcare community.

### Back pain

The practice of consistent standing can result in many common ailments; however, the most prominent is back pain. It can lead to further disabilities if not taken care of. When we stand for a long time, our whole body weight is pressing onto the spinal column/joints and related muscles. The continued pressure will eventually cause an abnormal function of the spinal and related structures causing a malfunction. That is when we come across the pain in the person back. It is most commonly found in obese people owing to their heavy weight structure as well as people with poor posture. Some of the vertebrae displace slightly and hence result in the severe form of pain. The patient who suffers from condition finds it hard to stand straight or stand at all. The individual loses flexibility gradually, and the motion becomes slow and guarded [10].

### Varicose veins

Because of consistent standing posture, a person may develop varicose veins. They are twisted knots visible in the veins of the extremities, the veins enlarge somehow and look like knots. When we stand right up for a long time, the blood pressure in our lower areas rises to an abnormal level resulting in such problems. Varicose veins can be a reason for severe discomfort and pain. In worse cases, the disease leads to further complication in the circulatory system. They usually appear purplish and bulged out of the smooth skin. The veins might ache in severe cases and occasionally might ache in severe cases. Also, occasionally the person might experience swelling in the lower legs, experience muscle cramping, some throbbing and burning sensation. It makes it difficult for the individual to sit or stand for an extended period and or fulfill the work assignment

appropriately. Moreover, in severe cases, the person might exhibit the indication of ulcers near the toe area; this is when things become more serious for the individual [12].

**Plantar fasciitis**

Plantar Fasciitis is a disease that damages the tissues of the plantar surface of an individual who constantly stands or excessively uses their legs. This disease has also been called police officer's heel or joggers' heel because of the constant and prolonged upright activity with minimal rest. Plantar fasciitis name comes from the plantar fascia tissue of the foot that connects the toes to the heel bones. That tissue inflames, which is where the itis comes from. The weariness or tiredness caused by continuous standing causes the inflammation and pain in the heels, which in turn damages these tissues. These tissues play a supporting role for the feet, therefore, they are in constant use. Extra strain/sprain on this tissue results in ultimate weakness, which leads to swelling of the area around it. The swelling will be followed by inflammation, abnormal sensation, and irritation. In that situation, the person finds it very difficult to walk or stand easily and comfortably which in turn will slow their daily activities. These injuries can be seen in older and younger individuals. Older individuals, such as police officers, soldiers, and athletes are the most to be affected. The individuals are more easily affected because their musculoskeletal system is not as strong and are therefore more susceptible to injury. The policemen, soldiers, and athletes are affected because of the constant bombardment to that particular body part with minimal rest. Since the health care providers are taking on longer hours in their shift with minimal rest, they have the perfect recipe to experience these types of painful injuries. Therefore, I believe since nurses and other health care providers are going into this type of prolonged work schedule, we will probably have to add a new nickname to this injury, maybe called Nurses's heel or Providers heel.

The symptoms of plantar fasciitis are very painful and that they can occur in one or both of the feet. Individuals that have reported having this issue mentioned that at times they were unable to put any pressure on their foot due to the severe pain that it caused. The individual that experiences this complaint must be careful to make things worse. They must seek care quickly because of the area of injury and the constant use that is required of that body part. Also, individuals that wear heels and or who are overweight need to be more mindful since they are more susceptible to this type of issue due to the prolonged stress on that body part [12].

## 4. Discussion

With the increasing cases of physical disabilities due to standing at the workplaces for a longer period, the need to tackle the problem has also increased. The research, conducted above, suggests that due to standing for a long time, the health professionals, especially nurses are getting affected to a large extent. The job of the nurses demands them to be standing most of the time, which is leading towards more health related issues, such as discomfort and fatigue in legs and feet, backaches, leg cramps, fatigue, plantar fasciitis, and varicose veins. The research also proposes that standing for a longer period is not only causing the physical disturbances but is also responsible for the psychological issues among the nurses. The studies evaluating low back pain in nurses showed that low back pain rates were higher [13, 14, &15-19] then the necessary protective measures. Nurses, who play an important role in protecting, maintaining and improving individuals' health, should attach importance to applying protective and improving actions for their own health, so that they can provide nursing care quality, be productive, and administer patient care without interruption [20]. Moreover, the researchers are focusing on the solution to the problem as it is increasing day by day among the health professionals, especially in nurses and other hospital workers. The studies have suggested that there are a lot of things in addition to remedies, which can be used in order to control the physical as well as psychological issues related to health [9]. Nurses are the backbone of any health organization and without them; no organization can work efficiently [7]. In order

to increase the efficiency of any health organization, it is very important that the health workers and health professionals of that health organization are in proper health so that they can deliver better health care to the patients.

## Recommendations

The above-discussed problem can be solved using different solutions. Following are the recommendations that may possibly be helpful in minimizing, preventing and treating the effects of prolonged standing.

- The organizational structure can be changed which will strictly prohibit the 12-hour shift and will hire more hospital staff so that everyone can contribute and eliminate a 12-hour shift.
- Compression hosiery can also be very effective in this regard as it boosts the venous return.
- Specific exercises that must be done regularly while one is on their feet for a while to help boost venous return.
- Comfortable footwear, which is also properly fitted, can also help reduce the discomfort and fatigue.
- Taking frequent breaks can also make a difference as it will keep the nurses and the hospital staff fresh and they will be able to perform their duties more effectively.

## Conclusion

Signs of fatigue begin to appear after the first two hours of work and then start to increase. Changes in stability of posture indicated the level of fatigue among participants. It is important to realize the fact that the findings are only limited to work cycle tested which shows consistent evidence of fatigue after standing work and increases chances of neuromuscular problems. It can be concluded that prolonged standing can cause multiple physical as well as psychological disorders, which can lead to the inefficiency of health care delivery. Moreover, the 12-hour shifts of the nurses are too long to provide quality work and due to the exhaustion of the prolonged shift, it becomes almost impossible for the nurses to deliver the best health care. The job of the nurses demands them to be standing most of the time, which can cause a great deal of health related issues, great deal of health related issues, such as discomfort and fatigue in legs and feet, backaches, leg cramps, fatigue, plantar fasciitis, and varicose veins. Nurses are trained to deal with such situations, but because of standing for too long, they have to face various health related issues, which ultimately lead towards the stress and poor performance.

## References

[1] Swayden, K. J, Anderson, K. K, Connelly, L. M, Moran, J. S, McMahon, J. K, and Arnold, P. M. (2012). Effect of sitting vs. standing on perception of provider time at bedside: A pilot study. *Patient education and counseling*, 86(2), 166-171.

[2] O'Brien, M. E. (2013). *Spirituality in Nursing: Standing on holy ground*. Jones & Bartlett Publishers.

[3] Ball, J., *Dall'Ora, C., & Griffiths, P. (2015). The 12-hour shift: Friend or foe? Retrieved* Nursing Times*; 111: 6, 12-14.*

[4] Kendall, J. C., Bird, A. R., & Azeri, M. F. (2014). Foot posture, leg length discrepancy and low back pain–Their relationship and clinical management using foot orthoses–An overview. *The Foot*, *24*(2), 75-80.

[5] Letvak, S., Ruhm, C., & Gupta, S. (2012). Nurses' Presenteeism and Its Effects on Self-Reported Quality of Care and Costs. *American Journal of Nursing, 112*(2), 30-38.

[6] Parahoo, K. (2014). *Nursing research: principles, process, and issues*. Palgrave Macmillan.Scanlon, M. N. (2014). Safe Patient Handling & No Lift Policy: Reducing The Incidence Of Work-Related Injuries Among Nursing Staff. *Master's Projects*, 78.

[7] Messing, K, Stock, S, Côté, J & Tissot, F (2015). William P. Yant Award Lecture Is Sitting Worse Than Static Standing? How a Gender Analysis Can Move Us Toward Understanding Determinants and Effects of Occupational Standing and

Walking. *Journal of Occupational and Environmental Hygiene*, *12*(3), D11-D17.

[8] Garcia, M. G., Läubli, T., & Martin, B. J. (2015). Long-Term Muscle Fatigue After Standing Work. *Human Factors: The Journal of the Human Factors and Ergonomics Society*, 0018720815590293.

[9] Knibbe J.J, & Friele R.D. (1996). Prevalence of back pain and characteristics of the physical workload of community nurses. *Ergonomics.*; 39(2):186-98.

[10] Lars, H. R Lar, B, Lawaetz, M, Blemings, A, Lawaetz, B, & Eklof, B (2007*). Journal of vascular surgery*; 46,2, :308–315

[11] Eriksen, W, and Bruusgaard, D. (2002). Physical Leisure-Time Activities and Long-Term Sick Leave: A 15-Month Prospective Study of Nurses' Aides. *Journal of Occupational & Environmental Medicine*; 44 , 6 :530-538

[12] Yip, V.Y. (2004). New low back pain in nurses: work activities, work stress and sedentary lifestyle. *J Adv Nurs*. ; 46(4):430- 440. doi: 10.1111/j.1365-2648.2004.03009.x

[13] Feng, C.K, Chen, M.L, & Mao, I.F. (2007). Prevalence of and risk factors for different measures of low back pain among female nursing aides in Taiwanese nursing homes. *BMC Musculoskelet Disord*.; 25(8):52. doi:10.1186/1471-2474-8-52.

[14] Cheung, K. (2010). The incidence of low back problems among nursing students in Hong *Kong. J Clin Nurs*. ; 19(15- 16):2355-2362. doi: 10.1111/j.1365-2702.2009.03091.x

[15] Warming, S, Precht, D.H, Suadicani, P, & Ebbehoj, N.E. (2009). Musculoskeletal complaints among nurses related to patient handling tasks and psychosocial factors--based on logbook registrations. Appl Ergon.; 40(4):569-576. Doi: 10.1016/j. apergo.2008.04.021.

[16] Mitchell, T, O'Sullivan, P.B, Burnett, A.F, Straker, L, & Rudd, C. (2008). Low back pain characteristics from undergraduate student to working nurse in Australia: a cross-sectional survey. Int J Nurs Stud. 2008;45(11):1636-1644. Doi: 10.1016/j. ijnurstu.2008.03.001.

[17] Trinkoff, A.M, Le R, Geiger-Brown, J, & Lipscomb, J, (2006). Lang, G. Longitudinal relationship of work hours, mandatory overtime, and on-call tomusculoskeletal problems in nurses. *Am J Ind Med*.; 49(11):964-971. doi: 10.1002/ajim.20330

[18] Alexopoulos, E.C, Burdorf, A, & Kalokerinou, A.A. (2006).comparative analysis on musculoskeletal disorders between Greek and Dutch nursing personnel. *Int Arch Occup Environ Health*; 79(1):82-88. doi: 10.1007/s00420-005-0033

[19] Yılmaz, E, and Ozkan S. (2008). Determination of the Prevalence of Low Back Pain among Nurses Working in Hospitals. *Turk J Phys Med Rehab*, 54:8-12