

## Original Research

# COMPLAINTS OF MUSCULOSKELETAL DISORDERS ON SALES PROMOTION GIRL AT COSMETIC STORES IN SURABAYA, INDONESIA

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### ABSTRACT

*One of the occupations that have a risk of Musculoskeletal Disorders (MSDs) is sales promotion girl (SPG), especially the SPG at a cosmetic store, because their job position is mostly done by standing and wearing high heels. This study aimed to analyze the correlation between duration of standing position and shoe characteristics to complaints of MSDs on sales promotion girl at cosmetic stores in Surabaya. This study was quantitative research with observational analytic research, where the data collection was carried out by cross-sectional. This research was conducted at 21 cosmetic stores from three shopping centers in Central Surabaya. The population in this study was 64 SPG. The sample was taken using simple random sampling with exclusion criteria, so that 47 people were obtained. The independent variables consisted of duration of standing position and shoe characteristics included shoe type and the height of heels. The dependent variable was complaint of MSDs. The data analysis was carried out using the Spearman correlation test. The result showed that there was a correlation between the duration of standing position and complaints of MSDs (Pvalue=0.011; r=0.369; positive direction), no correlation between shoe type and complaints of MSDs (Pvalue=0.735; r=0.051; positive direction), and no correlation between the height of heels and complaints of MSDs (Pvalue=0.256; r=0.169; positive direction). It was concluded that there was a correlation between the duration of standing position and complaints of MSDs, and there was no correlation between shoe type and the height of heels with complaints of MSDs.*

**Keywords:** Health risk; musculoskeletal disorders; sales promotion girl

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### Hi j n i j t u r

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### INTRODUCTION

Occupational health is one of the efforts to keep the workforce physically, mentally, and socially healthy while working, whereas occupational diseases is a health problem that is physically and psychologically caused by work activity or condition that is related to the occupation (Winoto 2018). One of the factors that causes occupational disease is the ergonomic factor. The ergonomic factor is related to posture or inappropriate body movement while working (Suma'mur 2020). The proper application of ergonomics will increase the effectivity and reliability of the work system, reduce health care cost of workers, increase the workers benefit, increase the quality of work processes,

products, and productivity (Tarwaka 2014). If ergonomic is not applied appropriately, it will lead to work-related musculoskeletal disorders or MSDs.

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to Basic Health Research in 2013, the prevalence magnitude of joint disease experienced by Indonesian based on diagnosis or symptoms is 24.7%, and 70% of these cases are experienced by workers. The MSDs that are experienced by workers have some impacts on the workers themselves and their works as well as producing impacts, such as the limitation of workers' daily activities and the workers' absence (de Kok et al. 2019). Referring to Labor Force Survey from HSE (Health and Safety Executive) in 2018-2019, there are 1,4 million workers in England that get occupational diseases and in the amount of 37%; or it is about 498,000 workers get MSDs. Musculoskeletal disorders have resulted in a reduction of 6,9 million working days.

Three factors can cause MSDs, namely individual factors, biomechanical factors, and psychosocial factors. The individual factor is a factor that comes up from the workers, such as genders, ages, smoking habits, exercise habits, body mass index, and working period. The biomechanical factor is also the factor that comes from the workers including body posture while working, duration, frequency, load, and also exposure to vibrations. Meanwhile, the psychosocial factor is the interaction that occurs among the workers, work environment, work condition, culture, capacity, and fulfillment of works, as well as personal considerations about works that affect performance, satisfaction, and occupational health (Mayasari & Saftarina 2016).

One of the occupations that have a risk of MSDs is sales promotion girl (SPG) at a cosmetic store. According to Tarwaka (2014), complaints of MSDs can occur when the muscles get load statically and repeatedly for a long time. Working with standing position for a long time can cause health problem. SPG's job description requires to work by standing and moving longer causes the muscles to get load statically. SPG is an occupation that relates to product promotions and marketing. This occupation is mostly occupied by women that physically good-looking in attracting the customer (Agow 2017). SPG needs to have persuasive speaking, recognize the product being promoted, and have an attractive appearance (Dewi & Duana 2013).

One of the supporting factors for an attractive appearance at SPG at cosmetic store is the use of high heels. For SPG, the use of high heels while working is the risk factor of MSDs. High heel is a type of footwear that forces the proximal part to be higher than the forefoot or distal during standing (Sysbania et al. 2018). According to Mika et al. (2012), muscle activity will increase and may exacerbate muscle fatigue when wearing high heels, and permanent wearing of high heels could excessive muscle use and repetitive strain injuries. The height of heels that are safe for health is about 3 to 4 cm (Purba et al 2015).

Based on Dewi and Duana (2013), 97% from 92 SPG mall in Denpasar that wear high heels while working get complaints of MSDs and the higher complaint occurs on the lower extremities, especially on the right and left feet, right and left calves. This complaint increases along with the increase of age, the height of the heels, and the duration of wearing high heels. However, Destiana et al. (2015), showed that a shopkeeper at X Department Store in Semarang wears  $\geq 5$  cm high heels and medium narrow heels and has a higher risk of getting pain in the lower back. Besides, a work position that is at risk of causing MSDs to SPG is the standing while working and the length of standing position is carried out.

One of the SPG fields that are at risk of MSDs is cosmetics SPG. Based on Sakale and Bhalekar (2019) on the SPG department store in India stated that cosmetics SPG has a low risk of MSDs on, the knee, moderate risk on the arms, and high risk on the back and neck. While, according to Sinta et al. (2014) in Manado, their research gained 97% from 30 people cosmetics SPG gets MSDs complaints on the mild to severity level.

Based on the previous research that was done on SPG cosmetic store in Surabaya, it was revealed that 5 of 8 people said that they ever had complaint of MSDs, while working and most of their job was done by standing up. These 8 SPGs wore a various type of shoes namely flat shoes, high heels until it had a pointed right with a heel height of between 3 cm to 7 cm. Based on that background explained, the purpose of this research was to analyze the correlation between the duration of standing work position and shoe characteristics with complaints of musculoskeletal disorders on sales promotion girl at cosmetic stores in Surabaya, Indonesia.

## MATERIALS AND METHODS

This study was a quantitative research with analytic observational research, where the data were collected by cross-sectional method. This study was conducted on SPG at twenty-one cosmetics stores from three shopping centers in Central Surabaya from November 2020–March 2021. The cosmetic stores were specific to boutique stores, where they sold only one brand of cosmetic products. The population in this research was 64 SPG. The research sample was 55 SPG and taken by simple random sampling. The exclusion criteria in this study were pregnant women and/or people with a history of musculoskeletal disorders. Where there were : reor le from the sample who were not further included in this study. because the yere in the exclusion criteria. so that the sample of this study { y au 69 reor le0

The independent variables were the duration of standing work position and shoe characteristics. Shoe characteristics included shoe type and the height of heels. Meanwhile, the dependent variable was the complaints of musculoskeletal disorders felt by the workers. The data were divided into primary and secondary data. The primary data included the data about duration of standing work position, shoe characteristics of respondents, and complaints of MSDs obtained through an online questionnaire by Google Form and observation. The secondary data were obtained from journal articles and books (included e-book) that were relevant to the object being studied.

Complaints of MSDs variables assessed using the Nordic Body Map (NBM) questionnaire as a method to measure the level of the severity of any disorders or injuries that occurred in the musculoskeletal system (Tarwaka 2014). The respondent measured subjectively their level of severity on their 28 body parts by rating 1 to 4, 1 meant no pain, 2 meant less painful, 3 meant painful, and 4 meant severe pain. The score of each body part was summed up into an NBM score ranging from 28 to 112. The NBM score was categorized into 4 (four) categories, namely 28-49 (low), 50-70 (moderate), 71-91 (high), and 92-112 (very high).

The data obtained were then inputted and processed using SPSS version 25. The data were analyzed by univariate and bivariate analysis. The univariate analysis described the data result through a table and graphic. Meanwhile, bivariate analysis was used to see the correlation among variables using Spearman Correlation Test.

The data obtained were then inputted and processed using SPSS version 25. The data were analyzed by univariate and bivariate analysis. The univariate analysis described the data result through a table and graphic. Meanwhile, bivariate analysis was used to see the correlation among variables using Spearman Correlation Test. This study had received an approval from the Ethics Commission of the Faculty of Dentistry, Universitas Airlangga, Surabaya under a decree No. Ethics 046/HRECC.FODM/II/2021.

## RESULTS

The activities that were done by the respondents during working were standing up to welcome and serve customers, arrange stock items on shelves with various shapes and heights, and record sales. The respondent's working hours were 48 hours per week. The respondents' ages ranged from 18 years to 41 years old.

position category was 5-7 hours in one shift, 16 respondents (34.0%) in 3-4 hour category, 8 respondents (17%) in 8 - 9 hours, 2 respondents (4.3%) in  $\leq 2$  hours' category, and 1 respondent (2.1%) in  $> 9$ -hour category. Based on shoe type that was worn while working, there were 21 respondents wearing flat shoes (44.7%), 16 respondents with pointy high heel shoes (34.0%), and 10 respondents with high heel wedges shoes (21.3%). Based on the height of heels, it showed that the most of respondents wore high heels  $< 5$  cm with a total of 26 people (55.3%), and those who wore high heels  $\geq 5$  cm were 21 people (44.7%).

Table 1. Respondent characteristics based on standing duration and shoe characteristics

Variables	n	%
Standing duration		
$\leq 2$ hours	2	4.3
3 - 4 hours	16	34.0
5 - 7 hours	20	42.6
8 - 9 hours	8	17.0
$> 9$ hours	1	2.1
Total	47	100
Shoe types		
Flat shoes	21	44.7
High heels wedges shoes	10	21.3
Pointy high heels shoes	16	34.0
Total	47	100
The height of heels		
$< 5$ cm	26	55.3
$\geq 5$ cm	21	44.7
Total	47	100

Table 2. The score of Nordic body map

NBM Score Category	n	%
Low	41	87.2
Moderate	6	12.8
Total	47	100

Based on Table 2, it showed that complaints of MSDs felt by the respondents through the NBM score were in the low to moderate category. The majority of respondents were in the low category with a total of 41 people (87.2%), and respondents who were in the moderate category were 6 people (12.8%). Furthermore, complaints of MSDs felt by respondents based on each body part in the NBM questionnaire, obtained five higher scores on the waist with a score of 93, left calf with a score of 90, back with a score of 86, right calf with a score of 83, and left knee with a score of 72. This result indicated that the most severe complaints felt by respondents were on the waist, back, left and right calf, and left foot.

The Spearman’s test result on the duration of standing position and complaints of MSDs obtained a p-value of 0.011, the p-value  $\alpha(0.05)$  indicated that two variables had a significant correlation with a correlation level of 0.369. This showed that the correlation was weak, and the direction of the correlation was positive. It showed that the longer the duration of standing work position, the higher was the NBM score. It also meant that the more severe the MSDs complaints were felt (Table 3).

The Spearman’s test result between shoe type and complaints of MSDs obtained p-value of 0.735. The p-value  $\alpha(0.05)$  indicated that there was no correlation between shoe type and complaints of MSDs. The coefficient correlation was 0.051, which showed that the

correlation between two variables were very weak and the direction was positive. It showed that the higher of respondents' shoe type category, the higher was the NBM score. It meant that the complaints of MSDs were worse.

Then, the Spearman’s test result on variable of the height of heels and complaints of MSDs obtained p-value of 0.256. The p-value  $\alpha(0.05)$  indicated that there was no correlation between the height of heels and complaints of MSDs. The coefficient correlation was 0.169, which showed that the correlation between two variables were very weak and positive. It showed that the higher the category of respondents' shoe heels, the higher was the NBM score and the more severe the complaints of MSDs were felt.

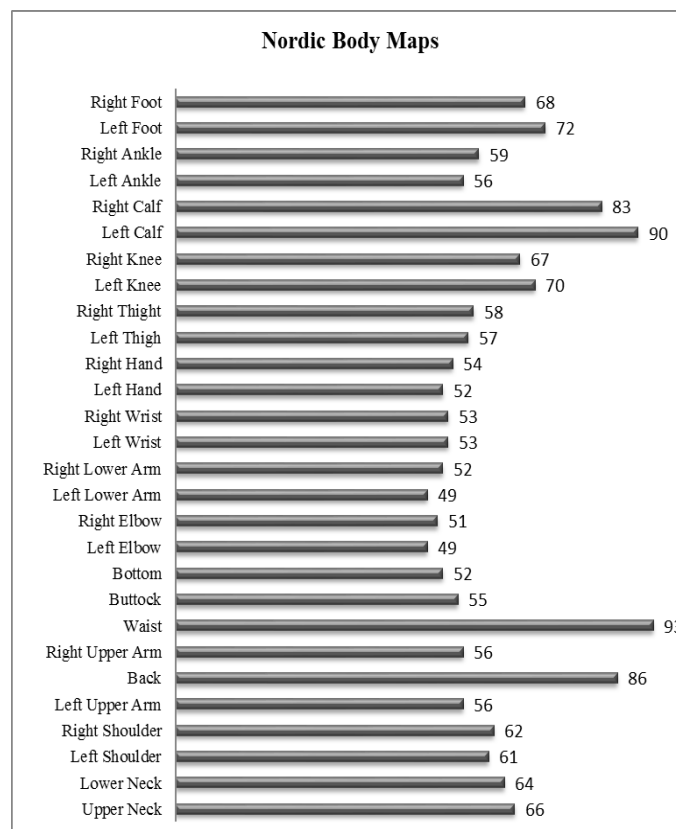


Figure 1. Complaint distribution graph according to body parts

Table 3. Spearman correlation test results

Variable			
Standing duration	Correlation Coefficient	1.000	.369*
	Sig. (2-tailed)		.011
Shoe type	Correlation Coefficient	1.000	.051
	Sig. (2-tailed)		.735
The height of heels	Correlation Coefficient	1.000	.169
	Sig. (2-tailed)		.256

## DISCUSSION

The duration of standing work position with complaints of MSDs has a significant correlation and the strength of correlation is weak and positive. The higher standing work position category is experienced by respondents, the higher is the level of complaints of MSDs severity. The longer the duration of standing work position, the more severe complaints of MSDs are felt. Some activities that are done by standing are such waiting and serving the customers, checking and arranging products on the shelves.

Most of respondents felt that most of their working time was done by standing position. This was also in line with a study by Lestari (2012) that mostly 87.5% of SPG working time was spent on standing and actively moving. The assessment was done by using one instrument to assess body posture, namely REBA (Rapid Entire Body Assessment) when SPG tidied the product in a standing position, which resulted in a high level of ergonomic risk or high-risk category.

The result was also in line with a study by Arih et al. (2013) that varicose veins or abnormal blood vessels often attacked in people who stood too long, especially when wearing high heels. People with varicose veins usually felt pain and cramps in the legs. Meanwhile, Ramadan and Laksmono (2012) stated that standing up was more tiring than sitting, because the energy expended was 10-15% more than sitting. Standing is a good alert attitude both physically and mentally, so that work activities are carried out stronger, faster, and more thoroughly.

According to a study by Nadrah et al. (2018), there was also poor standing position and good standing position found in their study. The MSDs symptoms among sales woman were different among sales woman with poor and good standing position. Sales woman with poor standing position had higher MSDs symptoms than those with good standing position. Good or natural standing position is the straight position of back and head with opened feet. Poor standing position is leaning against a display window or a wall repeatedly and standing with one leg.

According to a study by Anggrianti et al. (2017), there was relationship of standing work posture with complaints of leg pain among mechanical workers in the welding section. There were changes in the body system when standing for a long time. There were three effects when a person stood for a long time without stretching or resting. These impacts were infusion of back flow of blood to the legs, pressure on the joints, and fatigue in the muscles. According to Tarwaka (2014), working

with standing position for a long time was hard and resulted in low back pain, tension in the calves and legs, fatigue in the musculoskeletal system, and other health problems.

The shoe type with complaints of MSDs has no correlation. The degree of correlation strength is very weak and the direction is positive. The higher the respondent's shoe type category, the more severe of complaints of MSDs are felt. Shoes that have pointy, narrow, and wedges heels are riskier than flat shoes or shoes that do not have heels. The smaller width of the heels worn by the respondents, the higher of musculoskeletal complaints they felt. This result correlated to a study by Yohana and Winata (2017), that there was no correlation between shoe type and musculoskeletal complaint on the lower back (low back pain), the strength correlation between shoe type and low back pain are very weakly. This finding correlated with a study by Amaliyah et al. (2020), that smaller the surface area of the bottom of respondent's shoes, the greater complaints of musculoskeletal foot and ankle experienced.

According to Destiana et al. (2015), salespeople who wore shoes with narrow and pointy heels and medium heels have 8 times greater risk of experiencing complaints than those who wore flat-heeled types. A study conducted by Mustafa et al. (2020) had showed that even medium heels shoe type was more comfortable than narrow heels shoe type, however, both type of shoes could cause pain in the leg and heels. It was different when wearing flat shoes, where the pressure was given and rested on a larger surface, so that the pressure became smaller. When the type of heel shrunk and the area of the footing decreased, it could cause an imbalance of the ankle due to changes in the tibiotarsal angle. This change resulted in elevation and forward displacement of the gravity center resulting in a postural imbalance.

The height of heels with complaints of MSDs had no correlation. The degree of correlation strength was very weak and the direction was positive. The higher the category of respondents' shoe heels, the higher was the severity of the complaints of MSDs they felt. The higher the heel of the shoe, the more severe complaints of MSDs were felt. The result was in line with a study by Yohana and Winata (2017), that there was no correlation between the height of shoes and musculoskeletal complaint on the lower back or low back pain, while the correlation between two variables were weak.

According to Dewi and Duana (2013), musculoskeletal complaints increased along with the height of the heels.

The SPG that did not experience musculoskeletal complaints was SPG who wore shoes with a heel height of 1 cm - 5 cm, while the high-level musculoskeletal complaints were mostly experienced by SPG who wore shoes with heels >5 cm. According to Purba et al. (2015), the SPG with a higher heel 7 cm height had more musculoskeletal complaints in the lower extremity muscles compared to SPG who wore shoes with shorter heels, namely 5 cm and 6 cm.

The normal human body load when standing and walking was distributed by 90% on the heel and 10% on the front foot. However, when using high heels, the distribution pattern changed to 50% on the front foot and 50% on the heel (Rao et al. 2012). Due to this distribution, the body made any adjustment. The normal adjustments were to firstly raise the head, bend the back causing curvature of the spine, and bend the knees. Secondly, pulled the upper part of the body which caused a large flexion angle of the knee joint and bend of the spine. Thirdly, an excessive extension of the knee and pulled the body back caused the spinal curve to increase (Dewi & Duana 2013).

The use of high heels causes complaints of MSDs mainly on the legs, waist, and back. In this study, it resulted in the five highest scores for the severity of respondents that were on the waist, back, left and right calf, and left foot. This result was in line with a study by Lestari (2012) that the parts of body that experienced the most symptoms of CTDs or Cumulative Trauma Disorders on SPG were the right and left calves, buttocks, waist, back, right upper arms, left and right knees, and left and right ankles. In addition, Dewi and Duana (2013) also stated that most of musculoskeletal complaints in SPG occurred in the lower limb muscles, especially the legs and calves, and the trunk muscle, especially the back and waist. Shoes can support women's activities and benefit for their health and fashion. Good shoes are shoes that fulfill those two functions. In terms of fashion, shoes can support appearance, while in terms of health, shoes can maintain cleanliness, protect the feet, and help the feet to support the body. The use of high heels does fulfilling a function in terms of fashion, but has a high enough risk to health. The use of high heels causes negative impact for health, such as varicose veins, hallux vagus, and plantar fasciitis (Wulan & Rahayu 2016).

Based on the observation, the choice of shoes worn by the respondents was also related to the regulations for each cosmetic brand in each outlet. These regulations included the mandatory use of flat shoes, such as loafers or sneakers, so that some of them wore shoes with at least 5 cm heels. However, it was also found that respondents chose to wear shoes with higher heels than

required by the company due to their preference for high heels. Besides, some companies did not apply special regulations regarding the type and height of heels; they just recommended to wear shoes according to the working conditions, but workers prefer to wear shoes with high heels.

#### **Strength and limitaitaion**

The limitation of the study was the small population size. Further studies were recommended to conduct similar research with larger population size. It was also recommended to conduct similar research by considering and assessing other possible factors, such as psychosocial factors and individual factors including ages, exercise habit, work period and body mass index. Besides, there was a necessary to use other empirical viewpoints that could assess the severity of complaints of MSDs by focusing on the waist, back, and leg areas.

#### **CONCLUSION**

Complaints of MSDs that were felt by the respondents ranged from low to moderate category. The mostly felt complaints were on the waist, back, left and right calf, and left foot. The variable standing work duration had a significant correlation with complaints of MSDs, while the direction of correlation was positive. Type of shoes and the height of heels variable had no significant correlation with complaints of MSDs.

Sales promotion girls were suggested to sit down when there was no task that required to take a standing position. They were also suggested to standing with a good posture and not resting on one leg, bring and wear flat footwear, such as sandals or flat shoes when heading to work, resting, and returning from work to reduce exposure time to high heels. It was also suggested to stretch or warm-up before and after work to reduce the risk of pain in the musculoskeletal system.

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#### **Conflict of interest**

None.

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None.

### Author contribution

SDM wrote the manuscript. SDM and NW contributed to conceptualization, collected and analysis data. NW was final authorization of the completed worm

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