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Development of a high-powered Motorcycle Seat Discomfort Survey (MSDS): Traffic police motorcycle

Nur Athirah Diyana Mohammad Yusof[a,c], Karmegam Karuppiah[c,*], Putri Anis Syahira Mohamad Jamil[b], Mohd Shamsuri Khalid[a], Shamsul Bahri Mohd Tamrin[c], Hassan Sadeghi Naeini[d]

[a] Engineering and Technology Department, Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia Kuala Lumpur, Jalan Sultan, Yahya Petra, 54100, Kuala Lumpur, Malaysia
[b] Department of Environmental Engineering, Faculty of Engineering and Green Technology, Universiti Tunku Abdul Rahman, Jalan Universiti, Bandar Barat, 31900, Kampar, Perak, Malaysia
[c] Department of Environmental and Occupational Health, Faculty of Medicine and Health Sciences, Universiti Putra Malaysia, 43400, UPM Serdang, Selangor, Malaysia
[d] Industrial Design Department, School of Architecture & Environmental Design, Iran University of Science & Technology, Tehran, Iran

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ABSTRACT

High-powered motorcycles are commonly used as traffic police motorcycles worldwide. However, the seating discomfort for this type of motorcycles is less studied. Furthermore, there is no specific standardised questionnaire to evaluate the seating discomfort for high-powered motorcycles. Thus, the purpose of this study is to develop a high-powered motorcycles seating discomfort survey (MSDS) and evaluate its validity as well as reliability. Inputs from literature and key informants helped in establishing the appropriate terms used for each questionnaire item. Traffic police riders with no musculoskeletal disorders history and good physical condition participated in this study. Each participant was asked to rate their seat discomfort after a 20-min ride. The results indicate that this survey is reliable with a significant reliability coefficient of ($r = 0.84$, $p < 0.01$) and an internal consistency of ($\alpha > 0.75$). As a result, this study successfully evaluated and identified the level of discomfort of a high-powered motorcycle seat among users using this MSDS which is statistically proven in its validity and reliability. Therefore, it can be used as an ergonomic measuring tool to improve the discomfort of high-powered motorcycle seat.

1. Introduction

A motorcycle seat represents the work environment for traffic police riders which must be located optimally to meet various safety and ergonomics requirements, the task of riding, and be acceptable to the rider's needs in seat comfort. However, the seat is always the last and most challenging criteria to measure and achieve customer satisfaction (Lantoine et al., 2021). According to Lantoine et al. (2022), the evaluation of seat functionality can be conducted through a technology solution but, the seat discomfort evaluation still relies on human perception and feedback. This is because human perception changes with condition and time. Thus, updated information from the new subjective evaluation is always needed, especially when different types of vehicles and models are involved (Yusof et al., 2019).

Hiemstra-van Mastrigt et al. (2016) stated that discomfort and comfort are two different factors related to different contributing factors whereas comfort is a related to well-being, and emotions of relaxation and also can be influenced the user's aesthetic impression. Meanwhile, discomfort is related with pain, numbness and soreness which is caused by physical and posture constraints in design.

There are several ergonomics studies related with seating discomfort on car (Kolich and White, 2004; Deros et al., 2009; Velagapudi and Ray, 2017), aircraft (Hiemstra-van Mastrigt et al., 2016; Kokorikou et al., 2016), and bus (Sekulić et al., 2016). In these previous studies, they found out that a well-designed vehicle seat is supported by the backrest, the muscles relax and the lumbar spine is supported. Meanwhile, a poorly designed vehicle seat involved slouching which happened due to the lack of muscular effort in the trunk, resulting in a loss of lordosis and an increase in kyphosis (Mohammad Yusof et al., 2021). However, prolonged driving also would lead to spine disorders and is associated

* Corresponding author.
E-mail address: megam@upm.edu.my (K. Karuppiah).

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with musculoskeletal symptoms (Varela et al., 2019). The previous study was done by Nur Athirah et al. (2020) mentioned that seated postures have been regarded as potentially unhealthy and considered one of the major contributing factors for several musculoskeletal disorders such as pain in the lower back, neck, and shoulder. In the worst case, a disease such as deep vein thrombosis might occur. Due to increased exposure to seated postures and vibration, particularly in the motorcycle, sitting discomfort has turned into a vital issue that requests satisfactory ergonomic interventions.

However, unlike ergonomic research on other vehicle seats, the ergonomic research on the motorcycle seat, especially in seat design and discomfort, is very limited (Velagapudi and Ray, 2017; Jamil et al., 2021). Hence, the automotive industry strongly encourages the research field to focus more on comfort assessment, specifically on seat design and body discomfort (Yusof et al., 2019). Over the years, many researchers and designers have tried to understand the relationship between discomfort and the knowledge to the design and development of new materials and products for people to use (Mansfield et al., 2020). Several researchers agreed that to understand and assess the perception of discomfort, subjective measures such as surveys or questionnaires are a primary and the best method (Velagapudi and Ray, 2017). Therefore, in the process of questionnaire development, a properly designed subjective assessment method involves a colossal value. This provides the basis for the creation of predictive models and guidance for the design of comfortable seats (Yusof et al., 2019).

In the ergonomic research field, only one study conducted by Velagapudi and Ray (2017), has published a motorcycle seat discomfort survey questionnaire. However, certain variables in the study require further consideration when it is applied to a high-powered motorcycle seat. In order to gain an insight into the local and occupant riders' perceptions, the tools should use the local perspective, language, and motorcycle type. Hence, the authors have taken these conditions into consideration as well as an effort to develop a high-powered motorcycle seat discomfort questionnaire. Therefore, the present study aims to develop a high-powered motorcycle seat discomfort survey that is valid and reliable and evaluate the high-powered motorcycle seat discomfort ratings using a valid and reliable motorcycle seat discomfort survey (MSDS).

2. Methodology

2.1. Study design

This study was a cross-sectional study where the exposure and the health effects were measured and observed at a specific point of time from January 2020 until February 2020. A simple random sampling was used in this study.

2.2. Study location

This study was conducted at Traffic Police Station in Kuala Lumpur. This location was selected purposively because this police station is located in the city centre with a high density of vehicles on the road. Besides, this police station is among the highest number of traffic police that used a high-powered motorcycle in Malaysia and was suggested by Headquarter Police Station, Bukit Aman.

2.3. Sampling frame

The sampling frame was taken from the name list of all employees working at the Traffic Police Station. The name lists were obtained from the Registrar Department. However, this study only focused on traffic police from the escort department only to ensure the consistency of data which different departments have different tasks or jobs and duration of riding police's motorcycle. The responsibilities of escort are escorting the VVIP or any event and patrolling the selected location and finding any offense of road users.

2.4. Sample size

The formula used to determine the sample size for traffic police riders was using Lemeshow et al. (1990) formula. The value for the mean of motorcycle seat discomfort was taken from a previous study conducted by Velagapudi and Ray (2017) which 95% of motorcyclists reported having discomfort in some or other body parts. The calculation of the estimated sample size was 73 respondents. However, after considering, an additional 10% of the total respondents were required to counter-responsive cases and reject questionnaire samples. Thus, the minimum sample size needed was 81 respondents to participate in this study.

2.5. Study population

Seventy-one healthy male riders riding a high-powered motorcycle aged 20–39 years old and a mean BMI of 24.98 $\pm$ 4.35 participated in this study. All traffic police riders had the same work task (escorts and patrols involve a medium- and long-distance work task) and used paved road types in the urban city area.

2.6. Eligible criteria

The respondents were selected using simple random sampling based on the criteria, which are male because almost 90% of the traffic police riders population was male. At least one year of experience in high-powered motorcycle riding. Exclusion criteria were the presence of any injury (under treatment or taking any medication related to muscle pain), in the 12 months preceding this survey.

2.7. Study instrumentation

A set of questionnaires was used in this study. This questionnaire consists of three sections namely, Part A (individual information), B (occupational information), and C (a valid motorcycle seat discomfort survey) —the MSDS questionnaire uses a 100 mm (mm) visual analogue scale (VAS) with 14 items to evaluate. Besides that, SECA Body Meter and SECA Body weighting scale were used to measure the respondent's height and weight, respectively.

2.8. Study procedures

The riders were required to ride a motorcycle for 20 min in the Kuala Lumpur area before they were asked to rate the seat discomfort ratings. Based on Deros et al. (2009), 82.5% discomfort variance divergence was accounted for after being seated for 20 min. Besides, the average commute time for one task of traffic police riders is less than 30 min (Yusof et al., 2019). Questionnaire completion took approximately 5 min for respondents to evaluate the seat after 20 min ride.

2.9. Quality control

Prior to the actual data collection from the research, the questionnaire was tested first among 10% of respondents (N = 13) to observe and evaluate their level of knowledge, grammar and understanding towards the questionnaire. The form was used in both language, English and Malay Language so that the respondents can easily understand the question given. The questionnaire of MSDS was used in this study. Jancey et al. (2014) suggested that the reliability test was important to improve the research quality in the occupational health field. Thus, the test-retest reliability of questionnaire items in MSDS to determine motorcycle seat discomfort was conducted first in this study. In order to get more accurate results, under real-world working condition, the on-road test was conducted (Fig. 1).

Fig. 1. Three types of a high-powered motorcycle.

This pre-test was conducted in January 8th, 2020, and January 15th, 2020 from the same group of riders which involved an initial test and re-test by using the same questionnaire. The re-test was conducted in the same schedule and same location as the initial test. The period of test-retest reliability in this study was consistent with the previous study in assessing the discomfort among respondents (Franzblau, 1997; Booth-Jones et al., 1998).

2.9.1. *Questionnaire design*

The essential part of the questionnaire development is the selection of items. The high-powered MSDS is designed based on an extensive literature review and information obtained from previous studies (Deros et al., 2009; M. Kolich and White, 2004; Smith et al., 2006; Velagapudi and Ray, 2017). In order to improve the content validity as it involves both, the Malaysian national language and English language as well as to get the local perspectives as all the previous literature was conducted abroad, inputs from key informants were gathered. The key informants included an ergonomist, an academician, and an engineer. The details of the questionnaire design process is illustrated in Fig. 2.

2.9.2. *Rating selection*

A previous study by Velagapudi and Ray (2017) used a five-point Likert scale to measure motorcycle seating comfort. However, this study employs the VAS for the questionnaire because it was conducted during working hours; therefore, VAS can save the respondent time and it is easier to understand compared to the Likert scale (Yusof et al., 2019). Besides that, Annett (2002) remarked that the balanced Likert-type scale with a central indifference point could be wasteful as it has too many choices of scale which may lead to difficulties in choosing the answer and can reflect the unwillingness of the participants to make a judgment. This is supported by other studies which Smith et al. (2006) found that VAS is more favourable than the Likert scale since the Likert scale involved intermediate anchors, implying that discomfort is a split construct and not continuous. VAS, in this study, is continuous 100 mm lines, with 0 mm representing no discomfort and 100 mm representing extreme discomfort. Furthermore, this study found out that using VAS can save up to 5 min compared to Likert scale.

2.9.3. *Pilot study*

A pilot study was conducted to verify that the wordings of the questions and the rating scale expressed the intended meaning. The

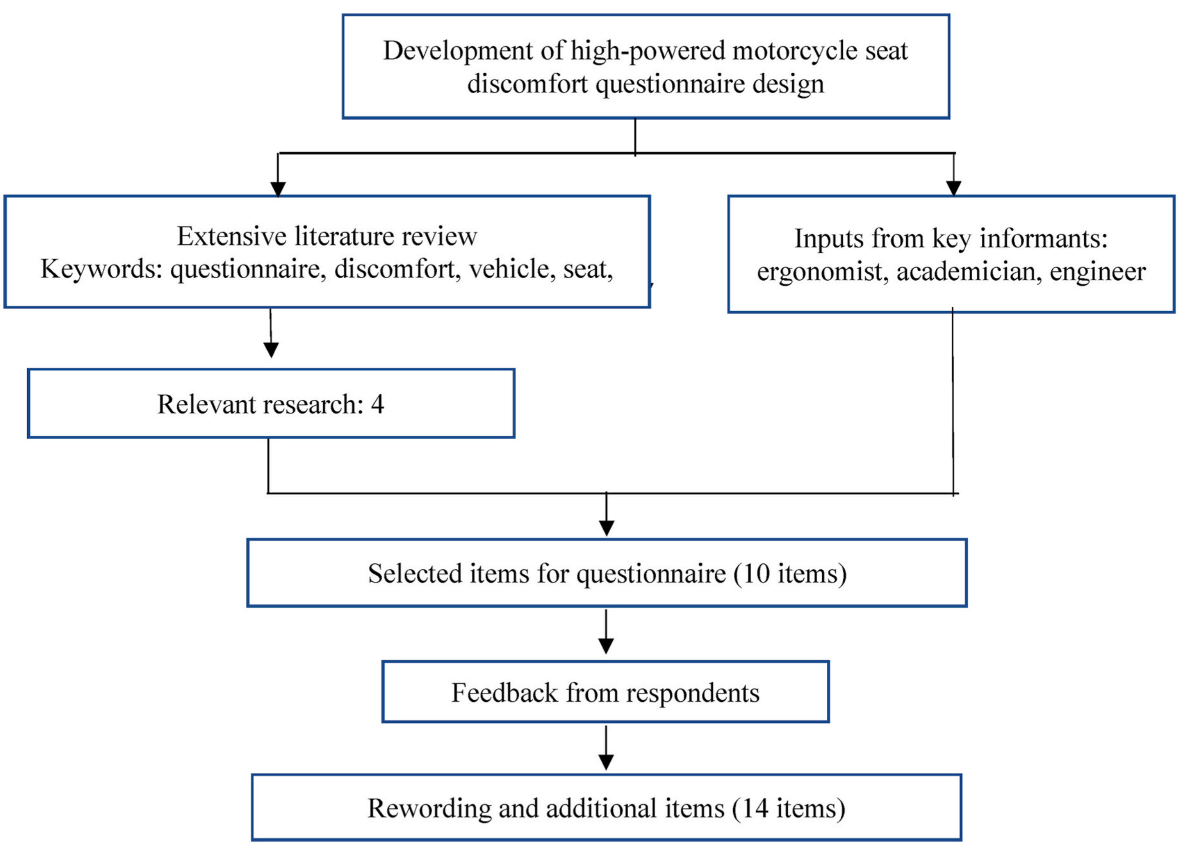

Fig. 2. Flowchart of High-powered Motorcycle Seat Discomfort Survey (MSDS) design.

input from the pilot study was used to modify the questionnaire accordingly. A test-retest of the questionnaire was conducted with a separation period of one week. The internal consistency of the pilot study was calculated and Cronbach's α value established an acceptable and significant result ($\alpha > 0.75$). The list of questions is shown in Table 1. The key informant feedback resulted in an addition of source items from 10 to 14, and more layman terms were used for both the Malay and English questionnaires to replace scientific and jargon words such as lumbar to the lower back. This survey achieved a high-face validity, as this set of questionnaires needed less explanation due it being written in both, national and international languages. The pilot study resulted in the re-wording of two items, as shown in Table 1. As the pilot study was conducted in a field-based setup, most respondents pointed out vibration as one of the factors causing discomfort during riding, especially on uneven roads. Furthermore, they also expressed that the specific parts of the posterior side of the body need to be listed.

The test-retest and Cronbach's α analyses were used in this study to measure the reliability and internal consistency of the MSDS. The results of the re-test were then used to assess the value of Cronbach's α, whose value of more than 0.75 is considered acceptable (Velagapudi and Ray, 2017). The mean ratings given by thirteen riders for the test and re-test are compared and shown in Fig. 3. Meanwhile, the correlation results between the test-retest of each of the 14 items are explained in Table 2. The range of kappa coefficients was between 0.708 and 0.860. Kappa value interpretation less than 0.20 is considered poor, and a value greater than 0.81 is considered very good (Barnhart et al., 2002). In the present study, overall results showed kappa coefficients in the good to very good range. Thus, this test-retest reliability was considered acceptable. The results showed that all of the questions have a statistically significant test-retest reliability coefficient with the rating of the overall discomfort showing a high correlation ($r = 0.84$, $p < 0.01$). Next, the Cronbach's α value for this questionnaire was 0.963 compared to the α value of 0.845 for the MSCQ (Velagapudi and Ray, 2017). Thus, the test-retest reliability and internal consistency of this MSDS are considered acceptable (Velagapudi and Ray, 2017).

Motorcycle Seating Comfort Questionnaire (MSCQ) by Velagapudi and Ray (2017) was used to assess the criterion validity. As MSCQ used a Likert scale, all scorings from the Likert scale-based items were computed into percentages. The computation was obtained by adding the overall comfort ratings and converting it into a percentage. Unlike the VAS, the results of a high percentage in MSCQ was the comfort percentage value. The comfort percentage results were, therefore, subtracted by 100 to obtain the percentage values of discomfort (Deros et al., 2009). The MSDS discomfort values were also converted into percentages. The overall discomfort ratings given for each type of motorcycle by thirteen riders using both types of scales concur with each other, as shown in Table 3. The results showed that there is a significant correlation between MSDS and MSCQ with a significant level of 0.05.

From the results of correlation between MSDS and MSCQ, it is suggested that the respondents had a different perception on different seats, but they were able to maintain the rating of the overall discomfort for both scales with consistent answers. This shows that the validity test between MSDS and MSCQ were good. Thus, all the results indicate that there is a significant correlation between both questionnaires (MSDS and MSCQ) for each type of motorcycle seat.

Table 1
List of items used in Motorcycle Seat Discomfort Survey.

Initial	Final
Seat width	Seat width
Seat length	Seat length
Seat contour	Seat contour
Physical design	Vibration
Tendency to slide	Physical design
No lumbar support	Tendency to slide
Pressure under buttock	No lumbar support
Lower back	Pressure under buttock
Buttock	Lower back
Overall discomfort	Middle back
	Upper back
	Side of body
	Buttock
	Overall discomfort

2.10. Statistical analysis

All the data gathered from the questionnaire, MSDS and measurement were analysed by using IBM SPSS Version 26.0. The descriptive analysis was used to calculate a mean rating of seat discomfort among traffic police riders. Kolmogorov-Smirnov was used in this study to determine the normality of variables data distribution. The normality of data was assumed when the p-value was more than 0.05. To analyse the significant correlation between the variables, the Pearson Correlation test was used for normally distributed data, and Spearman's Rho Correlation test was used for not normally distributed data. The results were considered significant when the p-value is less than 0.05.

3. Results

A seventy-one out of eighty-one respondents participated in this study. The ten officers were excluded due to unfulfilled criteria and were absent during the data collection period. Thus, the response rate for this study was 87.65%. The mean age of the respondents was 30.2 ± 4.5 years old. The mean BMI of the respondents was 24.98 ± 4.35, as shown in Table 4. Among 71 respondents, 45.1% of them were considered a normal BMI category. The riding experience as traffic police riders was ranged from one to twelve with a mean of 4.75 ± 2.84 years. Meanwhile, the mean riding hours per day was 4.66 ± 2.06 h.

The results of VAS on seat discomfort ratings by the respondents are shown in Fig. 4. This result represents the ratings of motorcycle seat feature discomfort after 20 min ride. The results indicate that pressure under the buttock (53.64 ± 23.04 mm) was the main factor that contribute to the seat discomfort followed by discomfort in the low back region (53.48 ± 25.88 mm) and without lumbar support (52.45 ± 25.4 mm). Generally, the mean overall high-powered motorcycle seat discomfort rating was 51.97 mm out of 100 mm.

The correlation results indicated a significant correlation between overall seat discomfort with hours of riding per day, lower back, middle back, upper back, side of the body, and buttock ($p < 0.001$) as shown in Table 5. There is a strong positive correlation in the upper back ($r = 0.865$), side of the body ($r = 0.865$), middle back ($r = 0.810$), lower back ($r = 0.864$) and buttock ($r = 0.864$).

4. Discussion

The pilot test with inputs from key informants and previous literature provides valuable information in developing this questionnaire. The 'no lumbar support' item was considered in this survey because they involve long-distance and prolonged riding, which would cause high discomfort in the back area of the body (Karmegam et al., 2009). The item of 'vibration' is also essential since one of the factors of discomfort in high-powered motorcycles comes from vibration, especially when they ride on uneven roads (Diyana et al., 2019; Nur Athirah et al., 2020). Besides, this research was conducted in a real road condition; thus, static and dynamic factors were involved. The dynamic factors contributed to high vibration and influenced the rating of discomfort (Velagapudi and Ray, 2017; Mansfield et al., 2020). There are also some changes in this questionnaire due to the interpretation and translation of the words and language. Although there is a change particular to the Malay language where the pilot test and experts' views are applied, this method and questionnaire still can be used in general and some ideas in a high-powered motorcycle seat discomfort to other countries and languages as well.

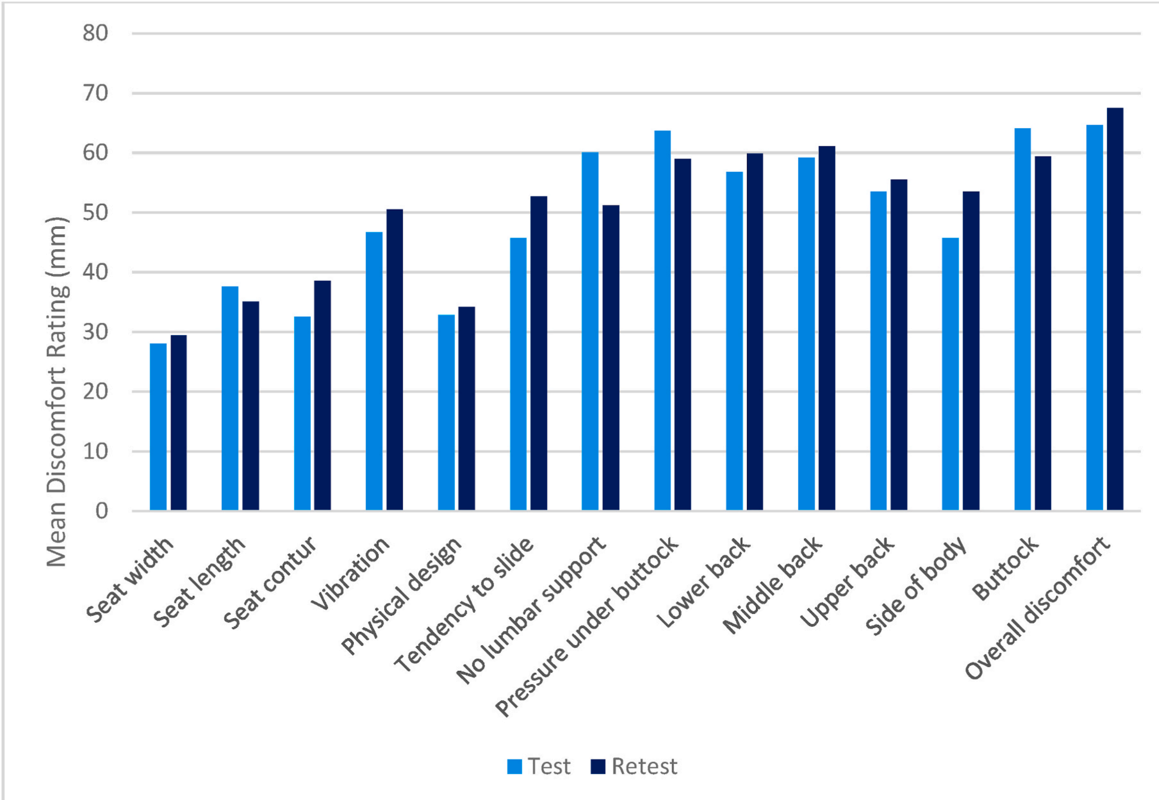

Fig. 3. Mean discomfort ratings for the test-retest of the 14 questions in the seat discomfort questionnaire (N = 13).

Table 2
Test-retest correlation coefficients of the MSDS (N = 13).

Questions	Pearson's Correlation Coefficient (r)
Seat width	0.85**
Seat length	0.89**
Seat contour	0.64*
Vibration	0.55*
Physical design	0.78**
Tendency to slide	0.70**
No lumbar support	0.61*
Pressure under buttock	0.78**
Lower back	0.89**
Middle back	0.79**
Upper back	0.94**
Side of body	0.51*
Buttock	0.93**
Overall discomfort	0.84**

*p-value is significant at $p < 0.05$.
**p-value is significant at $p < 0.01$.

Table 3
Correlations between the questionnaires.

Type of motorcycle	Pearson's correlation (r)
A	0.57*
B	0.66*
C	0.65*

*p-value is significant at $p < 0.05$.

Test-retest and internal consistency of MSDS showed good reliability in each item. The respondents' perceptions of MSDS were shown to be consistent over time. Between questionnaire correlation results, it was suggested that the respondents have different perceptions of the different seats, but they are able to maintain the rating of the overall discomfort for both scales with consistent answers. This showed that the validity test between MSDS and MSCQ were good. Overall, the results showed this MSDS is reliable and valid in test-retest, internal consistency as well as validity for subjective evaluation tool for a high-powered motorcycle seat discomfort.

Table 4
Information profiles of respondents (N = 71).

Variables	Total n (%)	Mean ± SD
Age (year)		30.2 ± 4.5
Body mass index (kg/m^2)		24.98 ± 4.3
Riding experience (years)		4.75 ± 2.84
Duration of daily riding (hours)		4.66 ± 2.06
Ethnicity		
Malay	65 (91.5)	
Others	6 (8.45)	
Rank		
Constable	39 (54.9)	
Lance Corporal	20 (28.2)	
Corporal	10 (14.1)	
Sergeant	1 (1.4)	

An overall seat discomfort rating demonstrated that traffic police riders experienced a high discomfort level on the seat (51.97 mm). Based on Hawker et al. (2010), discomfort ratings below than 5 mm was considered no discomfort, 5 mm to 44 mm mild discomfort, 45 mm–74 mm was considered moderate discomfort and discomfort ratings more than 75 mm were considered severe. Meanwhile, Cardoso et al. (2017) stated that respondent with more than 30 mm in perceived discomfort ratings was considered clinically significant. Thus, the perceived seat discomfort rating in this study was considered high, leading the riders to risk developing musculoskeletal disorders (MSD). This result was supported by Nur Athirah et al. (2020) which they found that the overall

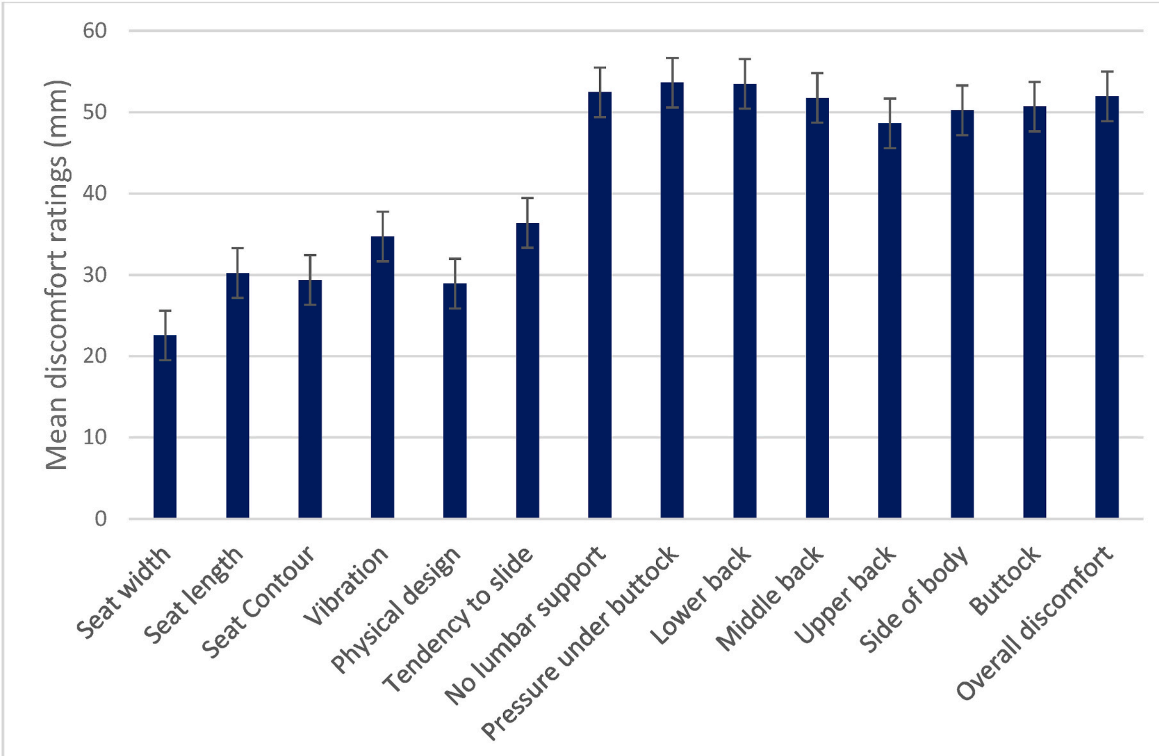

Fig. 4. Motorcycle Seat Discomfort ratings (in mm) for traffic police riders (N = 71).

Table 5
Correlation between overall seat discomfort with age, BMI, riding profiles and body regions (N = 71).

	Overall seat discomfort	
	r	p-value
Age[b]	.092	.446
BMI[b]	.025	.839
Riding experience (years)[b]	.090	.455
Duration of riding (hours)[b]	.371	<0.01*
Upper back[a]	.865	<0.01*
Middle back[a]	.810	<0.01*
Lower back[a]	.864	<0.01*
Side of body[a]	.865	<0.01*
Buttock[a]	.864	<0.01*

* Correlation is significant at $p < 0.01$ (2-tailed).
[a] Pearson Correlation test.
[b] Spearman's Rho Correlation test.

mean discomfort for all body regions was more than 20 mm among traffic police riders in Malaysia. Besides, Diyana et al. (2019) also found that the prevalence of MSD among traffic police riders was more than sixty-percent.

Pressure under the buttock (53.64 mm) was the main contribution to the seat discomfort in this study. Savonnet et al. (2018) supported this result, which they found that prolonged sitting was associated with compression of buttock-thigh tissue or ischial, which leads to limiting blood circulation (Mohammad Yusof et al., 2021). The distribution of higher pressure around the ischial area of the buttock compared to the thigh was the main reason for discomfort during sitting in this area (Huang et al., 2016). This could also explain the strong positive correlation between seat discomfort and buttock area in this study ($p < 0.001$). In a dynamic condition such as riding a motorcycle, the spinal column would act as an absorber of the shock and transmission of the vertical forces which loads the pelvis and buttock region. Yusof et al. (2021) agreed that the spinal column supports the head and body weight during sitting (Fig. 5) which led to forces of compression on the buttock and surrounding muscle that limit the circulation of the blood, resulting in the accumulation of lactic acid, which influencing the discomfort and fatigue of the muscle on the buttock region when seated without

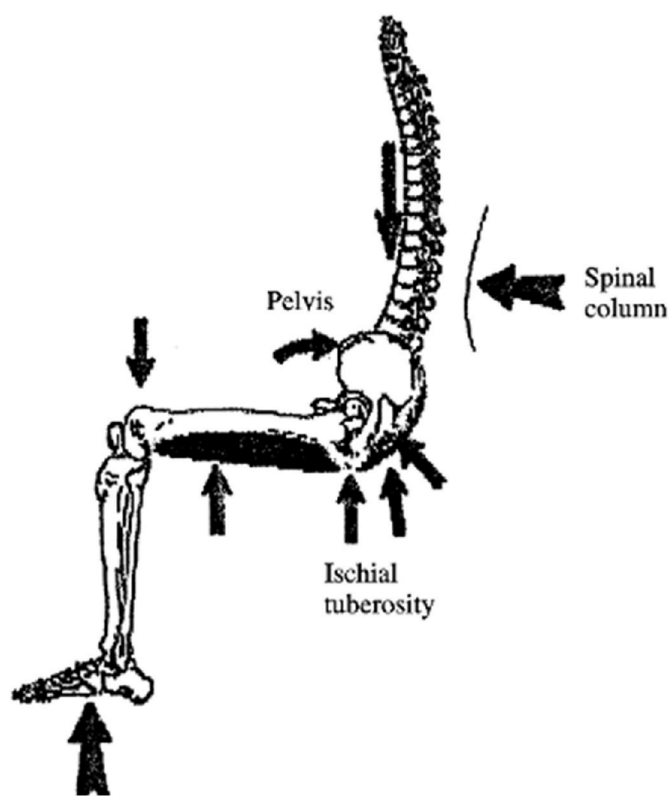

Fig. 5. Forces acting on a seating position.

support.

A without lumbar support feature was also found to contribute to the seating discomfort among traffic police riders, which mostly affects the lower back region of the body. A study conducted by Guo et al. (2016) found that individual tends to adopt a slumped posture during prolonged sitting, and the absence of lumbar support would contribute to the worst condition when the erector spine muscle was deactivated and the body posture just relies on spinal ligament for seating support. This would lead to lower back pain and muscle injury over time (Diyana et al., 2019). A well-designed seat should fit all user sizes and provide adequate body support (Halder et al., 2017). Mohammad Yusof et al. (2021) proved that a motorcycle seat without a lumbar support feature was the most significant factor for seat discomfort. This is because lumbar support plays a significant role in maintaining an upright posture for the riders and maximising the riders' health of posture and comfort.

Commonly prolonged sitting or riding is related to seating discomfort, which affects muscle discomfort, muscle fatigue, and MSD (Karuppiah et al., 2012; Diyana et al., 2019; Nur Athirah et al., 2020). The current study also agreed with this finding when the body regions (lower back, upper back, middle back, side of the body as well as buttock) have a strong significant correlation with motorcycle seat discomfort ($r > 0.80$). Another valuable finding in this study was that the duration of riding hours also would lead to seat discomfort. This was parallel with Waongenngarm et al. (2020) results which found that prolonged sitting leads to an increase in discomfort ratings over time. This could be explained when most riders spent up to 9 h riding a motorcycle daily to fulfill their work task. However, surprisingly, this study found no significant correlation between riding experience (years) with seat discomfort. These findings contradicted previous studies conducted by Nur Athirah et al. (2020) and Karmegam et al. (2009), which found that the riding experience had a positive correlation with muscle discomfort. The possible explanation might be that traffic police officers with less riding experience also showed a high level of discomfort on the motorcycle seat. This is because limited space and inability to adjust seat position during ridings, such as seat width, length, and design, were also contributing to the seat discomfort among these professional riders who spend most of their working hours on the motorcycle seat. These factors and problems can lead to more severe discomfort over time and contribute to a muscle injury in the future (Diyana et al., 2017).

5. Conclusion

This study showed that the newly developed high-powered motorcycle seat discomfort survey (MSDS) is statistically valid and reliable. All the items used in the MSDS are found to be understandable by the subjects without needing further explanation. Besides that, this study also demonstrates that there is a high seat discomfort rating associated with riding sessions among traffic police riders. It is recommended that future research works include the female user of high-powered motorcycles in order to support the findings of this study. Further in-depth investigation in seat design such as objective measurement and innovation should consider improving this motorcycle seat ergonomically, which indirectly can reduce discomfort problems and the likelihood of developing MSD from this occupational task.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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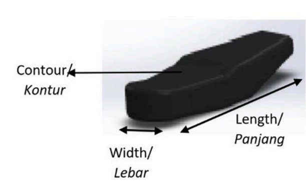
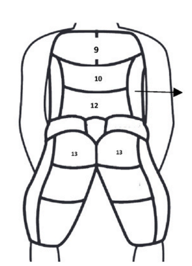
Appendix

HIGH-POWERED MOTORCYCLE SEAT DISCOMFORT SURVEY (MSDS)/*TAHAP KETIDAKSELESAAN TEMPAT DUDUK MOTOSIKAL BERKUASA TINGGI***Please tick above the line [/] on each question according to your level of discomfort.** *Tandakan atas garisan [/] pada setiap soalan mengikut tahap ketidakselesaan anda.*

No.	Item	No discomfort/ *Tiada ketidakselesaan*		Extereme discomfort/ *Ketidakselesaan melampau*
1.	Seat width/*Lebar tempat duduk*			
2.	Seat length/ *Panjang tempat duduk*			
3.	Seat contour/ *Kontor tempat duduk*			
4.	Vibration/ *Gegaran*			
5.	Physical design/ *Rekabentuk fizikal*			
6.	Tendency to slide/ *Kecundurungan untuk geluncur*			
7.	No back (lumbar) support/ *Tiada sokongan belakang*			
8.	Pressure under buttock/ *Tekanan di punggung*			
9.	Upper back discomfort/ *Ketidakselesaan di belakang atas*			
10.	Middle back discomfort/ *Ketidakselesaan di belakang tengah*			
11.	Side of body discomfort/ *Ketidakselesaan di sisi badan*			
12.	Lower back discomfort/ *Ketidakselesaan di belakang bawah*			
13.	Buttock discomfort/ *Ketidakselesaan di punggung*			
14.	Overall discomfort/ *Tahap ketidakselesaan keseluruhan*			





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