Original Article

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Prevalence of Musculoskeletal Pain among Half Marathon Runners and Full Marathon Runners: A Survey

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Abstract

Background: As awareness of exercises is widely promoted in public, running has become a popular physical activity. Hence, there are increased numbers of marathon event yearly in Malaysia. Consequently, running related injuries have become common. *Objectives:* To identify the prevalence and common location of running related musculoskeletal pain among the half marathon runners (21km) and full marathon runners (42km) in Malaysiaand to identify which type of runners (half marathon runners or full marathon runners) had higher prevalence of musculoskeletal pain. *Definition of Musculoskeletal Pain:* any pain in body, included muscle and joint, which caused a restriction of running or training for at least 1 day. *Design:* Cross sectional survey. *Methods:* A total of 100 half and full marathon runners from JB and KL marathon event were participated in this study. The self-reported questionnaire was used in this study and runners were asked to complete the questionnaire, which included demographic data, training characteristic, pain assessment, diagnosis and previous injury. *Results:* The prevalence of musculoskeletal pain was 52%. The knee (28%) and lower leg (28%) was frequent reported pain area. Data showed there is no significant difference for prevalence of musculoskeletal pain in between half marathon runners and full marathon runners (p= 0.261). *Conclusion:* The prevalence of musculoskeletal pain among half and full marathon runners were substantially high.80.8% of the runners were ignored the pain. Therefore, physiotherapists are important in implementing the prevention, awareness and interventions strategies in order to avoid worsening of injuries.

Keywords: Marathon Runners; Running Pain; Overuse Injury Prevalence.

Introduction

As awareness of exercises is widely promoted in public, more and more people are more likely to involve in one or two physical activities. Running is one of the most popular activities. It is not only because of low cost, but also because of ease of implementation and the health benefits. Running can decrease the risk of cardiovascular disease,diabetes mellitus, and depression. It also can improve bone density, decrease mortality and help in weight control (Cymet & Sinkov, 2006). According to a study from Standford University School of Medicine, which has tracked 500 olders runners for more than 20 years suggested that regular running slows the effect of aging (Digitale, 2016). Evidences also showed that endurance sport could increased the life expentancy (Burkule, 2016). It caused a greater lean body mass and slowed the progression of cardiovascular disease associated with cancer, infections and neurological disease. Lee et al have done an obsevational cohort study andsuggested that running with minimum 5 to 10 min per day and at a slow speeds <6 miles/h could markedly reduced risks of death from all causes and cardiovascular disease (Lee et al., 2014). Hence, running could reduce the risk of cardiovascular disease.

In Malaysia, there have increase number of marathon in different state each year since there is increased number of participants. There are up to 32 races for half marathon this year and 15 races for full marathon, which included Penang Bridge International Marathon, Standard Chartered KL marathon, ATA Marathon, Iskandar Puteri Night Marathon and others ("Running Events Calendar

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Malaysia", 2017). However, there are some risks for running, musculoskeletal pain in runners are common, which present with incidences rate from 18.2% to 92.4% and prevalence rates is between 6.8 to 59 injuries per 1000 hours of running, depend on the target population and definition used (Lopes, Hespanhol, Yeung & Costa, 2012; Roos, Taube, Zuest, Clénin& Wyss, 2015). Although there was no standard definition for running injuries, in this study, the definition for RRI is same as Buist's study which defined as any musculoskeletal pain in the body included muscle and joints, which caused a restriction of running for at least 1 day (Buist et al., 2008). 80% of the running injuries are overuse injuries, which is more likely to occur in long distance runners due to the distance and time exposure to running (Taunton, 2003). Van Mechelen also reported that there were 2.5-12.1 injuries per 1000 hours of running in recreational and competing runners (van Mechelen, 1992). The competitive and elite athletes tend to have fewer running related injuries per 1000 hours of exposure compared to recreational or inexperienced runners (Roos, Taube, Zuest, Clénin& Wyss, 2015). Although there are a lot of running related injury study been done, there is less study about prevalence of musculoskeletal pain been done in Malaysia. Therefore, it is important to assess the prevalence of running related musculoskeletal pain and associated risk among runners in Malaysia before a race in order to plan an effective prevention strategies and intervention.

The Objectives of this Study are:

1. To determinethe prevalence and common body location of running related musculoskeletal pain among the half marathon runners and full marathon runners in Malaysia.
2. To determine the type of runners having higher prevalence of musculoskeletal pain.

Methodology

Participants

In this study, a cross sectional survey was conducted through purposive sampling technique to identify the prevalence of musculoskeletal pain among half and full marathon runners and which type of runners having more presence of musculoskeletal pain. The consent email for conducted the survey in selected recreational marathon events at Johor Bharu (JB) and Kuala Lumpur (KL) was sent before the event day. These events were chosen through online marathon calendar within March and April 2017. These two cities were selected because of JB is the second largest cities in Malaysia; while, KL is the biggest city in Malaysia and it is the center of country("Cities and towns in Malaysia | Wonderful Malaysia", 2017).

The questionnaireswere distributed to the half and full marathon runners. Detailed explanation was given to subjects and informed consent was obtained from the runners' prior the data collection. Subjects were free to ask the questions if they are not understanding the questions in the questionnaire during first reading.

This study was approved by INTI International University Board of Ethics Committee. The half and full marathon runners with at least 2 years of running experiences, had participated at least 2 marathon event under same categories (half or full marathon), completion of at least 1 marathon in past 12 months, age between 18 to 65 years old and able to understand English were included in this study. However, those runners who does not run in any full or half marathon in past 12 months or stop running for more than 1 year and those recreational runners who run for 5km and 10km were not included in this study.

A total of 108 runners who agreed to take the survey, however, 8 runners were not met the criteria (n=3: not participate in any marathon in past 12 months, n=5: have 2 years running experiences but had participated less than 2 times of marathon event in half or full marathon). Hence, total of 100 runners were involved in the final data analyses with a respondent rate of 90%.

Data Collection or Instrument Used

The self-reported questionnaire was used in this study. Questions were developed based on the Lopes' and Hespanhol's study with the permission of authors and been evaluated by the supervisor. The questionnaire has been divided into 5 sections.

The section A included the personal data (gender, age, race, height, weight, and BMI), running experiences, running categories, number of marathon event been participated in past 12 months in order to ensure the subjects met the inclusion criteria. Section B is about the training characteristic which included frequency of training, duration for a training session, predominant training surface and the training distance in a week.

Section C is the pain assessment which used to identify the prevalence of running related musculoskeletal pain among the runners. According

to the International Association for the Study of Pain (IASP), pain can be defined as unpleasant sensory and emotional experience associated with actual or potential tissues damage, or describe in term of such damage. It is always subjective (Merskey & Bogduk, 2012).The subjects who reported current running related musculoskeletal pain were asked to describe the intensity of pain with the visual analog scale (VAS), location of pain with body chart, duration and behavior of pain. According to the reported pain intensity where the runners circle on VAS from 0 to 10, it is further describe with mild (1-2), moderate (3-7) and severe (8-10) (Teixeira, Lunardi, da Silva, Lopes & Carvalho, 2016).

Section D was included the medical diagnosis and treatment done and section E is about the past history of pain or injury particular for past 6 month in order to reduce the recall bias.

Statistical Analysis

Descriptive analysis with Statistical Package for Social Science (SPSS) window version 24 was used to summarize the data. The categorical data which included prevalence of musculoskeletal pain, common location of musculoskeletal pain and pain behavior were describe in percentage and expressed in bar chart and body chart. Independent Samples T-test was used to identify which type of runners (half marathon or full marathon) had more prevalence of musculoskeletal pain with the p value < 0.05. Cross tabulation also been used to identify the prevalence of pain among half and full marathon runners with different variables.

Results

The characteristic of the participantswas presented in Table 1 and Table 2.

Prevalence of Musculoskeletal Pain among Recreational Marathon Runners and Common Location of Pain.

Figure 1 showed the reported pain location by respondent with musculoskeletal pain. 11 individuals reported two distinct of pain and 9 individuals reported of 3 area of musculoskeletal pain.

Prevalence of Musculoskeletal Pain in Between Half Marathon Runners and Full Marathon Runners.

In cross tabulation, result showed 36 out of 64 half marathon runners reported existing of musculoskeletal pain. Whereas, 16 out of 36 of full marathon runners reported presence of pain and 20 of full marathon runners reported no pain (Figure 1). In this study, Independent Sample T-Test was used and result showed that there is no significant difference for prevalence of musculoskeletal pain in between half marathon runners and full marathon runners, p=0.261, which greater than 0.05 (Table 3).

Table 1: Characteristic of Runners

	Numbers (N=100)	Percentage %
Gender		
Male	66	66
female	34	34
Age		
18-19	6	6
20-29	35	35
30-39	31	31
40-49	23	23
50-59	4	4
60-65	1	1
Race		
Malay	36	36
Chinese	56	56
Indian	3	3
Others	5	5
Height		
less than 150cm	8	8
150cm - 159cm	20	20
160cm -169cm	39	39
170cm - 179cm	27	27
more than 180cm	6	6
Weight		
40kg - 49kg	15	15
50kg - 59kg	25	25

60kg - 69kg	37	37
70kg - 79kg	17	17
more than 80kg	6	6
BMI		
Underweight	12	12
Normal	74	74
Overweight	13	13
obese	1	1
Categories		
21km or half marathon	64	64
42km or full marathon	36	36
Running Experiences		
2 years	37	37
3 years	19	19
4 years	21	21
5 years	7	7
more than 5 years	16	16
Training Frequency		
1-2day/week	29	29
3-4day/week	41	41
5-6day/week	10	10
Everyday	1	1
ecific training time, do when free	19	19
Training Duration		
less than 30 min	15	15
30-60min	46	46
1-2hours	33	33
2-3 hours	3	3
more than 3 hours	3	3
Training Distance		
up to 10km	42	42
10-20km	25	25
21-30km	16	16
31-40km	10	10
more than 40km	7	7
TrainingSurface		
asphalt (road surface)	74	74
grass	8	8
clay	3	3

Table 2: Prevalence of musculoskeletal pain which reported by runners according the body area

Pain Location	Anterior
Shoulder	2.4
Hand and Forearm	2.4%
Back	6.1%
Thighs	19.5
Knee	28%
Leg	28%
Foot	13.4%
Back	6.1%

Table 3: Independent Sample T-Test, $p < 0.05$.

		Independent Samples Test								
		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	DF	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference Lower	Upper
pain	**Equal variances assumed**	.017	.896	-1.130	98	.261	-.11806	.10446	-.32536	.08924
	Equal variances not assumed			-1.128	72.194	.263	-.11806	.10469	-.32675	.09064

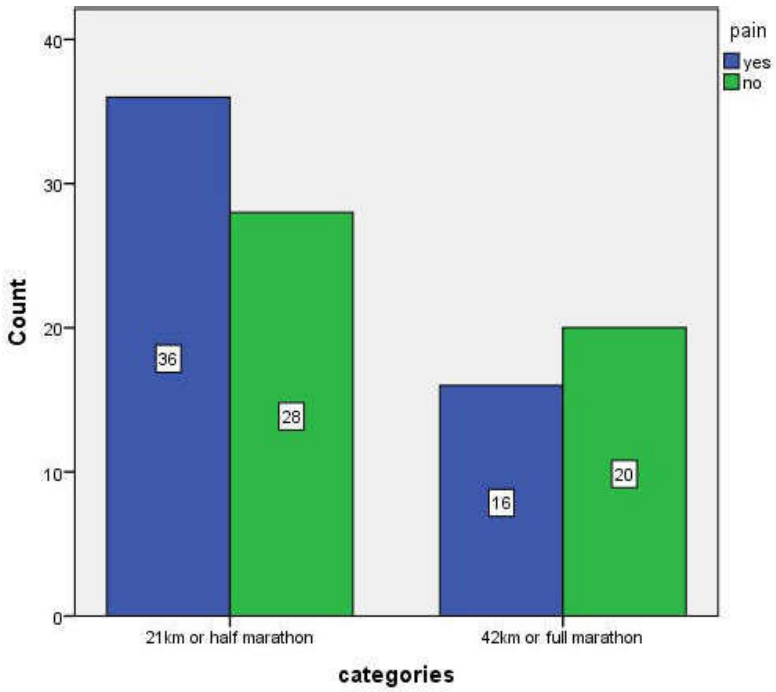

Fig. 1: Cross tabulation for Prevalence of musculoskeletal pain in between half marathon runners and full marathon runners

Discussion

This cross sectional survey was done to identify the prevalence of musculoskeletal pain among the marathon runners and common location of injury. The result showed that the prevalence of musculoskeletal pain among 100 respondents of both half marathon runners and full marathon runners were 52%. The knee (28%) and lower leg (28%) weremost frequent reported pain area. The second objective of this study was to identify which type of marathon runners, either half or full marathon runners have higher prevalence of musculoskeletal pain. Independent Sample T-Test showed that there is no significant difference for prevalence of musculoskeletal pain in between half marathon runners and full marathon runners.

Overuse injuries usually do not cause immediate cessation of participation. However, eventually, it will cause restriction and limitation in participation over the time. Recent studies have mentioned that it is important to described overuse injuries in term of pain and reduce performance as athletes do not recognized the symptoms as an injury (Bahr, 2009; Lopes et al, 2011). The prevalence of musculoskeletal pain among marathon runners in this study were 52%, which revealed that around 1 in 2 runners is compete the race with pain. It means most of the runners are unaware about overuse injuries while still participate the run.

This study showed higher prevalence than other study which done in Brazil, where the prevalence among the recreational runners for 5km and 10km immediately before a race were only 22% (Lopes et al., 2011). It also showed higher than the study which done in an athlete club, Cape Town, where the prevalence of injury among half and full marathon runners were 32% (Hendricks & Philips, 2013). However, it showed lower than the study which done among half marathon runners in South Africa, where the study showed 90% of runners sustained a RRI (Ellapen, Satyendra, Morris & Van Heerden, 2013). It also showed lower prevalence in another study which done among elite marathon runners a week before a race (Teixeira, Lunardi, da Silva, Lopes & Carvalho, 2016). This may be due to the sample size and different study population.

The most frequent reported pain intensity through a VAS from 0 to 10 was moderate pain, followed by mild pain, and none of the respondents reported severe pain before the race, which may suggests overuse or chronic musculoskeletal conditions among the respondents (Lopes et al, 2011). Surprisingly, 80.8% of the runners with pain did not seek help from doctor and only 8% of the runners undergone physiotherapy treatment for their current complaint. 6% of the respondents suggested chronic musculoskeletal conditions, which included knee pain (3%), muscle pain (1%), muscle tightness (1%), and patella tracking (1%). However, 3% of the respondents reported ACL injury and 1% of individual been diagnosed as ankle sprain.

Van der Worp et al found that previous injury increased the risk of lower limb injury in runners, especially for those lower limb injuries in the previous 12 months (Van der Worp et al., 2015). Among 35 individuals with previous injury, 15 individuals reported recurrent injury and the most common site of recurrent injury was knee. The higher incidence of re-injury in runners especially knee problem may be due to incomplete healing from the original injury or uncorrected biomechanics problems (Van der Worp et. al., 2015).

36 out of 64 half marathon runners reported pain at the moment (56.25%) and only 43.75% of half marathon runners reported no existence of pain. In contrast, data showed 16 out of 36 full marathon runners reported presence of pain (44.44%) and 55.55% of full marathon runners reported no presence of musculoskeletal pain. The higher weekly training distance and more years of running experiences among full marathon runners may cause musculoskeletal adaptation and thus less predisposed to develop injuries (Van Middelkoop et al., 2008; Rasmussen et al., 2013;van Poppel, de Koning, Verhagen & Scholten-Peeters, 2015). A study done by van Poppel et al, 2015, also showed that half marathon group had higher incidence of lower limb injuries, where the incidence of injuries was 23.6%. Whereas, the running injuries rate in marathon runners was 22.7% (van Poppel, de Koning, Verhagen & Scholten-Peeters, 2015). However, in this study, Independent Sample T-Test showed that there is no significant difference for prevalence of musculoskeletal pain in between half marathon runners and full marathon runners. Thus, a further study may require in order confirming the findings.

This study had found that 42 out of 67 runners who ran up to 10 km to 20 km weekly had presence of musculoskeletal pain. However, only 1 runner out of 7 individuals who trained more than 40 km weekly reported musculoskeletal pain. Hence, this suggested that increased in training distance were considered to be protective factors against knee injury to marathon runners (Lopes, Hespanhol, Yeung & Costa, 2012). The result in this study also showed consistent with a review done by Lopes et al, 2012, where high weekly training frequency and trained only once a week were more prone to RRI.

Future Direction

This study had provided the baseline information of prevalence of musculoskeletal pain among marathon runners in Malaysia. Hence, the detailed prevention and effective intervention strategies with evidence based are required to implement in order to reduce the incidence rate and prevalence of musculoskeletal pain which caused impairments, dysfunction, and restriction among the runners. Further studies included RCT to test the effectiveness of interventions for RRI should encourage in future in order reducing the disability among runners (Hespanhol Junior, Costa, Carvalho & Lopes, 2012). In addition, due to the design of study, the association between the training characteristic, such as training frequency, training distance, and musculoskeletal pain could not be well established. (Lopes et al., 2011).

Limitations

This study had some limitations, thus, the findings are required to interpret cautiously. As this study used self-reported questionnaire, it may have some recall bias. The sample size in this study was only a small proportion of marathon runners which hardly presented as whole population. It was not possible to identify the causation factor from this study due to the study design was cross sectional design (Mann, 2003).

Conclusion

52% of half and full marathon runners were reported presence of musculoskeletal pain. The most common location of musculoskeletal pain among the runners was knee (28%) and lower leg (28%). The consistent of location for musculoskeletal pain with other international studies suggested that a standard prevention strategies are encouraging among the runners to reduce the prevalence of musculoskeletal pain. Although more number of half marathon runners reported presence of musculoskeletal pain in this study (36 out of 64 respondents reported existence of pain and 20 out of 36 full marathon runners reported no existence of musculoskeletal pain), however, this study showed that there is no significant difference for prevalence of musculoskeletal pain in between half marathon runners and full marathon runners. As 80.8% of the marathon runners were neglected the pain, the awareness and early identification of injuries are important to rise among public and runners in order to prevent worsening of conditions. Therefore, the baseline data of musculoskeletal pain may contribute to the development of educational and preventive strategies (Lopes et al., 2011).

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