

Investigating the Pain, Functional Disability and Kinesiophobia Caused by Low Back Pain among Elite Ping Pong Players

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Abstract

Introduction: Low back pain is a common pain among ping pong players and the presence of functional impairment due to low back pain, is one of the important reasons for absence of these athletes in trainings and competitions. The purpose of the present study is to evaluate the pain and functional impairment and Kinesiophobia which caused by low back pain among ping pong players in the league 1 and premier league of Iran and factors such as the relationship between pain prevalence and some variables; age, weight, height, and activity level. **Materials and Methods:** This cross-sectional study was conducted on 80 ping pong players of premier league and league 1 of Iran (80 men with a mean age of 23.26 ± 5.74 years, height of 177.18 ± 7.07 cm and weight of 71.63 ± 9.26 Kg). Demographic and athletic data was collected by a researcher-devised questionnaire. Pain level was measured through the Visual Analogue Scale (VAS), functional disability through Oswestry Questionnaire and Poverty Scale through the Tampa Scale for Kinesiophobia (TSK). Statistical methods were used for analysis. **Results:** The results of this study show that by 16.3% of patients had pain at the moment, by 33.7% had pain in the last six months, by 40% had pain in the past year and by 45% had a history of pain during their lifetime. Also, by 43% of ping pong players had degrees of functional disability with a mean score of 9.07 ± 7.93 and a mean score of Kinesiophobia of 39.63 ± 6.68 . There is also a significant and direct relationship between the intensity of the present pain in the players and the degree of functional disability and their kinesiophobia ($P < 0.05$). The results of the study show a significant relationship between pain prevalence, weight, age, athletic level (ranking of players) and the number of training hours per session ($P < 0.05$). **Conclusion:** The results of this study indicate a high prevalence of pain, functional disability and kinesiophobia among elite ping pong players in Iran. Factors such as age, athletic level, weight and number of training hours per session are among the risk factors of pain prevalence and functional disability in ping pong players. Considering foresaid risk factors, it has been recommended to take necessary measures in order to prevent the occurrence of low back pain in Iranian ping pong players.

Keywords: Ping Pong, Epidemiology, Low Back Pain, Functional Disability, Kinesiophobia

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Introduction

Ping pong -an individual Olympic sport- at its championship levels, needs high accurate technical abilities, rapid actions and reactions, speed and strength, flexibility and agility. In spite of public belief and what is apparent at first glance, it needs high levels of mobility at its national championship levels. In addition to low but hard continuous pressure on body, it has swift sideward, backward and forward movements. Ping pong has been recently witnessed great progress in Iran, as our national team entered the world premiere league.

Low back pain is growing worldwide. It has a special negative effect on life quality in developing countries (1). Recent researches have shown that this disability is among the top ten disabilities in the whole world(2). Low back pain prevalence is by 23-84 % in person's life(3). Those with chronic low back pain have solely 80% of its costs(4). Bahr and colleagues have shown that low back pain is an important factor of functional impairment and they have stated that its prevalence is as follows: Cross country skiers (63%), rowers (55%) and orienteer (49%) (5).

There are several factors for low back pain; previous low back pains, repetitive twists and leanings, long periods of

standing, depression and stress, all can increase low back pain(6). As ping pong has many twists and leanings in forehand top spin alongside with high excitement, stress and mental pressure of athletes are prone to low back pains.

In 2011, Kendrick and colleagues have shown that elite Slovenian ping pong players have the second place in comparison to other racquet sports' players with respect to back pain prevalence(7). It's been shown that the rate of pain recur is by 5-8% for all athletic pains except that of the low back pain which is by 10-90%(8).

Researches have demonstrated that inappropriate performance of lumbar-pelvic muscles changes the lumbar range of motion and increases the burden on the vertebrae and this change of functional pattern leads to chronic low back pain (9). Neglecting appropriate treatment and rehabilitation of the damages which has been caused by excessive pressure might gradually lead to disabilities in ping pong players' back (10). So these muscles should be trained well to be in a good form to do hard movements without back pain during the games.

Clinically, low back pain is a complicated multi-factor process depending on environmental, physical and psychological factors. As a result, classic medical approaches which have been concerned only the physical factors, were mostly unsuccessful in preventing chronic back pain. Some studies have shown that psychological factors have less importance in treatment of acute back pain rather than that of the chronic ones (11). Many researches distinguished the relationship between psychological factors and back pain. Also, one must concern both physical and psychological aspects in order to prevent the back pain (12). In public too, there are witnesses stating that psychological variables such as attitudes, cognitions, depression and anxiety have an effect on the risk factors of back pain more than biomechanical and biophysical ones (13).

"The higher the back pain intensity, the more the functional disability" studies have been shown(14, 15). But, some other studies have been shown that there is a more powerful relationship between the intensity of fear and avoidance of movement and the functional disability in those suffering from low back pain in comparison to that of the low back pain intensity (16, 17). We believe that the individual who suffering from low back pain, sees it as a damage which will increase by increasing activity and so stopping the physical activity, leads to more functional disability (17-20).

As mentioned above, there is no exact information about the prevalence of the low back pain in ping pong players. There is also no study dealing with the prevalence and intensity of the

low back pain, functional disability and its kinesiophobia in ping pong players. Then, the present study has investigated level of the pain, functional disability and kinesiophobia of low back pain in elite Iranian ping pong players. In addition, some individual and athletic factors which relating to damage have been studied which are as follows: age, height, weight, athletic background, level of the activity, etc.

Materials and Methods

The present paper is a cross-sectional study. The population is all ping pong players (male) of premiere league and league 1 of Iran in 2016-2017. The limitation for qualification was 4-year athletic background. The following criteria leads to the exclusion from the study: special instances of spinal column issues like tumor and infection, spinal column surgery, spondylolisthesis, vertebral fraction, disc herniation and spinal column instabilities. All the subjects have been given some explanations about the research procedure both written and spoken. They have been asked to fill a written testimonial for participating in the study. Also, they've been assured about the confidentiality of their information and that they can willingly quit the project anytime. Data collecting was done through different interviews and questionnaires. One questionnaire was about personal and athletic backgrounds; its reliability is 0.91 (21). Pain intensity was measured by Visual Analogue Scale (VAS). It ranges from 0 to 100 mm (0=no pain and 100=unendurable pain). VAS is a fast, easy to work, valid and reliable tool which has been used in many clinical medical researches (22). Functional disability was measured by Oswestry Questionnaire (22) which was validated by Mousavi and Colleagues (23). It has ten 6-scale parts assessing individual performance in daily activities. Each part rates the functional disability from 0 (ideal performance with no pain) to 5 (disability to do daily activities because of intense pain). Oswestry Disability Index (ODI) is equal to sum of the 10 parts which has been multiplied by 2 and has the value of 0-100. Zero is equated with no disability and doing daily activities with no pain. 0-20 is equated with minimal disability, 21-40 is equated with moderate disability, 41-60 is equated with severe disability, 61-80 is equated with crippled and 81-100 is equated with bedbound disability. Kinesiophobia was measured through 17-item Tampa Scale of Kinesiophobia (TSK) (24). It has 17 questions and the subject fills it based on a 4-point Likert scale (totally disagree-totally agree) (25). In calculating the total score, scores of items 4, 8, 12 and 16 must be inverted, *i.e.* 1 to 4 and 2 to 3 and vice versa. According to some findings, in case of missing these items, the internal homoscedasticity increases

Table 1. Anthropometric and demographic data of samples

Variable	Total samples [mean (SD)]
age	23.26 (5.74)
Height (cm)	177.81 (7.07)
Weight	71.63 (9.26)
BMI	22.6 (2.35)

Table 2. The level of back pain prevalence

Variable	Total samples
Pain at the moment prevalence	16.3
Last 6 months pain prevalence	33.7
Past year pain prevalence	40
Lifetime pain prevalence	45

slightly. As the total score is the sum of all the scores, the range of total score would be 17-68 if the minimum score is 1 and the maximum score is 4 for each item. The more the score, the more the fear of movement and pain (24). In addition to good reliability and validity, this scale is benefitted from internal homoscedasticity ($\alpha=0.68-0.80$) (26).

SPSS v. 22 was used for statistical analysis. The linear relationships among the variables were analyzed by Chi-Square and Pearson correlation coefficient. The relationship between low back pain prevalence and other variables was determined using logistic regression. The level of significance was $\alpha = 0.05$ for all the analyses.

Results

80 ping pong players (male) have participated in the present study from premiere league and League 1 of Iran (2016-2017). Table 1 summarizes their personal features, table 2 the pain prevalence and table 3 the average low back pain intensity of the samples in different times. Table 4 shows the relationship between low back pain prevalence and some variables in lifetime (including odd ratio, CI: 95%) using logistic regression.

The result of the present study has shown that by 42.25% of the subjects had some degree of lumbar functional disability. The Oswestry functional disability and TSK were 7.93 ± 9.05 and 6.68 ± 39.33 , respectfully.

There isn't a significant correlation between age and the dominant hand in different times ($P>0.05$), i.e. age and the dominant hand have nothing to do with the low back pain prevalence. Both age and weight have a negative significant relationship with low back pain prevalence in different times ($P<0.05$), i.e. younger and lighter players are more prone to low back pain.

Table 3. The average back pain intensity of samples in different times

Variable	Total samples [mean (SD)]
Pain at the moment prevalence (VAS)	28.46 (17.24)
Last 6 months pain prevalence (VAS)	37.04 (17.55)
Past year pain prevalence (VAS)	35.94 (20.45)
Lifetime pain prevalence (VAS)	30.83 (15.56)
Level of functional disability (Oswestry)	9.07 (7.93)
Level of kinesiophobia (TSK)	39.33 (6.68)

Table 4. Variables relationship with back pain prevalence in lifetime

Variable	Odds ratio	CI 95%	Level of significance
Age	0.86	0.79–0.95	0.001
Height	0.94	0.88–1.01	0.1
Weight	0.95	0.9–1	0.05
Dominant Hand	1.11	0.38–3.25	0.84
Athletic Level	1.02	1–1.04	0.01

There's a positive significant relationship between low back pain prevalence and players levels (national ranking) ($P>0.05$). The higher level of the player, the more vulnerability to low back pain. The national team players are more vulnerable than those active in club level.

There isn't any significant relationship between low back pain prevalence and number of training days per week/number of training sessions per week/number of training sessions per day ($P>0.05$). But, there's a significant relationship between hours of training per session and low back pain prevalence ($P<0.05$), i.e. those train more than 3 hours a session are more vulnerable to low back pain.

The present study have shown a direct significant relationship between kinesiophobia index and present pain intensity of players ($P=0.04$) and also, a direct significant relationship between functional disability and pain at the moment intensity of players ($P=0.007$), i.e. the pain intensity is related to psychological factors in addition to physical ones.

Discussion

The results of the present study show that pain, functional impairment and kinesiophobia which have been caused by low back pain are prevalent problems among the subjects. Previous studies have shown the high prevalence of low back pain and damages among athletes (5, 27). But the results of the present study show that in addition to pain intensity, functional

impairment which has been caused by low back pain has great prevalence among elite ping pong players (about 43%). Also, present pain intensity has a direct significant relationship with kinesiophobia caused by low back pain (in addition to functional disability), i.e. the psychological aspect has a relationship with pain intensity (in addition to physical one). One could expect high prevalence of low back pain and the level of functional impairment and kinesiophobia caused by that in the subjects of the present study according to the following factors: high loads of training, compactness of competitions, short periods of rest between games and hard repetitive movements in any training session.

In the present study, there is a significant relationship between age and low back pain prevalence; the younger the player, the more the vulnerability to back pain. Many studies have shown the age as a risk factor for athletic damages; age has a close relationship with low back damages in young elite athletes (8, 28, 29). This is due to the fact that the growing spinal column are quite prone to damages especially in youth (8). Furthermore, most of the players start harsh trainings in the early days of adolescence in order to get to the higher levels as soon as possible. That's why younger players are more prone to low back pain.

In the present study, there is not a significant relationship between pain intensity and functional disability. There are different results about the relationship between low back pain intensity and functional disability caused by that; in some studies, there is strong direct relationship between them (the increase of the pain intensity leads to the increase of functional disability) (14, 15), but in some others, there is not such a relationship and (17, 30, 31) perhaps, this is due to the difference in individual response to low back pain intensity and its successive disabilities.

In the present study, there is a significant relationship between present pain intensity and kinesiophobia. Athletes may avoid harsh physical activity due to the fear of pain recur. It's also possible that fear of the movement affect the coping strategies and make the person even weaker (16). Researchers have even stated that the fear of the pain is more weakening than the pain itself (16, 31, 32).

As the subjects were elite ping pong players who had to train 1.5 hours a day to keep their athletic level, there was no significant relationship between low back pain prevalence and the following variables: number of training days per week/number of training sessions per week/number of training sessions per day.

The significant relationship between athletic level (national ranking) of the players and low back pain prevalence shows the more possibility of low back pain among higher level players rather than lower level ones. This is due to the competitions and

short intervals of rest for them. Despite that, there is no research which is concerning the relationship between the level of the players and low back pain prevalence.

There are some limitations in this study, although reliable and valid questionnaires were used on high athletic level samples; lack of clinical checkups, exclusion of lower level players and exclusion of female subjects.

Conclusion

The results of the present study indicate that pain prevalence, functional disability and kinesiophobia which have been caused by low back pain have high levels among elite Iranian ping pong players. In addition, there's a significant relationship between factors such as athletic level, training hours per session and weight (risk factors of low back pain), and low back pain prevalence. Also, it's been shown that low back pain intensity is related to psychological factors along with physical ones. It is suggested to do comprehensive researches for minimizing kinesiophobia in ping pong players using psychological methods focusing on decreasing this fear, along with protocols for decreasing the pain intensity, according to the significant relationship between pain intensity and psychological/physical aspects of the players.

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Authors' contributions:

All authors made substantial contributions to conception, design, acquisition, analysis and interpretation of data.

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