

# Health-Related Quality of Life of Wheelchair Fencers, Sedentary People with Disability and Conventional Fencers in Brazil, Assessed by Short Form 36 (SF-36)

Mirna Clemente<sup>1\*</sup>, Marilis Dallarmi Miguel<sup>1</sup>, Karina Bettega Felipe<sup>1</sup>, Ivan Marangon Schwantes<sup>2</sup>, Darlan França Ciesielski Junior<sup>2</sup>, Athos Marangon Schwantes<sup>2</sup>, Christian Burmeister Schonhofen<sup>2</sup>, Tabea Epp Kuster Alves<sup>1</sup>, Tiago Volpi Braz<sup>3</sup>, Luiz Claudio Fernandes<sup>1</sup>, Obdulio Gomes Miguel<sup>1</sup>

1. Federal University of Parana (UFPR), Brazil

2. Physical Disability Association of Parana (ADFP), Brazil

3. Methodist University of Piracicaba (UNIMEP), Brazil

## ABSTRACT

**Purpose:** *It is well established that physical exercise, in general, decreases anxiety and depression. Para sport or sport for people with disabilities is used as a rehabilitation strategy to improve their quality of life. This study aimed to investigate people with disabilities who practise wheelchair fencing, sedentary people with physical disability and conventional fencers, assessed by Short Form 36 (SF-36), by comparing the groups.*

**Method:** *Forty-two people from Physical Disability Association of Parana (ADFP) answered SF-36 and were divided into three groups: Conventional Fencers (CF), Wheelchair Fencers (WF), and Sedentary People with Physical Disability (SD).*

**Results:** *This study was the first to report the Health-Related Quality of Life (HRQOL) of conventional fencers, wheelchair fencers, and sedentary people with physical disability, using SF-36. The data demonstrated high scores in CF and WF, on seven SF-36 scales of the eight-scale profile, including functional and mental health, role physical, bodily pain, general health perception, vitality, social functioning, mental health. Moreover, the sedentary group had lower scores in most of the domains when they were compared to CF.*

**Conclusion:** *The results might provide supportive evidence that HRQOL of WF has demonstrated a positive effect on people with disability since para sport has been used as a rehabilitation programme.*

---

\* **Corresponding Author:** Mirna Clemente, Federal University of Parana (UFPR), Av. Pref. Lothário Meissner, 632-Jardim Botânico- 80210-170- Curitiba/Pr/ Brazil. Tel: +55 041 999196805. Email: mirnaclemente@yahoo.com

**Implication:** *The implementation of a public campaign is recommended, about sport as a health promoter for disability and rehabilitation. By involving healthcare providers from the area, people with disabilities can be encouraged to participate in para sport.*

**Key words:** *Wheelchair fencing, Health-Related Quality of Life (HRQOL) Short Form 36(SF-36), rehabilitation programme, para sport.*

## INTRODUCTION

Physical disability refers to impairment of the locomotor system caused by a kind of disease or injury that strikes the nervous, muscular and osteoarticular systems, alone or together (Silveira et al., 2012). People with disabilities have demonstrated more days of pain and less vitality compared to individuals without disabilities (Groff et al, 2009).

After ending the formal physical rehabilitation period, people with a physical disability still require some form of rehabilitation, using para sport or adaptive sports to replace formal physiotherapy (Groff et al, 2009).

One of the goals of rehabilitation for people with physical disabilities is to reach the highest possible level of life satisfaction (Groff et al, 2009), and there is strong evidence that sport in general has been used as a rehabilitation strategy to improve their Health-Related Quality of Life (HRQOL) (Yazicioglu et al, 2012). The number of people with a physical disability participating in para sports (competitive or recreational) has been increasing over the years (Winnick et al, 2004; Mauerberg-deCastro et al, 2016). The body and mind benefit not only from competitive sports participation, but also from recreational activities that have a positive impact on health. Moreover, early encouragement of an active lifestyle can have a good effect on the health promotion of these people (Wilson et al., 2010).

Besides, it is well established that physical exercise, in general, produces mood benefits in many of the same domains assessed by HRQOL scales, including decrease of psychological distress, anxiety, depression, and fatigue (Shapiro et al., 2016). Paralympic sport has demonstrated beneficial effects on physical and mental functioning, promoting life satisfaction for people with disabilities (Yazicioglu et al., 2012). Moreover, from sport people can learn health habits, developing self-esteem, building social skills and friendship (Fiorilli et al., 2013).

Wheelchair fencing arose from the adaptation of conventional fencing, which was presented for the first time in 1960 at the Stoke Mandeville Games (Nazareth, 2009). Although wheelchair fencing is a consolidated sport in most of the countries of Europe, little is known about HRQOL in people who practise it.

This research used the Medical Outcomes Study 36-item Short Form Survey (SF-36) to measure the HRQOL of people with physical disabilities who practise wheelchair fencing, as well as among the conventional fencers and sedentary people with a physical disability. The measure evaluates health status across eight scales including physical functioning, role limitations due to physical health problems, bodily pain, general health perceptions, vitality, social functioning, role limitations due to emotional issues and mental health (Ciconelli, 1997).

## **Objective**

This study aims to investigate the association between sport and the perceptions of wheelchair fencers as compared to sedentary people with a physical disability and fencers without disability, as assessed by the questionnaire SF-36. Moreover, encouraging people with disability to participate in para sports, may be a good strategy to improve their HRQOL. This research also intends to provide recommendations for future investigations relating to different kinds of para sports as health promoters.

## **METHOD**

### **Study Design**

This is a qualitative and a case-controlled study.

### **Study Sample**

Forty-two individuals from the Physical Disability Association of Parana (ADFP) were invited to answer the 36-Item Short Form Health Survey (SF-36).

The inclusion criteria were:

- Males associated with the ADFP,
- 18 years of age and older,
- Practising fencing for more than two years, with physical disability and/or without disability, and
- People with a physical disability, with no participation in sport.

The 42 individuals were divided into three groups: 1) Conventional Fencers (CF), 2) Wheelchair Fencers (WF), and 3) Sedentary people with a physical disability (SD).

Group 1: Conventional Fencers, comprising 14 healthy men, were invited to be the control group. The average age was 30.43 years. Although they did not have any physical impairment, they were all volunteers of the ADFP since the training for both conventional and wheelchair fencing is carried out at the same place. All of them were competitive athletes in the National competition in Brazil.

Group 2: Wheelchair Fencers were 14 in number. The average age was 33.54 years. Among them, 4 were amputees and 10 had spinal cord injuries. All the participants were competitive para athletes (5 of them having participated in international competitions and 9 in national competitions).

People with disability who wish to participate in Wheelchair Fencing competitions, must be classified according to the classification of International Wheelchair Fencing Committee rules, which are described in Table 1.

Group 3: Sedentary people with a physical disability (SD), comprising 14 men, were invited to be part of this group. The average age was 32.42 years. All of them were associated with the ADFP. They did not participate in any para sport and were not physically active.

**Table 1: Criteria of the Functional Classification of International Wheelchair Fencing Committee Rules (adapted from The International Wheelchair Fencing Committee Rules & Regulations)**

Class 1A	Athletes with no sitting balance who have a disabled playing arm. No efficient elbow extension against gravity and no residual function of the hand which makes it necessary to fix the weapons used in fencing (foil, épée or sabre) with a bandage. Tetraplegics with spinal lesions level C5/C6.
Class 1B	Athletes without sitting balance and affected fencing arm. Functional elbow extension but no functional finger flexion. The weapon (foil, épée or sabre) has to be fixed with a bandage. Comparable to complete tetraplegics level C7/C8 or higher incomplete lesion.



Class 2	Athletes with right sitting balance, without the support of legs and standard fencing arm, e.g., people with paraplegia from D10 to L2. Subjects with double above-the-knee amputation with short stumps, or incomplete lesions above D10 or comparable disabilities can be included in this class, provided that the legs can help in maintaining the sitting balance
Class 4	Athletes with right sitting balance with the support of lower limbs and standard fencing arm, e.g., with lesion below L4 or comparable disability. Minimal disability of lower limb comparable to a below-knee amputation

C5, C6, C7, C8 (Cervical spinal segment); D10 (Dorsal spine); L2, L4 (Lumbar spinal discs)

### Instrument

The SF-36 Health questionnaire or Medical Outcomes Study 36-item Short Form Survey (SF-36) is a questionnaire, which has been used extensively to quantify HRQOL, and has also been validated in Brazil (Ciconelli, 1997).

The SF-36 questionnaire consists of 36 items, which are used to calculate eight scales or domains of different health dimensions: Physical Functioning (PF), Role Physical Limitation (RP), Bodily Pain (BP), General Health (GH), Vitality (VT), Social Functioning (SF), Role Emotional Limitation (RE), and Mental Health (MH). The first four scores can be summed to create the Physical Composite Score (PCS), while the last four can be summed to create the Mental Composite Score (MCS), which provides a measure of the overall effect of physical and mental impairment. Scores for the SF-36 scales range between 0 and 100, with higher scores indicating better HRQOL. The SF-36 has been recognised as one of the most trusted measures of quality of life of people with spinal cord injury, workers with chronic pelvic pain and athletes with no physical impairment (Zhu et al., 2016).

### Statistical Analysis

To investigate the HRQOL analyses for SF-36 in each domain and summary, and to compare the groups, statistical analysis was carried out using the one-way analysis of variance (ANOVA) with Tukey's multiple comparison tests and/or Kruskal-Wallis test, followed by Dunn's test if the requirements for performing a parametric test were not satisfied. Results are demonstrated as mean  $\pm$  S.E.M. Statistical analysis was done using Graph Pad Prism Software (Graph Pad Software, Inc. La Jolla, CA, USA, version 7.0), significance was considered at  $p < 0.05$ .

## Ethics Approval

The local ethics committee (Federal University of Paraná) and their recommendation with number 2.294.303 approved the study protocol. The protocol for carrying out the study was developed by following the guidelines SRQR (Standards for Reporting Qualitative Research) with 21 items (O'Brien et al., 2014) and CARE (Consensus-based Clinical Case Reporting) (Gagnier et al., 2013). Participants were asked to complete the informed Consent Form before answering the questionnaire.

## RESULTS

Forty-two men who fulfilled the inclusion criteria were admitted to the study. The characteristics of the participants are described in Table 1 and the HRQOL, assessed by SF-36 questionnaire, were demonstrated by PF, RP, BP, GH, VT, SF, RE, MH, PCS, MCS, standard error of the mean (S.E.M). No significant differences were observed between the groups CF and WF, on the frequency of training, which was 3 to 4 times a week for both groups. However, the WF and the sedentary people with physical disability had lower level of education (graduation completed), 28.57% and 22.42 % respectively, compared to 71.42% of CF group.

On PF, RP, BP, SF, MH, PCS and MCS, there were statistically significant differences among the groups. No significant differences were found among the groups on the three scales: general health, vitality and role emotional limitation (Table 2).

**Table 2: HRQOL from CF, WF, and SD assessed by SF-36**

SF-36 SCALES	CF		WF		SD	
	N= 14		N= 14		N= 14	
	MEAN	S.E.M	MEAN	S.E.M	MEAN	S.E.M
Physical Functioning (PF)	96.43 ***	1.42	56.43 ***	6.49	30.11	5.07
Role Physical limitation (RP)	85.71 **	6.79	78.57	7.34	55.64	9.54
Bodily Pain (BP)	78.14 **	3.75	66.21	4.48	52.11	4.18
General Health Perception (GH)	73.07	4.22	65.21	4.10	60.43	5.42

Vitality (VT)	67.14	5.20	72.5	3.38	55.36	6.16
Social Functioning (SF)	92.86 **	3.86	87.5 ***	5.07	60.65	8.30
Role Emotional Limitation (RE)	92.85	5.16	61.85	11.51	59.47	12.68
Mental Health (MH)	76.29 **	3.96	72.57 ***	4.31	50.29	7.18
Physical Composite Score (PCS)	83.34 **	5.07	66.61 ***	4.55	50.31	7.19
Mental Composite Score (MCS)	82.29 **	6.38	73.61	5.27	56.44	2.34

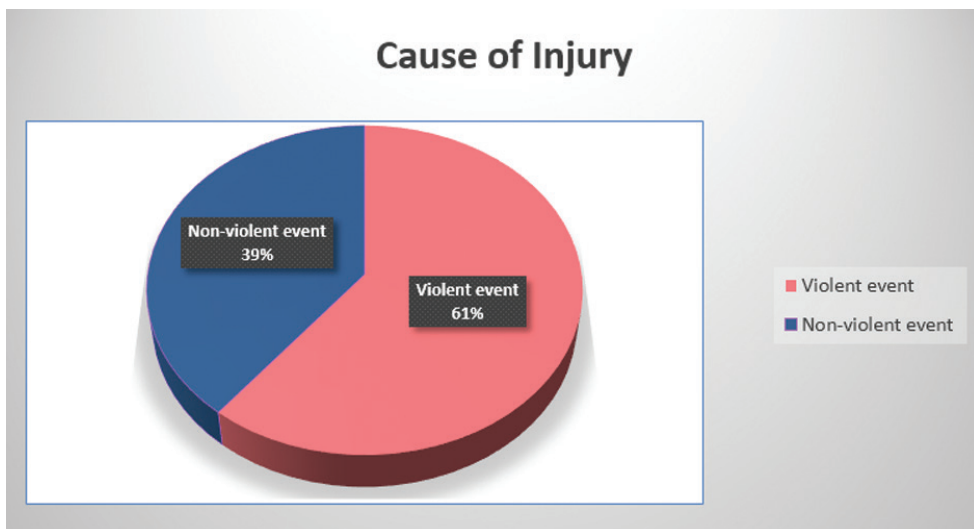
\* Statistically significant difference between groups CF and WF p < 0.05

\*\* Statistically significant difference between groups CF and SD p < 0.05

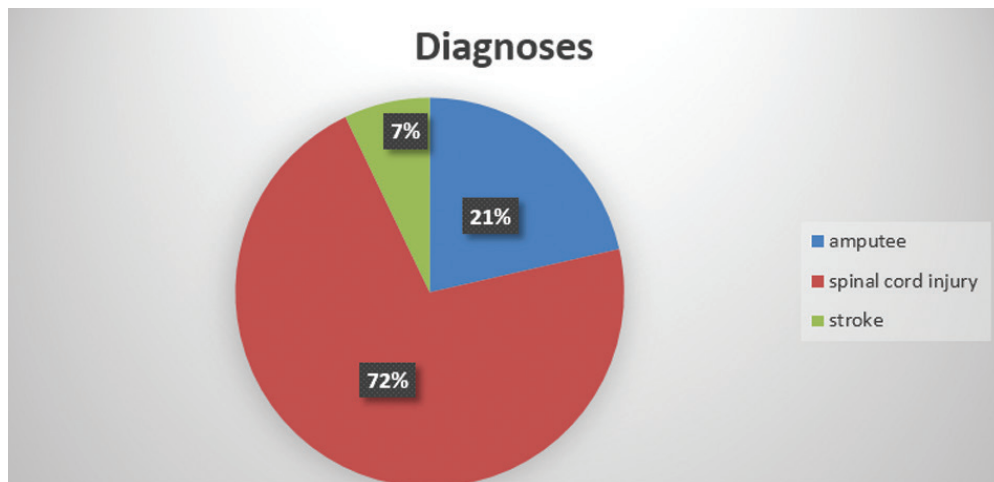
\*\*\* Statistically significant difference between groups WF and SD p < 0.05

Other variables collected for descriptive purposes included cause of injury (Figure 1) and diagnoses (Figure 2) from wheelchair fencers and sedentary people with physical disability.

**Figure 1: Cause of Injury for the Wheelchair Fencers and Sedentary People with Physical Disability in this study in percentages in the figure**



**Figure 2: Diagnoses of Wheelchair Fencers and Sedentary People with Physical Disability in this study in percentages in the figure**



## DISCUSSION

The present study aimed to compare HRQOL assessed by SF-36, among CF, WF and SD. Although a few studies using SF-36 with people with disability have been already reported in the literature (Fiorilli et al., 2013), none of them have dealt with the conventional fencers, wheelchair fencers and sedentary people with physical disability. The hypothesis of this study was to demonstrate that Paralympic sport, in this case fencing, as a rehabilitation process, might bring excellent benefits to people with a physical disability, in terms of their quality of life.

In this research, the results showed no statistically significant difference with CF in comparison to WF, on seven SF-36 scales: role physical, bodily pain, general health perception, vitality, social functioning, role emotional limitation and mental health. This is consistent with other research that linked sport to a higher quality of life (Kljajic et al., 2016). In contrast, when wheelchair fencers were compared to the sedentary group with a physical disability, the WF group had a higher score and with statistically significant differences on PF, SF, MH, and PCS. Corroborating these results, (Arango-Lasprilla et al., 2010) and (Kljajić et al., 2016) demonstrated that health related to the quality of life of active people with spinal cord injury was higher than when compared to the sedentary group.

It was no surprise that WF and SD had lower scores in the physical functioning and physical composite scores as compared to CF. In this study, 71.42 % of WF and 64.28% of SD were with spinal cord injury; this could cause many physical problems that lead to lower physical function and physical composite score (Arango-Lasprilla et al., 2010), demonstrating that, in this case, sport could not make any difference when comparisons were made to people without impairments. A study by (Lidal et al., 2008) demonstrated that PF scores were higher for those with less severe injuries compared to participants with a functionally completed spinal cord injury, also assessed by SF-36. This could explain why people with disability, in this study, could not reach higher scores in the physical scale and subscale as compared to healthy people. In contrast, WF had a higher score and demonstrated statistically significant differences, compared with the SD group, on the PF.

Role emotional limitation is compounded by the following items: work-related changes or same daily activity changes, as a result of psychological problems (Silqueira, 2005). In this study, RE was not statistically different among the three groups. In contrast, mental health and physical composite scores showed significant difference when WF and CF were compared with SD. MCS has also had similar results to both groups (WF and CF). Akin to this study, (Blauwet, 2005) demonstrated that the level of self-esteem had the same score among athletes with disabilities and athletes in the general population.

This study was able to demonstrate that WF and CF are more likely to have a similar experience of Health-Related Quality of Life (HRQOL) in most of the domains. Both CF and WF groups had higher scores than the SD group. The data corroborates that of (Fiorilli et al., 2013), which has shown the effect of competitive Olympic or Paralympic sport might stimulate a positive complex system in athletes without and with disability on vigour and vitality, and lower on tension, fatigue and depression, than people in general.

All the findings support the importance of conducting more research in qualitative studies, which should investigate HRQOL of individuals with a disability participating in other Paralympic sports. The findings demonstrated that sport, as a rehabilitation programme for wheelchair fencers, was the reason for the high score in most of the domains and responsible for improving their quality of life.



## **Limitation**

A limitation of this study was the small size of the study sample. However, in Brazil, only a small number of people engage in Para sport, in this case in wheelchair fencing. Moreover, the public health system in Brazil is affected by lack of finances, due to which many people with disability have not accessed rehabilitation programmes. Using sport as a rehabilitation programme could be an excellent strategy, since wheelchair fencing has demonstrated that it has improved people's quality of life.

## **CONCLUSION**

According to the data in this study, the HRQOL showed high and similar scores for WF, as compared to CF, on seven scales and was lower only in the physical functioning. Compared to SD, WF showed a higher score in four of the domains assessed by SF-36.

These results might provide supportive evidence that Para sport has had a positive effect on wheelchair fencing individuals since it has been used as a rehabilitation programme. The implementation of a public campaign about disability and rehabilitation is recommended, involving healthcare providers from this area to encourage people with disability to be part of Paralympic sport, either recreational or competitive, to improve their HRQOL.

## **ACKNOWLEDGEMENT**

This study was funded and supported by Federal University of Parana: Pharmaceutical Science Department, Physical Disability Association of Parana (ADFP) Fencing in Parana. It was also financed in part by the Coordination for the Improvement of Higher Education Personnel (CAPES) in Brazil- Financial code 001.

## **Conflict of interest**

The authors declare that they have no conflict of interest to be disclosed.

## **REFERENCES**

Arango-Lasprilla, Juan Carlos, Nicholls, Elizabeth, Olivera, Silvia Leonor, Perdomo, Jose Libardo and Arango, Jose Anselmo (2010). Health-related quality of life in individuals with spinal cord injury in Colombia, South America. *NeuroRehabilitation*; 27(4): 313–319.

Blauwet, Cheri (2005). Promoting the health and human rights of individuals with a disability through the paralympic movement. International Paralympic Committee.

Ciconelli, Rozana Mesquita (1997), Tradução Para o Português e Validação Do Questionário Genérico de Avaliação de Qualidade de Vida "Medical Outcomes Study 36-Item Short-Form Health Survey (SF-36)". Tese (doutorado) Universidade Federal de São Paulo: 01-120.

Fiorilli, Giovanni, Iuliano, Enzo, Aquino, Giovanna, Battaglia, Claudia, Giombini, Arrigo, Calcagno, Giuseppe and Di Cagno, Alessandra (2013). Mental health and social participation skills of wheelchair basketball players: A controlled study. *Research in Developmental Disabilities*; 34(11): 3679-3685. <https://doi.org/10.1016/j.ridd.2013.08.023> PMID:24012595

Gagnier, Joel J., Kienle, Gunver, Altman, Douglas G., Moher, David, Sox, Harold, Riley, David, Allaire, Alyshia, Aronson, Jeffrey, Carpenter, James, Gagnier, Joel, Hanaway, Patrick, Hayes, Carolyn, Jones, David, Kaszkin-Bettag, Marietta, Kidd, Michael, Kiene, Helmut, Kienle, Gunver, Kligler, Ben, Knutson, Lori, Koch, Christian, Milgate, Karen, Mittelman, Michele, Oltean, Hanna, Plotnikoff, Greg, Rison, Richard Alan, Sethi, Anil, Shamseer, Larissa, Smith, Richard and Tugwell, Peter (2013). The CARE guidelines: Consensus-based clinical case reporting guideline development. *Headache*; 53(10): 1541-1547. <https://doi.org/10.1136/bcr-2013-201554> PMID:24155002 PMCID:PMC3822203

Groff, Diane G., Lundberg, Neil R. and Zabriskie, Ramon B. (2009). Influence of adapted sport on quality of life: Perceptions of athletes with cerebral palsy. *Disability and Rehabilitation*; 31(4): 318-326. <https://doi.org/10.1080/09638280801976233> PMID:18608427

Kljajic, D, Eminovic, F, Dopsaj, M, Pavlovic, D, Arsic, S and Otasevic, J (2016). The impact of sports activities on quality of life of persons with a spinal cord injury: VPLIV SPORTNIH AKTIVNOSTI NA KAKOVOST ZIVLJENJA OSEB S POSKODBO HRBTENJACE. *Zdr Varst*; 55(2): 94-101. <https://doi.org/10.1515/sjph-2016-0014> PMID:27284378 PMCID:PMC4845769

Lidal, I. B., Veenstra, M., Hjeltnes, N. and Biering-Sørensen, F (2008). Health-related quality of life in persons with long-standing spinal cord injury. *Spinal Cord*; 46(11): 710-715. <https://doi.org/10.1038/sc.2008.17> PMID:18332888

Nazareth, Valber lazaro (2009). ESGRIMA EM CADEIRA DE RODAS: Pedagogia de Ensino a Partir Das Dimensoes e Contexto Da Modalidade. Tese.

O'Brien, Bridget C, Harris, Ilene B, Beckman, Thomas J, Reed, Darcy A, Cook, David A (2014). Standards for reporting qualitative research: A synthesis of recommendations. *Academic Medicine*; 89(9): 1245-1251. <https://doi.org/10.1097/ACM.0000000000000388> PMID:24979285

Shapiro, Deborah R, Malone, Laurie A (2016). Quality of life and psychological affect related to sport participation in children and youth athletes with physical disabilities: A parent and athlete perspective. *Disability and Health Journal*; 9(3): 385-391. <https://doi.org/10.1016/j.dhjo.2015.11.007> PMID:26747413

Silqueira, Salette Maria de Fátima (2005). O Questionário Genérico SF-36 Como Instrumento de Mensuração Da Qualidade de Vida Relacionada a Saúde de Pacientes Hipertensos. Tese

Silveira, Marcelo Dalmédio, Costa e Silva, Anselmo de Athayde, Godoy, Priscila Samora, Calegari, Décio Roberto, Araújo, Paulo Ferreira de; and Gorla, José Irineu (2012). Correlação

Entre Dois Testes de Agilidade Adaptados: Handebol Em Cadeira de Rodas. Revista da Sobama; 13(2): 43-48.

Wilson, Pamela E, Clayton, Gerald H (2010). Sports and disability. *PM and R*; 2(3): S46-S54. <https://doi.org/10.1016/j.pmrj.2010.02.002> PMID:20359679

Winnick JP, Porretta DL (2017). *Adapted physical education and sport. Sixth Edition.* Champaign, IL : Human Kinetics.

Yazicioglu, Kamil, Yavuz, Ferdi, Goktepe, Ahmet Salim and Tan, Arif Kenan (2012). Influence of adapted sports on quality of life and life satisfaction in sport participants and non-sport participants with physical disabilities. *Disability and Health Journal*; 5(4): 249-253. <https://doi.org/10.1016/j.dhjo.2012.05.003> PMID:23021735

Zhu, Yu Xia, Li, Ting, Fan, Shang Rong, Liu, Xiao Ping, Liang, Yi Heng and Liu, Ping (2016). Health-related quality of life as measured with the short-form 36 (SF-36) questionnaire in patients with recurrent vulvovaginal candidiasis. *Health and Quality of Life Outcomes*; 14(1): 1-6. <https://doi.org/10.1186/s12955-016-0470-2> PMID:27129474 PMCID:PMC4850632