

# Accepted Manuscript

Medication and Supplement Use in Disability Football World Championships

Daniel Broman, Osman Hassan Ahmed, Philippe M. Tscholl, Richard Weiler

PII: S1934-1482(17)30380-5

DOI: [10.1016/j.pmrj.2017.02.017](https://doi.org/10.1016/j.pmrj.2017.02.017)

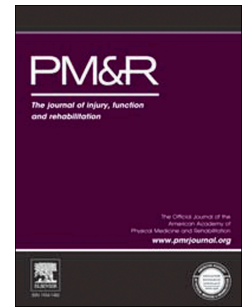
Reference: PMRJ 1872

To appear in: *PM&R*

Received Date: 14 June 2016

Revised Date: 16 February 2017

Accepted Date: 19 February 2017



Please cite this article as: Broman D, Ahmed OH, Tscholl PM, Weiler R, Medication and Supplement Use in Disability Football World Championships, *PM&R* (2017), doi: 10.1016/j.pmrj.2017.02.017.

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

# Medication and Supplement Use in Disability Football World Championships

---

**Authors:** Daniel Broman<sup>1,2</sup>  
Osman Hassan Ahmed<sup>1,3</sup>  
Philippe M. Tscholl<sup>4,5</sup>  
Richard Weiler<sup>1,2,6</sup>

**Institutions:** <sup>1</sup>The FA Centre for Disability Football Research  
St. George's Park  
Burton-upon-Trent, UK  
DE13 9PD

<sup>2</sup>Institute of Sport, Exercise & Health  
University College London  
170 Tottenham Court Road,  
London, UK  
W1T 7HA

<sup>3</sup>Department of Physiotherapy,  
Poole Hospital NHS Foundation Trust,  
Longfleet Road,  
Poole, Dorset, UK  
BH15 2JB

<sup>4</sup>Division of Orthopedics and Trauma Surgery,  
Geneva University Hospital,  
1201 Geneva,  
Switzerland.

<sup>5</sup>FIFA Medical Assessment and Research Center (F-MARC)  
Schulthess Clinic, 8008 Zurich,  
Switzerland

<sup>6</sup>Fortius Clinic,  
17 Fitzhardinge Street,  
London, UK  
W1H 6EQ

**Corresponding Author:** Dr. Daniel Broman MBChB MSc MRCP(UK) DipSEM MFSEM  
**Address:** The FA Centre for Disability Football Research  
St. George's Park  
Burton-upon-Trent, UK.  
DE13 9PD  
**Tel:** (+44) 7944580979  
**E-mail:** Daniel.Broman@thefa.com  
DBroman@readingfc.co.uk  
DanielBroman@nhs.net

**Keywords:** Medications, Nutritional Supplementation, Non-Steroidal Anti-inflammatory Drugs, Disability Football, Soccer

## **Abstract**

**Background:** Individuals with an impairment make up over 15% of the world's population, many of whom can benefit greatly from participation in sport. The provision of medical services in disability sport is a challenging area with a lack of scientific evidence. Given the positive impact that sport can have on the people with an impairment, it is vital that measures are taken to better understand the medical issues posed by disability sport. It is well established that medications and supplements are over-used in sport, particularly within professional football, but there is no current evidence on medication or supplement use in elite disability football.

**Objective:** To examine and describe the use of medication and supplements in disability football, prior to and during international tournaments, and to identify the profile of substances used by category.

**Design:** Prospective, descriptive, cohort study.

**Setting:** International Blind Sport Association (IBSA) Football World Cup 2015 and the International Federation of Cerebral Palsy Football (IFCPF) World Cup 2015.

**Participants:** Two hundred and forty-two elite level disability footballers, classified with B1 visual impairment or cerebral palsy.

**Methods:** Team clinicians were asked to document all medication and supplements taken in the 48 hours prior to each match.

**Results:** This study recorded the use of 1648 substances in 242 players, with more than half (53.1%) classified as supplements. There was an overall rate of 1.26 substances used per player per match and a medication use rate of 0.59 medications per player per match. Seventy percent (170/242) of players reported using at least one substance per tournament, with 57.9% (140/242) using at least one prescribed medication (63.6% of players at IBSA World Games and 57.7% of players at IFCPF World Cup). The most commonly prescribed

category of medications was non-steroidal anti-inflammatory drugs (NSAIDs), representing 39.3% of all reported medications.

**Conclusion:** This study highlights the potential overuse of medication and supplements in disability football, particularly in the use of NSAIDs. These trends are comparable to previous research in FIFA World Cup competitions.

## **Introduction**

The World Health Organization reports that there are more than 1 billion people world-wide with a form of impairment, representing over 15% of the world's population.<sup>1</sup> Individuals with an impairment can benefit greatly from exercise, particularly team sport, which brings with it added physical, psychological and social benefits.<sup>2,3</sup> From a healthcare perspective, the provision of medical services in disability sport presents many challenges not faced elsewhere and has been described as "the most challenging and rewarding area of sports medicine".<sup>4</sup> Given the positive impact that sport can have on people with an impairment, it is vital that measures are taken to better understand the medical issues posed by disability sport,<sup>5</sup> to further safeguard athlete welfare. The Football Association created the Centre for Disability Football Research (FA-CDFR) in England, which shares Fédération Internationale de Football Association (FIFA) aspirations and commitment to "Football for Health" and aims to improve the care of athletes with an impairment through medical research in this field of sports medicine.

The use of medication has been vital throughout medical history to help prevent and treat disease. More recently, the legal and prohibited use of medical ingredients has moved into elite sport to aid recovery from injury and enhance health and performance. It is well established that medications, in particular non-steroidal anti-inflammatory drugs (NSAIDs), are over-used in sport.<sup>6-21</sup> Concerns have been raised about the legal use of prescribed medications in sport and the potential drug-related adverse effects this may pose to athletes. A variety of medicines are permitted for athlete use to cure illness, treat injury and obtain a competitive edge<sup>6</sup>.

At the Sydney Olympic Games 78% of athletes used medication or supplements, with five athletes using more than 18 substances in a single day.<sup>6</sup> In a similar study of Olympic athletes outside of competition, 40.6% of elite Serbian athletes were reported to be taking medications, totalling 1.98 medications per athletes.<sup>8</sup> This study also found significantly higher rates of medication use in team sports rather than individual events (3.64 vs. 2.63 medications per user,  $p < 0.01$ ). A study of Finnish Olympic athletes<sup>9</sup> compared medication use in their cohort against a representative age-matched sample found that athletes use significantly more medications than controls (74.4% vs. 56.4%,  $p < 0.001$ , OR 2.30). At the Athens Paralympic Games 2004, 64.2% of athletes declared use of medication or food supplement, with NSAIDs (9.8%) and other analgesia (5.6%) being most commonly used medication<sup>10</sup>. In this study the overall incidence of medication use per athlete was lower in Paralympic athletes than their Olympic counterparts and fewer individual Paralympic athletes used a high number of medications when compared to individual Olympic athletes<sup>10</sup>. In contrast with these findings, a later study with direct comparison of medication use in Paralympic and Olympic athletes<sup>11</sup> concluded that the use of physician-prescribed medication, especially those used to treat chronic disease, is higher in Paralympic athletes than Olympic athletes with the exception of asthma medicines.

The Fédération Internationale de Football Association Medical Assessment and Research Centre (F-MARC) have been systematically monitoring and recording the use of medication and nutritional supplements in international football since the 1998 FIFA World Cup.<sup>16,18,20</sup>

Table 1 demonstrates the results of research on the use of medications in FIFA World Cups. The most frequently prescribed category of medication during FIFA tournaments was NSAIDs, representing 36% of all substances used. The results of the published data on

medication use in elite football has greatly concerned FIFA, with the conclusion that “the high intake of medications in international football - especially of NSAIDs - is alarming and should be addressed”.<sup>20</sup>

The use of nutritional supplements among elite athletes is well documented with studies reporting that 45%-81.9% of Olympic athletes use dietary supplements.<sup>6-7,12-13</sup> At the Athens Paralympic Games 2004, 42.1% of athletes used food supplements with vitamins (43.5%), minerals (16.1%) and proteins (10.5%) being most popular<sup>11</sup>. A comparison of the prevalence of supplement use in FIFA World Cups<sup>29</sup> is summarised in Table 2 and suggests supplement use in elite football is less prevalent than in Olympic sports. The use of supplements for immunological and nutritional reasons has been declared as unnecessary in athletes with an adequate diet and when using supplements, it is important to consider the chance of contamination<sup>22,23</sup> and the potential for adverse side-effects.<sup>24-26</sup> The regulations governing the purity of dietary supplements are not always as stringent as the pharmaceutical production of clinical drugs, which could result in contamination leading to the potential of a failed doping test and a subsequent ban from sport.<sup>27,28</sup>

In the current medical literature, there are no studies investigating the use of medications and supplements in elite disability football. By analysing the use of medications and supplements in disability football, the medical profession will begin to learn more about athlete medical needs, tournament medical planning and medical management of these athletes. This would potentially reduce the risk of iatrogenic side effects, showing better consideration of the risk-benefit profile of substance use in athletes and improve athlete welfare.



128

129 The aim of this study is to determine and quantitatively describe the use of medication and  
130 supplements in disability football during elite international tournaments, and to identify the  
131 profile of substances used by category. This will generate new knowledge and advance  
132 understanding within disability football medicine.

133

134

135

136

137

138

139

140

141

142

143

144

145

146

147

148

149

150

151

## **Methods**

### **Study Design**

A prospective, cohort study was performed investigating the use of medication and supplements in elite disability football.

### **Data Collection**

The methodology chosen was analogous to that used by F-MARC,<sup>16,20</sup> in similar studies at FIFA World Cups. In connection with the medical provision for the International Federation of Cerebral Palsy Football (IFCPF) World Cup 2015 and the International Blind Sports Association (IBSA) World Games 2015 Football Tournament, a designated member of each nation's medical team were asked to enter, in English, any medications or supplements taken by the players or administered to them in the 48 hours preceding a match on a data collection sheet (Appendix 1). One person per team was asked to record all data to avoid duplication of results. The assigned individual was the national team doctor unless the team did not have a doctor on their staff, in which case the data was collected by the team physiotherapist. All data was entered in English and where English language skill was limited the official team liaison officer for the nation, who was bi-lingual with English and the mother tongue of the nation, supported the designated medical professional with translation. In the previous research during FIFA World Cups<sup>16,20</sup> the data was collected for any substance taken 72 hours before each match, however this was adapted due to the period between matches being shorter than 72 hours in disability football. The designated team medical personnel were educated in regards to the project through a presentation on the research proposal at the tournament medical meeting and via a written information

sheet (Appendix 2). Ethical approval was granted by the University College London Ethics Committee (Project ID - 6247/001).

### **Participating Players**

The IFCPF World Cup 2015 at St. George's Park in England, consisted of 15 national teams with each country having a squad of 13 or 14 athletes. The IBSA World Games 2015 Football Tournament in Seoul, South Korea, consisted of 9 national teams with each country having a squad of 9 or 10 athletes. This equated to 242 athletes eligible for inclusion in the study, with our data collection covering a total of 826 player-matches.

The IFCPF World Cup involves athletes with cerebral palsy (CP) who have ataxia, hypertonia or athetosis, causing a permanent and verifiable activity limitation. CP football uses a classification system, which groups athletes depending on how their impairment impacts performance, and CP football includes 4 classes, called FT5, FT6, FT7 and FT8. As CP football is a team (7-a-side) sport, classification aims at ensuring fairness in regards to the impact of impairment between both teams.

The IBSA World Games Football Tournament involves athletes who have a visual impairment classed as B1, B2 or B3, participating in 5-a-side football matches. Our cohort included athletes classified as B1, which is defined as visual acuity poorer than LogMAR 2.6, and is the only visual impairment classification at Paralympic Games. Our study did not include B2/B3 athletes which are classifications of visual impairment but who do not participate in Paralympics. Visual impairment can arise from a variety of conditions, including genetics, prenatal developmental differences or from illness or trauma.

199

## 200 **Substance Classification**

201 The active pharmaceutical ingredient of each substance was identified to categorise the  
202 medication or supplement into one of the following: Analgesia and anti-inflammatory  
203 medications (NSAIDs, other analgesia, local anaesthetics), muscle relaxants, respiratory  
204 agents, gastrointestinal medications, antimicrobial medications, antihistamines,  
205 supplements and others. This classification is consistent with previous pharmaco-  
206 epidemiological studies in sport.<sup>6-21</sup>

207

## 208 **Data Presentation**

209 The primary outcome measure of interest was the incidence of substance consumption. This  
210 was determined by calculating: (i) The number of individual athletes reported to be using a  
211 substance per tournament; (ii) Mean substance use/player/match; (iii) Mean substance  
212 use/player/tournament. The proportion (%) of each type of medication, by classification,  
213 was also monitored and analysed.

214

## 215 **Statistical Analysis**

216 The statistical approaches applied were frequency analysis, cross-tabulations and Pearson's  
217 correlations. Chi-square ( $\chi^2$ ) tests were used for analysis of substance categories. Mean  
218 values and 95% confidence intervals were calculated using SPSS 22.0 (SPSS Inc. Chicago, IL,  
219 USA). A p-value of <.05 was accepted as statistically significant.

220

221

## **Results**

At the two disability world championships (IBSA World Games 2015 Football Tournament and IFCPF World Cup 2015) we studied 242 male, elite international disability football players, with an age range from 17 to 43 (mean age =  $26.02 \pm 5.14$  years).

A total intake of 1648 substances (medication or supplement) was reported, of which more than half (53.1%) were classified as supplements. There were a wide range of medications prescribed with the most commonly used categories being NSAIDs (39.3%), “other analgesia” (14.7%) and antihistamines (12.7%), as seen in Figure 1.

During the two tournaments, the incidence of substance use was 1.26 substances (0.59 medications) per player per match, with the highest substance use in an individual athlete being 8 substances (6 medications) per match. Four national teams, all of which were participating in the IFCPF World Cup, gave NSAIDs to every player before every match of the tournament. Seventy percent (170/242) of players reported using at least one substance per tournament with 57.9% (140/242) using at least one medication per tournament (63.6% of players at IBSA World Games and 57.7% of players at IFCPF World Cup), see Table 3. Twenty nine percent of players reported no medication or supplement use during their respective tournament.

Significantly fewer medications and supplements were taken by blind footballers at the IBSA World Games 2015 Football Tournament than in footballers with cerebral palsy at the IFCPF World Cup 2015 (4.67 vs. 7.46 substances/player/tournament,  $p = .003$ ).

### **Non-Steroidal Anti-Inflammatory Drugs and Analgesia**

NSAIDs were the most frequently prescribed group of medications, representing 39.3% of all reported medications (Figure 1). 38% ( $n = 92$ ) of players took a NSAID at least once during the tournament, with 18 players using a NSAID before every match, independent of whether they played or not. Substantial differences were observed between the various national teams with two clinicians giving NSAIDs to every player before every match, where as another team did not report using a NSAID during the entire tournament. Ten players reported using more than one preparation of NSAID at the same time, often by combining NSAIDs via the oral and topical routes. There was no statistical difference between the use of NSAIDs at the IBSA World Games 2015 Football Tournament and at the IFCPF World Cup 2015.

Other analgesia accounted for 14.7% of all medications used at the tournament. Of these 92% were Paracetamol, but Codeine and Tramadol were also used on occasion. There were only three instances of use of local anaesthetic or corticosteroid injections in this cohort.

### **Antihistamines**

Antihistamines were the second most commonly prescribed category of medication (98 out of 773 medications) with all of these being prescribed and taken at the IFCPF World Cup 2015. In 61 out of the 98 (62.2%) instances of antihistamine use they were taken via the oral

route. The remaining cases used topical antihistamine (30/98), intraocular antihistamine (6/98) and in one instance an IV dose of Chloranphenamine was given for anaphylaxis.

### **Medications for the Respiratory Tract**

Within this cohort, 10 athletes (4.1%) had diagnosed asthma or exercise-induced bronchospasm and therefore used respiratory medications. We recorded 84 respiratory drugs being used before matches over the tournament, which represented 5.1% of all substances used and 10.9% of all medications used. As one would expect, the majority of these were inhaled  $\beta$ 2-agonist (n = 66, 78.6%) and inhaled corticosteroids (n=14, 16.7%).

### **Supplements**

Supplements represented a large volume (875/1648, 53.1%) of the substances taken during the tournaments. Vitamins were the most commonly used supplement (420/1648, 48%), followed by minerals (289/1648, 33%) and creatine (157/1648, 18%).

Five teams used multivitamins on every player in their squad before every match in the tournament and some athletes were identified to take up to 6 different supplements before a match.

### **Relationships with Player Exposure and Team Success**

At both tournaments, there was no significant correlation between the number of matches played by each player and the total substances used, total medications used or total NSAIDs used. There was no statistically significant correlation between the success of the team

(measured by final ranking) in the tournament and the mean number of substances used per player.

## **Discussion**

This is the first study investigating medication and supplement use in elite disability football, in comparison to prior studies which looked at either a country-specific cohort<sup>11</sup> and/or a cohort of all athletes at a Paralympic Games<sup>10</sup>. The results from the present study indicate the widespread use of medications and supplements at two disability football world cups. In total, we recorded the use of 1648 substances for 242 players, playing an average of 3.18 matches each. More than half (53.1%) were classified as supplements, with a rate of 1.26 substances (0.59 medications) per player per match. This trend is slightly lower than seen in previous research in football<sup>28</sup> at FIFA World Cups, where male footballers have a rate of 0.77 medications per player per match and female footballers report a rate of 0.85 medications per player per match. The results are, however, comparable to the rate of medication use in the U-20 and U-17 FIFA World Cups, where players are reported to use 0.51 medications per player per match. The number and proportion of disability footballers using medications is however much higher than in footballers participating in FIFA World Cups, with our study finding 57.9% of players using at least one medication per tournament, compared to 48.2% of elite male footballers<sup>17</sup> and 37.9% of elite female and youth footballers.<sup>16</sup> This trend might reflect the possibility that athletes with an impairment have a higher rate of injury than able-bodied athletes<sup>29-31</sup> or may be due to these athletes being



more commonly prescribed regular medications to manage chronic medical conditions. Do disability footballers have more co-morbidities and so require regular medications? Do they suffer more overuse injuries because of their disability and subsequent biomechanical differences? Do athletes with an impairment have altered pain perception resulting in increasing analgesic requirements? These questions, and many more, are all relevant to this study and remain unanswered but are potential targets for future research in the field of disability sport.

### **Non-Steroidal Anti-Inflammatory Drugs**

Previous research in able-bodied athletes has revealed high and unexpected levels of medication use especially of NSAIDs.<sup>6-19</sup> In keeping with much of this research, NSAIDs were by far the most commonly used medication in disability footballers in our cohort, representing 39.3% of all medications used. Over one third (n = 92, 38%) of all players took a NSAID at least once during the tournament, with 18 players (7.4%) using a NSAID before every match, and with 6 players (2.5%) using two or more different preparations of NSAID concurrently. The findings are lower than the 54.5% of male players, 50.9% of female players and 43.4% of adolescent players using NSAIDs at FIFA World Cups.<sup>32</sup> As suggested in previous studies our findings on use of NSAIDs in sport are alarming and go against current guidelines,<sup>33,34</sup> which recommend using the lowest possible dose and for shortest possible period and using one preparation of NSAID at a time. Of particular concern was the fact that one national team used topical NSAIDs on every player before every match, independent of whether the player was starting a match or was a substitute.

One possible explanation for the high rate of NSAID use is the readiness of doctors, physiotherapists, coaches and players to use this class of medication prophylactically to mask pain and allow continuation in sport, rather than to treat injury, but this practice needs to change to reduce the potential iatrogenic side-effects of NSAIDs. Endurance athletes who use NSAIDs have an almost five times higher incidence of adverse events.<sup>35,36</sup> NSAID-associated gastrointestinal adverse events and changes in renal function and nephritis have been reported in athletes taking NSAIDs during exercise.<sup>37,38</sup> NSAIDs can also have a negative effect on bone turnover and osteoblast activity<sup>39,40</sup> and this is particularly important in our cohort as CP is associated with osteoporosis and osteopenia.<sup>41,42</sup> The clinical use of NSAIDs should therefore be balanced between the potential benefits and side effects and should follow clinical guidelines.

The risks associated with NSAIDs<sup>35-40</sup> can be reduced by using alternative analgesia, such as Paracetamol, which has a similar analgesic success.<sup>43</sup> Despite this fact, alternative analgesia, mainly (92%) composing of Paracetamol, only represented 14.7% of all medications used at the disability football world cups. Therefore, where analgesia is required, one potential target to reduce NSAID-associated risks is to try to manage pain by using Paracetamol rather than NSAIDs.

### **Antihistamines**

The relatively high use of antihistamines at the IFCPF World Cup is likely to reflect the fact that the tournament took place in summer, with high pollen counts affecting the local environment in the UK at this time of year.

### **Supplements**

The use of supplements in disability football is relatively common, with 53.1% of the substances used at the tournaments being classed as supplements, and with 30.2% of all players taking at least one supplement during the tournaments. These figures compare closely to the supplement use in FIFA World Cups, where 33.4% of male footballers and 45.6% of female footballers use supplements. The trends are, however, lower than the documented use of supplements in Olympic athletes, which ranges from 45% - 81.9%.<sup>6-9</sup> The use of supplements, for immunological and nutritional reasons, is often unnecessary in athletes with an 'adequate' diet and when using supplements it is important to consider the chance of contamination<sup>22,23</sup> and the potential for adverse side-effects.<sup>23-25</sup> The findings of this study suggest that supplements are not overused in disability football when compared to other forms of football or other sports.

### **Limitations to the study**

Within this study there are various limitations which need to be considered when analysing the data and ahead of further research in this field. The data in the study comes directly from official team clinicians on their prescribing patterns with the involvement of players, but data was not taken from players themselves, which may raise an issue with concordance. Self-medicating athletes who did not disclose the use of certain substances were not included in our data set because their data could not be recorded or accounted for, which could underestimate the true prevalence of medication use. The information reported was also not verified by blood analysis so could not be objectively confirmed. Another aspect to consider is that in studies taking data from team physicians, the use of regular medications might have been excluded by the clinician because they did not actually

prescribe those medications, which might further underestimate the true use of medications in athletes. Also, whilst this study looked at the prevalence of substance use and the types of medications and supplements used, it did not investigate the underlying reasons for this current practice. Accurate medication recall is very important to the validity of pharmaco-epidemiological studies and therefore this study endeavoured to account for this by asking clinicians to promptly record in a written manner substance given, but unfortunately this aspect of monitoring substance use cannot be fully controlled.

### **Conclusions**

The present study highlights the problems with overuse of medication in elite disability football and indicates that the current use of NSAIDs in disability football is high but is slightly lower than the “over-use”<sup>16,18</sup> seen in professional football. It also suggests the use of supplements is comparable to that seen in FIFA World Cups. This study highlights the need for more research to establish the injury and illness patterns in disability sport to better link the use of medical substances, and to understand the reasons as to why athletes use medications and supplements. F-MARC have campaigned to reduce the use of NSAIDs in professional football and have initiated an education programme for clinicians, but more work is needed to spread this message within disability football.

### **Acknowledgements**

The authors highly appreciate the co-operation of team clinicians at the International Federation of Cerebral Palsy Football (IFCPF) World Cup 2015 and the International Blind Sports Association (IBSA) World Games 2015, who provided the data for this project and we would like to thank them for their role in the data collection.

The authors would also like to thank the FA Centre for Disability Football Research (FA-CDFR) and Professor Jiri Dvorak at F-MARC for their support with the research.

### **Competing Interests**

None.

### **Funding**

The research was self-funded with no external sources of funding.

**Tables and Figures**

<b>Tournament</b>	<b>Teams</b>	<b>Players</b>	<b>Matches</b>	<b>Reports</b>	<b>Medications Prescribed</b>	<b>Intake of Medication (per player, per match)</b>
FIFA World Cup 2014	32	736	64	2944	2346	0.80
FIFA World Cup 2010	32	736	64	2944	2335	0.79
FIFA World Cup 2006	32	736	64	2944	2052	0.70
FIFA World Cup 2002	32	736	64	2944	2392	0.81
FIFA Women's WC 2007	16	336	32	1344	1200	0.89
FIFA Women's WC 2003	16	320	32	1280	1036	0.81
FIFA U-20 World Cup 2007	24	504	52	2184	965	0.44
FIFA U-20 World Cup 2005	24	504	52	2184	1248	0.57
FIFA U-17 World Cup 2007	24	504	52	2184	1036	0.47
FIFA U-17 World Cup 2005	16	320	32	1280	717	0.56

**Table 1 - Medication Use at FIFA World Cups**

Tournament	Supplement per Match N (%)	Supplement per Tournament N (%)
FIFA World Cups 2002-2014	2985 (25.3%)	984 (33.4%)
FIFA Women's World Cups 2003-2007	880 (33.5%)	229 (45.6%)
FIFA U-20 & U-17 World Cups 2005-2007	3104 (39.6%)	906 (49.5%)

**Table 2 - Supplement Use at FIFA World Cups<sup>27</sup>**

Medication Category	IBSA World Games 2015 Football Tournament		IFCPF World Cup 2015	
	No. of players (n = 48)	% of players	No. of players (n = 194)	% of players
Any Medication	28	63.6%	112	57.7%
NSAIDs	19	39.6%	73	37.6%
Other Analgesia	19	39.6%	37	19.1%
Injections	2	4.2%	1	0.5%
Respiratory Drugs	4	8.3%	8	4.1%
Gastrointestinal Agents	2	4.2%	9	4.6%
Antimicrobials	1	2.1%	10	5.2%
Antihistamines	0	0%	18	9.3%
Any Supplement	12	25%	61	31.4%

**Table 3 - Number of Players using Each Medication Category during Tournament**



# **Medication Use Report Form**



Player Initials: \_\_\_\_\_ Team: \_\_\_\_\_ Date: \_\_\_\_\_

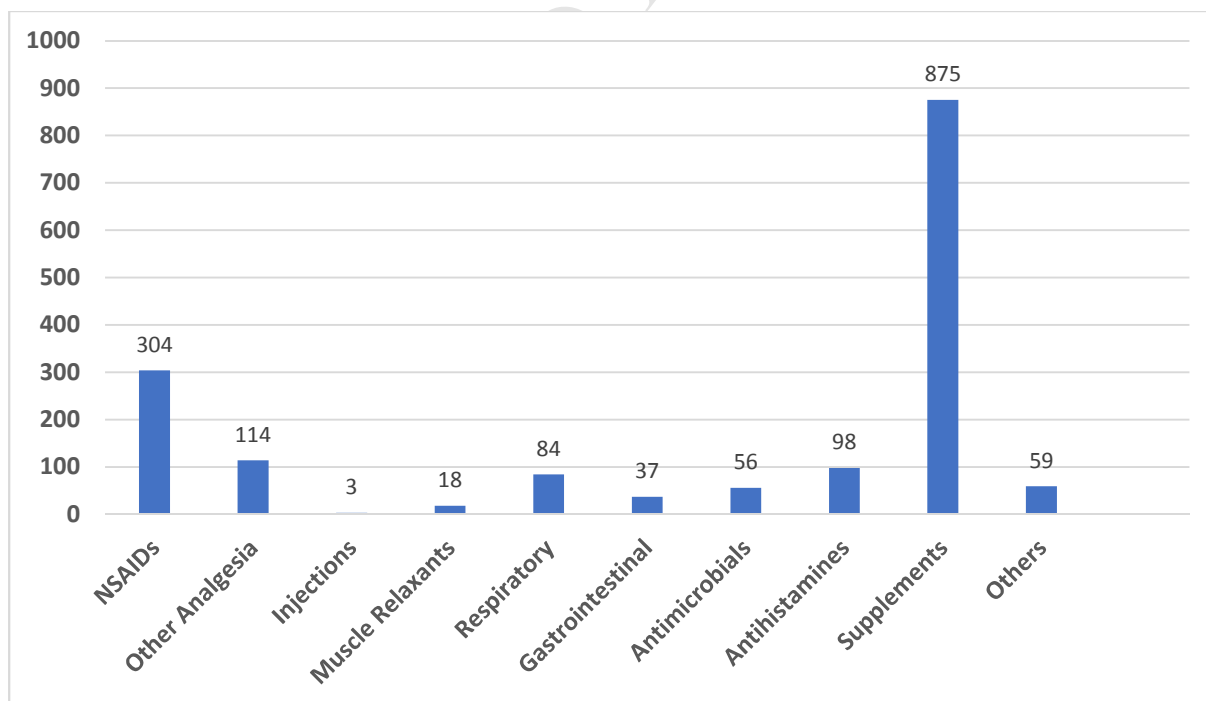
Name of Medication or active pharmaceutical indigence	Drug Code see below	Daily Frequency & Dose	Route	Duration	Indication
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	
		x mg	Oral / IM / IV / Topical / Inhaled	Days	

## **Drug Code:**

1 = NSAIDs  
2 = Other Analgesia  
3 = Injected Corticosteroids & Local Anaesthetics

4 = Muscle Relaxants  
5 = Respiratory Drugs  
6 = Medication for Gastrointestinal Purpose

7 = Antimicrobials  
8 = Supplements  
9 = Antihistamine  
10 = Others



**Figure 1 - Substances Used by Category**

## **Appendix 1**



**Appendix 2****Information Sheet for Team Physicians involved in Research Study**

**Title of Project:** Medication and Supplement Prescribing Patterns in Disability Football World Championships

This study has been approved by the UCL Research Ethics Committee - Project ID Number: 6247/001

**Name** Dr. Daniel Broman  
**Work Address** Institute of Sport and Exercise Health, 170 Tottenham Court Rd, London, W1T 7HA  
**Contact Details** E-Mail: [Daniel.Broman@thafa.com](mailto:Daniel.Broman@thafa.com) or [Daniel.Broman.14@ucl.ac.uk](mailto:Daniel.Broman.14@ucl.ac.uk)  
 Mobile Phone: 07944580979

We would like to invite all team physicians at the IBSA World Games 2015 Football Tournament and the CPISRA 2015 Football World Championships to participate in our study, looking into the medication and supplement prescribing patterns in footballers with a disability.

**Details of Study:**

**Aim:** To examine medication and supplement prescribing patterns in male disability football, prior to and during international elite tournaments and to compare this to the medication use in elite non-disability football players.

It is well established that medications and in particular NSAIDs are over-used and potentially abused in elite football, with Tscholl et al.<sup>1</sup> in 2008 concluding that "the high intake of medications in international football - especially of NSAIDs - is alarming and should be addressed". A similar study by Tscholl et al.<sup>2</sup> in 2009 highlighted "the problem of overuse of medication in professional soccer players". A follow up study by Tscholl et al.<sup>3</sup> in 2012, looking at medication use during the 2010 FIFA World Cup showed that "there was no change in the high use of medication despite several preventative measures" and "the use of medication reported by the team physicians in international football competition is high, and still seems to be increasing. The major problems are NSAIDs".

We aim to compare this trend in elite non-disability footballers to disability football. Direct comparison between research data from FIFA World Cups and the 'International Blind Sports Association (IBSA) World Games 2015 Football Tournament' and the 'Cerebral Palsy International Sports and Recreation Association (CPISRA) 2015 Football World Championships' will be examined. By analysing the use of medications in disability football, the medical profession can better plan and manage the care of these athletes, potentially reducing the risk of iatrogenic side effects of medications and show better consideration of the risk/benefit profile of medications in athletes.

The findings of the study will be disseminated by presentation at sports medicine events/conferences and through submission of a publication in a medical journal with relevance to sports medicine.

<sup>1</sup> Tscholl P., Junge A. & Dvorak J. The use of medication and nutritional supplements during FIFA World Cups 2002 and 2006. *Br J Sports Med* 2008;42:725-30.

<sup>2</sup> Tscholl P., Feddermann N., Junge A. & Dvorak J. The use and abuse of painkillers in international soccer: data from 6 FIFA tournaments for female and youth athletes. *Am J Sports Med* 2009;37:260-65.

<sup>3</sup> Tscholl P. & Dvorak J. 2012. Abuse of medication during international football competition in 2010 - lesson not learned. *Br J Sports Med* 2012;46:1140-41.

Please discuss the information above with others if you wish or ask us if there is anything that is not clear or if you would like more information.

It is up to you to decide whether to take part or not; choosing not to take part will not disadvantage you in any way. If you do decide to take part you are still free to withdraw at any time and without giving a reason. All data will be collected and stored in accordance with the Data Protection Act 1998.

## References

- <sup>1</sup>World Health Organisation. World Report on Disability. World Health Organisation, 2011. Geneva, Switzerland.
- <sup>2</sup>Ahmed OH, Hussain AW, Beasley I, et al. Enhancing performance and sport injury prevention in disability sport: moving football forwards in the field of football. *Br J Sports Med* 2015;49:566-567.
- <sup>3</sup>Burgeson CR, Wechsler H, Brener ND, et al. Physical education and activity: results from the School Health Policies and Programs Study 2000. *J School Health* 2001;71:279-293.
- <sup>4</sup>Webborn N, Van de Vliet. Paralympic medicine. *Lancet* 2012;379:65-71.
- <sup>5</sup>Thompson W, Vanlandewijck YC. Science and the Paralympic movement. *Br J Sports Med* 2013;47:811.
- <sup>6</sup>Corrigan B, Kazlauskas R. Medication use in athletes selected for doping control at the Sydney Olympics 2000. *Clin J Sport Med* 2003;13:33-40.
- <sup>7</sup>Tsitsimpikou C, Tsiokanos A, Tsarouhas K, et al. Medication use by athletes at the Athens 2004 Summer Olympic Games. *Clin J Sport Med* 2009;19:33-38.
- <sup>8</sup>Lazic JS, Dikic N, Radivojevic N, et al. Dietary supplements and medications in elite sport - polypharmacy or real need? *Scand J Med Sci Sports* 2011;21:260-267.
- <sup>9</sup>Alaranta A, Alaranta H, Heliövaara M, et al. Ample use of physician-prescribed medications in Finnish elite athletes. *Int J Sports Med* 2006;27:919-925.
- <sup>10</sup>Tsitsimpikou C, Jamurtas A, Fitch K, et al. Medication use by athletes during the Athen 2004 Paralympic Games. *Br J Sports Med* 2009;43:1062-1066.
- <sup>11</sup>Aavikko A, Helenius I, Vasankari T, et al. Physician-prescribed medication use by the Finnish Paralympic and Olympic athletes. *Clin J Sport Med* 2013;23(6):478-482.
- <sup>12</sup>Huang SH, Johnson K, Pipe AL, et al. The use of dietary supplements and medications by Canadian athletes at the Atlanta and Sydney Olympic Games. *Clin J Sport Med* 2006;16:27-33.
- <sup>13</sup>Ronsen O, Sundgot-Borgen J, Maehlum S. Supplement use and nutritional habits in Norwegian elite athletes. *Scand J Med Sci Sports* 1999;9:28-35.

<sup>14</sup>Sobal J, Marquart LF. Vitamin/mineral supplement use among high-school athletes. *Adolescence* 1994;9:835-843.

<sup>15</sup>Taioli E. Use of permitted drugs in Italian professional soccer players. *Br J Sports Med* 2007;41:439-441.

<sup>16</sup>Tscholl P, Feddermann N, Junge A, et al. The use and abuse of painkillers in international soccer: data from 6 FIFA tournaments for female and youth players. *Am J Sports Med* 2009;37:260-265.

<sup>17</sup>Tscholl P, Alonso JM, Dolle G, et al. The use of drugs and nutritional supplements in top-level track and field athletes. *Am J Sports Med* 2010;38:133-140.

<sup>18</sup>Tscholl PM, Dvorak J. Abuse of medication during international football competition in 2010 - lessons not learned. *Br J Sports Med* 2012;46: 1140-1141.

<sup>19</sup>Waddington I, Malcolm D, Roderick M, et al. Drug use in English professional football. *Br J Sports Med* 2005;39(4):e18.

<sup>20</sup>Tscholl P, Junge A, Dvorak J. The use of medication and nutritional supplements during FIFA World Cups 2002 and 2006. *Br J Sports Med* 2008;42:725-730.

<sup>21</sup>Pedrinelli A, Ejnisman L, Fagotti L, et al. Medications and nutritional supplements in athletes during the 2000, 2004, 2008 and 2012 FIFA Futsal World Cups. *Biomed Res Int.* 2015;870308;1-6.

<sup>22</sup>Geyer H, Parr MK, Koehler K, et al. Nutritional supplements cross-contaminated and faked with doping substances. *J Mass Spectrom* 2008;43:892-902.

<sup>23</sup>Maughan RJ. Contamination of dietary supplements and positive drug tests in sport. *J Sports Sci* 2005;23(9):883-889.

<sup>24</sup>Bjelakovic G, Nikolova D, Gluud LL, et al. Mortality in randomised trials of antioxidant supplements for primary and secondary prevention. *JAMA* 2007;297:842-857.

<sup>25</sup>Fisher AEO, Naughton DP. Iron supplements: the quick fix with long-term consequences. *Nutr J* 2004;3:2.

<sup>26</sup>Palmer ME, Haller C, McKinney PE, et al. Adverse events associated with dietary supplements: An observational study. *Lancet* 2003;11:101-6.

<sup>27</sup>De Hon O, Coumans B. The continuing story of nutritional supplements and doping infractions. *Br J Sports Med* 2008;41(11):800-805.

<sup>28</sup>Maughan RJ. Contamination of dietary supplements and positive drug tests in sport. *J Sports Sci* 2005;23(9):883-889.

<sup>29</sup>Willick SE, Webborn N, Emery C, et al. The epidemiology of injuries at the London 2012 Paralympic Games. *Br J Sports Med* 2013;47:426-432.

<sup>30</sup>Weiler R, van Mechelen W, Fuller C, et al. Sports injuries sustained by athletes with disability: a systematic review. *Sport Med* 2016:1-13.

<sup>31</sup>Webborn N, Cushman D, Blauwet CA, et al. The epidemiology of injuries in football at the London 2012 Paralympic Games. *PM&R*. 2016;8(6):545-552.

<sup>32</sup>Tscholl PM, Vaso M, Weber A, et al. High prevalence of medication use in professional football tournaments including the World Cups between 2002 and 2014: A narrative review with a focus on NSAIDs. *Br J Sports Med* 2015;49:580-582.

<sup>33</sup>National Institute for Health and Care Excellence (NICE). Non-steroidal anti-inflammatory drugs (NSAIDs): NICE Guidelines 2013. Available from: <http://cks.nice.org.uk/nsaids-prescribing-issues#!topicsummary>. [Accessed: 01/12/2015].

<sup>34</sup>Paoloni JA, Milne C, Orchard J, et al. Non-steroidal anti-inflammatory drugs in sports medicine: Guidelines for practical but sensible use. *Br J Sports Med* 2009;43:863-865.

<sup>35</sup>Küster M, Renner B, Oppel P, et al. Consumption of analgesics before a marathon and the incidence of cardiovascular, gastrointestinal and renal problems: a cohort study. *BMJ Open* 2013;3:e002090.

<sup>36</sup>Wharam PC, Speedy DB, Noakes TD, et al. NSAID use increases the risk of developing hyponatraemia during an Ironman Triathlon. *Med Sci Sports Exerc* 2006;38:618-622.

<sup>37</sup>Irving RA, Noakes TD, Raine RI, et al. Transient oliguria with renal tubular dysfunction after a 90 km running race. *Med Sci Sports Exerc* 1990;22:756-761.

<sup>38</sup>Walker RJ, Fawcett JP, Flannery EM, et al. Indomethacin potentiates exercise-induced reduction in renal hemodynamics in athletes. *Med Sci Sports Exerc* 1994;26:1302-1306.

<sup>39</sup>Wheeler P, Batt ME. Do non-steroidal anti-inflammatory drugs adversely affect stress fracture healing? A short review. *Br J Sports Med* 2005;39:65-69.

<sup>40</sup>Bailey Su J, O'Connor P. NSAID therapy effects on healing of bone, tendon and the enthesis. *J Appl Phys* 2013;115(6):892-899.

<sup>41</sup>Houlihan CM, Stevenson RD. Bone density in cerebral palsy. *Phys Med Rehabil Clin N Am* 2009;20(3):493-508.

<sup>42</sup>Sheridan KJ. Osteoporosis in adults with cerebral palsy. *Dev Med Child Neurol* 2009;51(4):38-51.

<sup>43</sup>Woo WWK, Man SY, Lam P, et al. Randomized double-blind trial comparing oral Paracetamol and oral non-steroidal anti-inflammatory drugs for treating pain after musculoskeletal injury. *Ann Emerg Med* 2005;46: 352-361.