Nutritional practices for match preparation in football (soccer) - real-life insights into the food, the logistics, and the strategies of elite practitioners

Buchheit M., [1 2 3 4] **Ramachandran AK.,** [5] **Fabre M.,** [6] **Cock-Le Doré S.,** [7] **Tiollier E.,** [4] **Lacome M.,** [8]

[1]Kitman Labs, Dublin, Ireland
[2]Lille OSC, Lille, France
[3]HIITscience, Revelstoke, Canada
[4]Laboratory Sport, Expertise and Performance (EA 7370), French Institute of Sport, Paris, France
[5]Youth Physical Development Centre, Cardiff School of Sport and Health Sciences, Cardiff Metropolitan University, Cardiff CF23 6XD, United Kingdom
[6]Performance and Medical Department, Paris Saint Germain Football Club
[7]CP+R. London, United Kingdom
[8]Performance and Analytics Department, Parce Calcio 1913, Parma, Italy + INSEP

Nutrition | Real-life scenario | Logistic | Match preparation | Catering | Real food | Supplements

Headline

With the continuous increases in staff numbers and specialized sports science support in elite football, performance nutrition is now completely part of players' preparation. Academics, researchers, and field experts have all done a great job in producing comprehensive nutritional guidelines (1,2,3), where all typical nutritional aspects are discussed: from optimal meals composition, macronutrients periodization, micronutrients intake, to supplements use for both healthy and injured players - information has never been so accessible and available.

When asking people in the field, however, they often admit that despite their theoretical relevance, these academic resources are often of limited use when it comes to implementing things in practice. While some practitioners have attempted to provide clear examples of real food to be served to players (3,4), all the logistical and planning aspects around meals and supplement serving have to our knowledge been wholly overlooked so far. In fact, when working as a nutritionist or performance manager for a team, for example, the daily challenges are rarely related to the exact quantity of carbohydrates (CHO) to be ingested pre-match or the grams of protein to be added in a post-match shaker. The pain points are generally more related to the creation of attractive menus, and how to organize and order the right food in a small locker after a match when away for example. While most of the players need to unwind and probably dream about eating fast foods, practitioners still need to find feeding strategies for them to ingest enough energy with the right macronutrients, micronutrients and fibers while factoring in the uncertainty about the stadium caterer (e.g., whether the food will be warm and good enough). Being a successful nutritionist requires some great logistics and planning skills, which have often more impact than their actual knowledge in terms of nutrition!

Aim

Therefore, to shed light on this less documented area of performance nutrition, we surveyed an international group of 62 elite practitioners (from November 2019 to April 2020) and asked them to simply describe what they offered to players, and how things were organized and planned in their context. We focused the questions on match preparation, starting from the meal the night before match day (MD-1) to the post-match meal on match day (MD), and going through MD breakfast, lunch, pre-match meals, snacks, and locker nutrition for both home and away matches. We also quickly taped into supplement use and prescription.

Methods

The practitioners surveyed were contacted via email or Whatsapp. They all belonged to the authors' direct network. They were also asked to contact their peers to invite them to participate to increase the authors' reach. Given the amount of information surveyed, we organized 4 consecutive rounds. The first round was generic about the overall practices, the timing, and the location of the meals when playing a night match (i.e., $>$ 7 pm). The three following rounds were then used to drill further into each meal's content and specific practices, such as understanding the why (e.g., why breakfast is served or not before home matches) and getting into some more details (e.g., the quantity of a given food, etc).

Results

Two third of the practitioners involved in the 4 rounds came from Europe, and more specifically from the UK, Spain, and Portugal (Figure 1). The majority of them had reached a bachelor (49%) or Ph.D. (25%) level and had been working in clubs for 5-10 yrs (41%, Figure 2).

The responses to the 197 questions are summarized in the 102 figures below, with results grouped chronologically in terms of nutritional interventions, from the diner the night before match day (MD-1) to post-match meals on match day (MD).

The last two sections provide information on snack contents and timing during travel and supplement use, both in the context of healthy and injured players.

MD-1 Dinner

- The majority of practitioners reported providing dinner at MD-1 (Figures 3 and 4), most of the time served in a hotel as a consequence of the typical player's concentration pre-match routine (i.e., overnight in a hotel to better

control/promote sleep and recovery activities and healthy habits, including food - with a greater frequency for away than home matches, 97% vs 82%, Figure 4).
- This meal is mainly served at 8 pm (51%) (21% for both 7 or 9 pm) (Figure 5) in the form of a large buffet (food self-selected by players, Figure 6) avoiding junk food (86%) and food that are known to increase digestive discomfort (51%), with an emphasis on high CHO contents; protein and fiber servings are moderate, and fat content is low (Figure 6).
- Interestingly, however, the MD-1 diner meal was the one for which practitioners had the greatest tendency to change some dishes, especially when the local cuisine or regional food can offer some healthy and relevant alternatives (Figure 77).

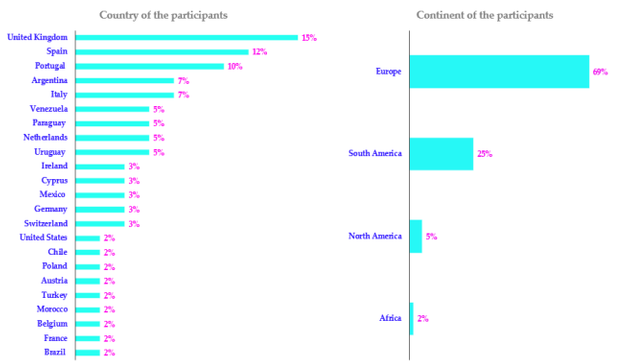

Fig. 1. **(a): Left: Country-wise distribution of the participants. (b): Right: Continent-wise distribution of the participants.**

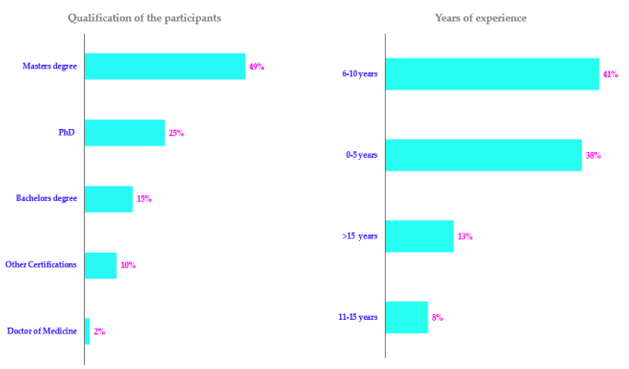

Fig. 2. **(a): Left: Highest qualification obtained by the participants. (b): Right: Professional experience of the participants in elite football.**

There is a large variety of actual drinks and food served (Figures 7 to 16), with the following being the most representative of general practices/players' favorites:

- Still water (100%), coffee/tea (68%), and fruit juice (59%) (Figure 7)
- White (77%) and whole wheat/grain cereals (55%) (Figure 7)
- Chicken (91%), white fish (68%), and grilled salmon (59%) - note that these dishes are served with more frequency than red meat on that day (50%) (Figure 10)
- Raw/cooked veggies (80%), soup (68%), and avocado (50%) (Figure 8)
- Pasta (91%), rice (77%) and potatoes (73%) (Figure 11)
- Pasta bolognese sauce (59%) or lasagna (beef or veggie, 49%) (Figure 12)
- Parmesan (59%) and grated (41%) cheese (Figure 9)
- Fat is almost restricted to olive oil (100%) and nuts/grains (50%) that are generally offered with the yogurts (Figure 13)
- Plain low fat (59%) and greek yogurts (36%) - note that 23% offered soy/vegetal alternatives (Figure 9)
- Fruit salad (82%), rice pudding (45%), cake (32%) (Figure 14)
- Banana (86%), apple (82%), orange (68%) (Figure 15)

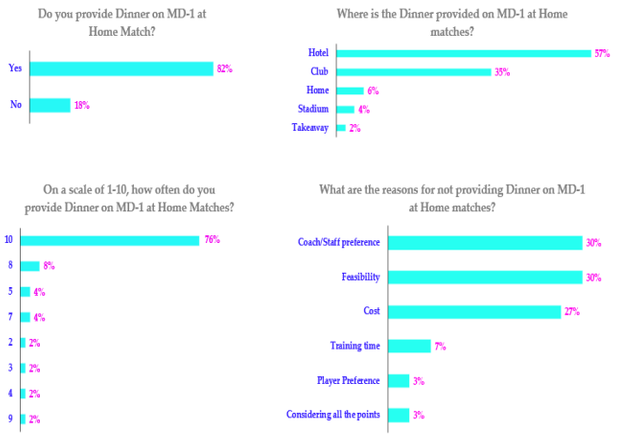

Fig. 3. **(a): Top-left: Administration of Dinner by the participants on MD-1 at Home matches (b): Top-right: Location of Dinner on MD-1 at Home matches. (c): Bottom-left: Frequency of administration of Dinner by the participants on MD-1 at Home matches. (d): Bottom-right: A few potential reasons for not providing Dinner on MD-1 at Home matches. Abbreviations: MD– match day.**

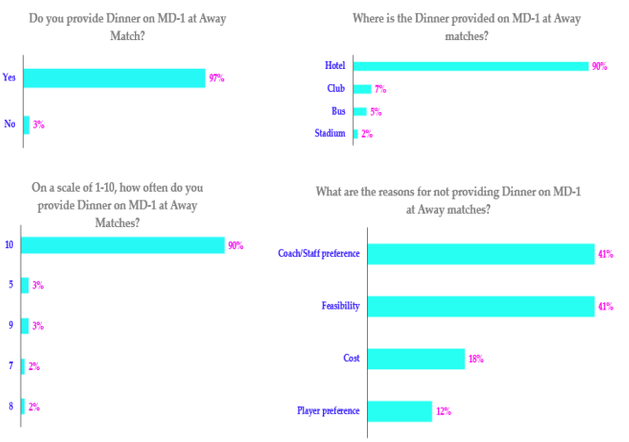

Fig. 4. **(a): Top-left: Administration of Dinner by the participants on MD-1 at Away matches. (b): Top-right: Location of Dinner on MD-1 at Away matches. (c): Bottom-left: Frequency of administration of Dinner by the participants on MD-1 at Away matches. (d): Bottom-right: A few potential reasons for not providing Dinner on MD-1 at Away matches.**

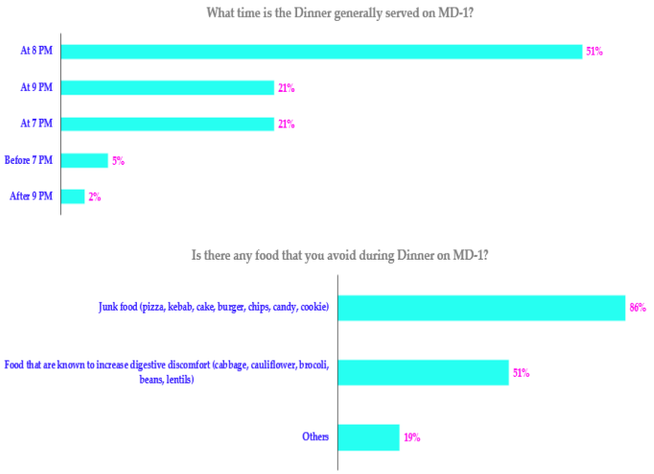

Fig. 5. (a): Top: Various times at which the Dinner is served on MD-1. (b): Bottom: Food that are avoided for Dinner on MD-1.

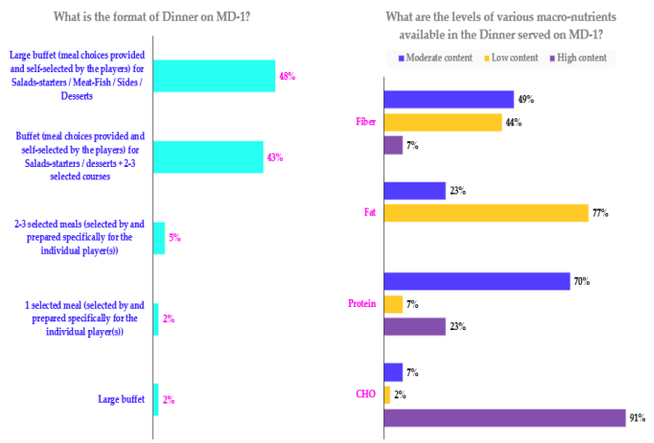

Fig. 6. (a): Left: Dinner arrangements on MD-1. (b): Right: Various nutritional content available in Dinner provided on MD-1. Abbreviations: CHO- carbohydrate.

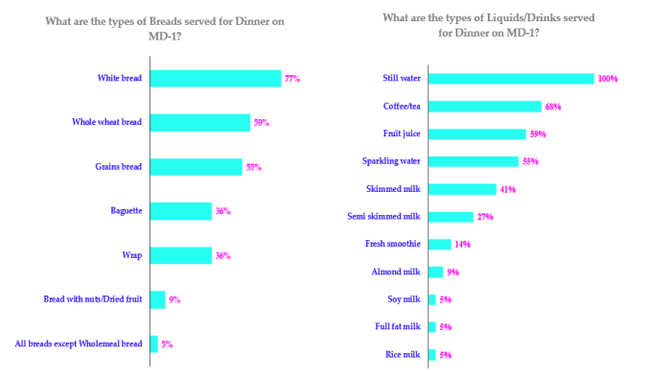

Fig. 7. (a): Left: Various types of Breads served for Dinner on MD-1. (b): Right: Various types of Liquids/Drinks served for Dinner on MD-1.

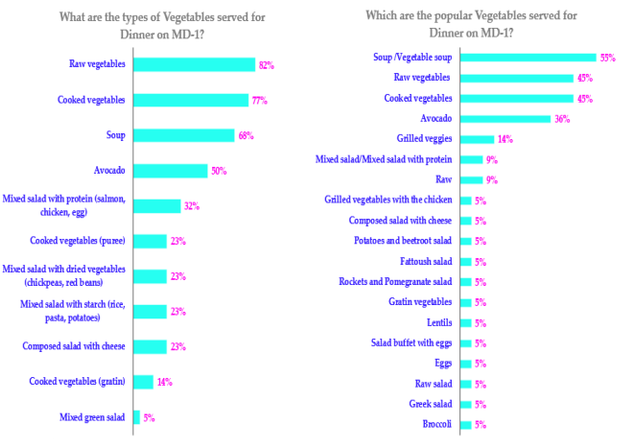

Fig. 8. (a): Left: Various types of Vegetables served for Dinner on MD-1. (b): Right: Popularity of the various types of Vegetables served for Dinner on MD-1.

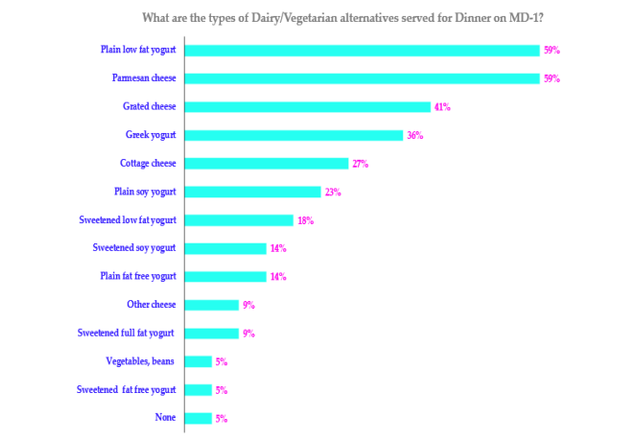

Fig. 9. Various types of Dairy/Vegetarian alternatives served for Dinner on MD-1.

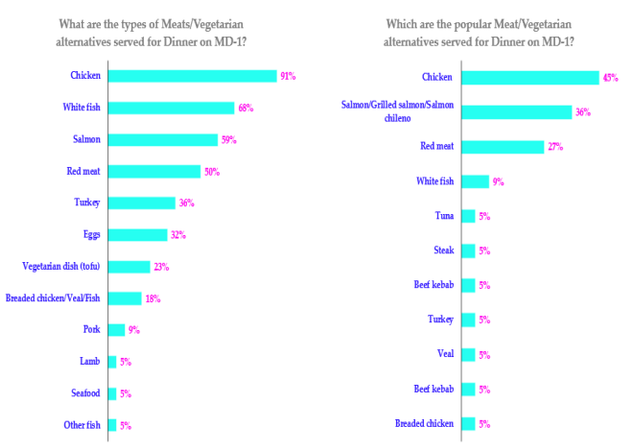

Fig. 10. (a): Left: Various types of Meat/Vegetarian food served for Dinner on MD-1. (b): Right: Popularity of the various types of Meat/Vegetarian food served for Dinner on MD-1.

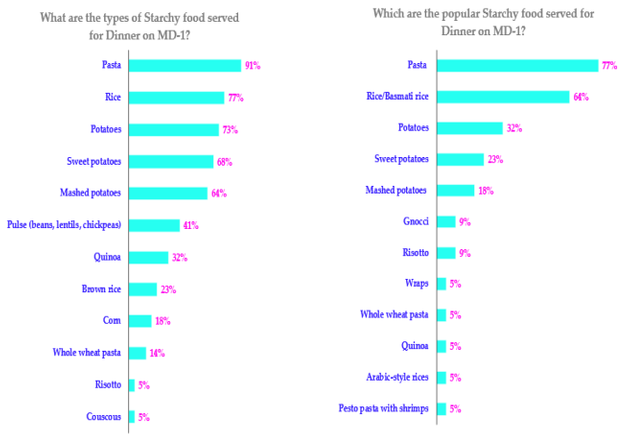

Fig. 11. (b): Right: Popularity of the various types of Meat/Vegetarian food served for Dinner on MD-1. (b): Right: Popularity of the various types of Starchy food served for Dinner on MD-1.

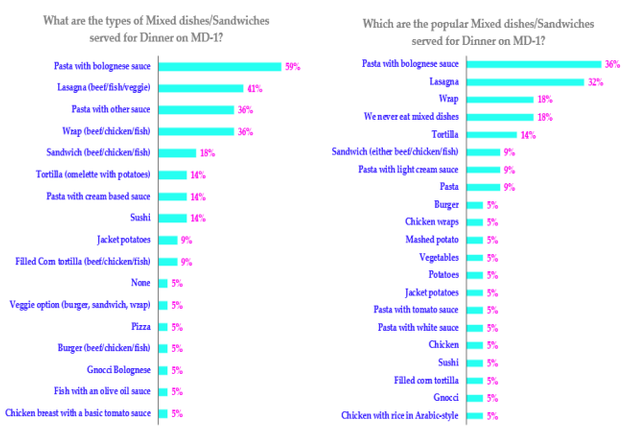

Fig. 12. (a): Left: Various types of Mixed dishes/Sandwiches served for Dinner on MD-1.

(b): Right: Popularity of the various types of Mixed dishes/Sandwiches served for Dinner on MD-1.

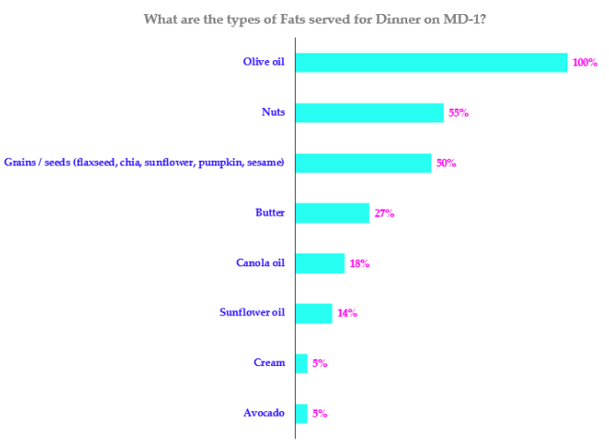

Fig. 13. Various types of Fats served for Dinner on MD-1.

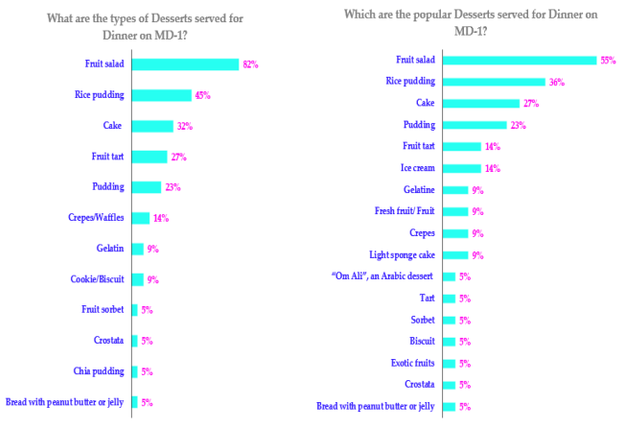

Fig. 14. (a): Left: Various types of Desserts served for Dinner on MD-1. (b): Right: Popularity of the various types of Desserts served for Dinner on MD-1.

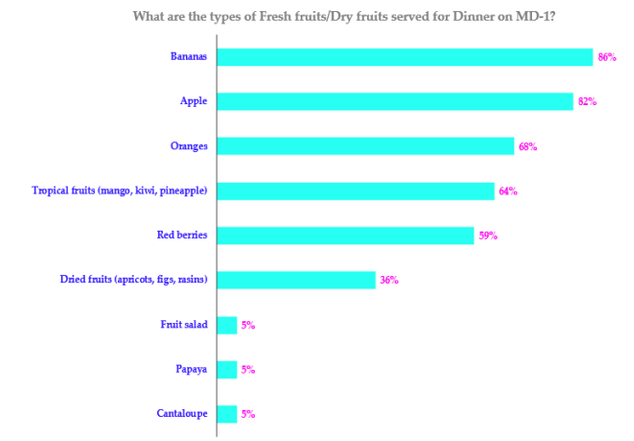

Fig. 15. Various types of Fresh fruits/Dry fruits served for Dinner on MD-1.

MD Breakfast

- The majority of practitioners reported providing breakfast on MD (Figure 16 and 17), most of the time served in a hotel (with a greater frequency for away than home matches, 97% vs 78%, which is kind of 'automatic' when the team travels a day ahead of MD, Figure 17).
- This meal is mainly offered before 10 am (2-hrs time window, 51%) in the form of a large buffet while avoiding pastries and croissants (Figure 18), with an emphasis on high CHO contents; protein serving is moderate, and fat and fiber content are low (Figure 19).
- Interestingly, many specific foods including lactose-free, gluten-free, vegetarian, vegan, and religious-related options are also offered (Figure 18).

There is a large variety of actual drinks and food served (Figures 20 to 26), with the following being the most representative of general practices/players' favorites:

- Still water (100%), coffee/tea (91%), and fruit juice (82%) (Figure 20)
- White (100%) and whole wheat/grain cereals (64%) (Figure 20)
- Jam (86%), honey (82%) and butter (55%) (Figure 23)
- Muesli (68%), rolled oats (64%) and flake-based cereals (59%) are the favorites (Figure 21)

- Almonds (73%) and walnuts (68%) are the nuts the most served (Figure 25)
- Eggs (95%), ham/turkey (57%), and smoked fish (23%) - note that these dishes are served with more frequency than chicken on that meal (5%) (Figure 24)
- Tomatoes (64%), mushrooms (36%), and avocado (32%) (Figure 22)
- Plain low fat (68%) and greek yogurts (41%) and cottage cheese - note that 23% offered soy/vegetal alternatives (Figure 23)
- Banana (100%), apple (73%), orange (64%) (Figure 27)

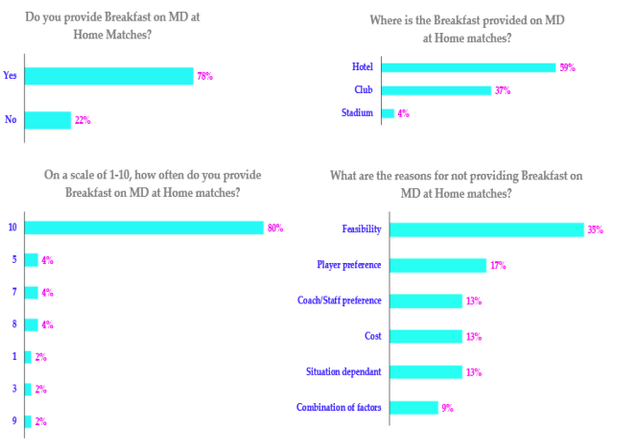

Fig. 16. (a): Top-left: Administration of Breakfast by the participants on MD at Home matches (b): Top-right: Location of Breakfast on MD at Home matches. (c): Bottom-left: Frequency of administration of Breakfast by the participants on MD at Home matches. (d): Bottom-right: A few potential reasons for not providing Breakfast on MD at Home matches.

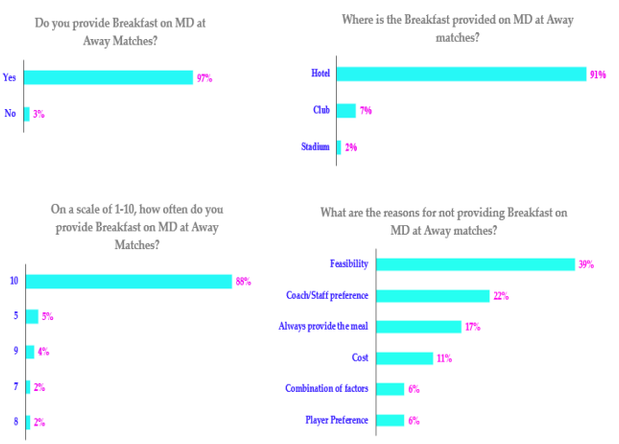

Fig. 17. (a): Top-left: Administration of Breakfast by the participants on MD at Away matches. (b): Top-right: Location of Breakfast on MD at Away matches. (c): Bottom-left: Frequency of administration of Breakfast by the participants on MD at Away matches. (d): Bottom-right: A few potential reasons for not providing Breakfast on MD at Away matches.

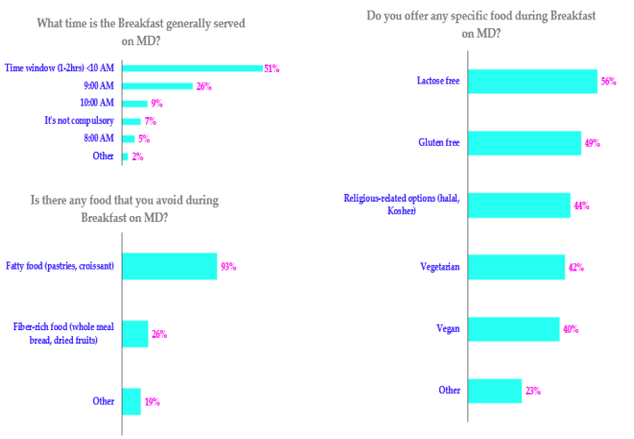

Fig. 18. (a): Top-left: Various times at which the breakfast is served on MD. (b): Top-right: Food that are avoided for Breakfast on MD. (c): Right: Specific food served for Breakfast on MD.

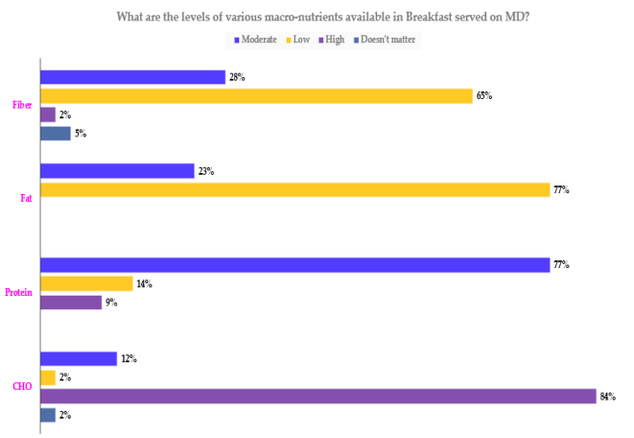

Fig. 19. Various macro-nutrients available in the Breakfast provided on MD.

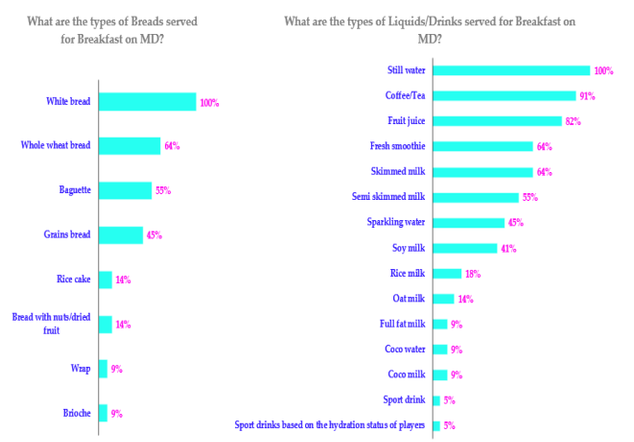

Fig. 20. (a): Left: Various types of Breads served for Breakfast on MD. (b): Right: Various types of Liquids/Drinks served for Breakfast on MD.

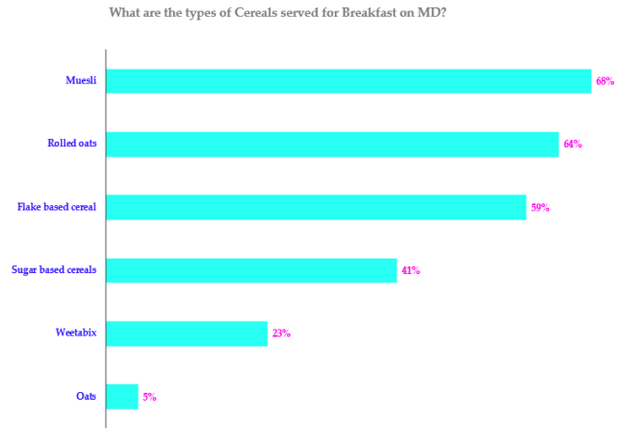

Fig. 21. Various types of Cereals served for Breakfast on MD

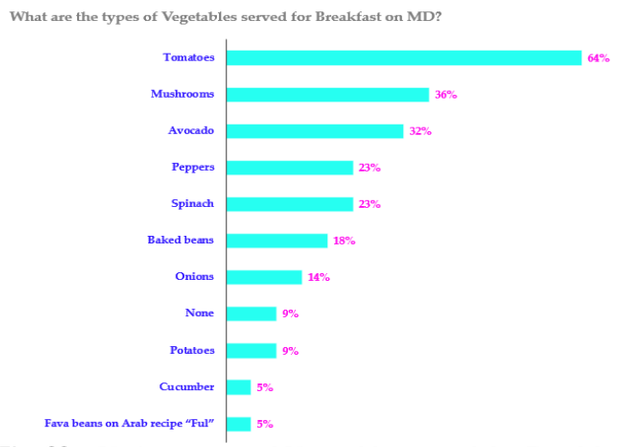

Fig. 22. Various types of Vegetables served for Breakfast on MD.

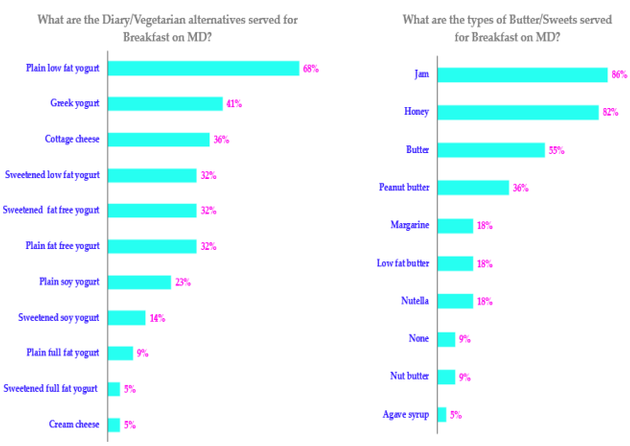

Fig. 23. (a): Left: Various types of Diary/Vegetarian alternatives served for Breakfast on MD. (b): Right: Various types of Butter/Sweets served for Breakfast on MD.

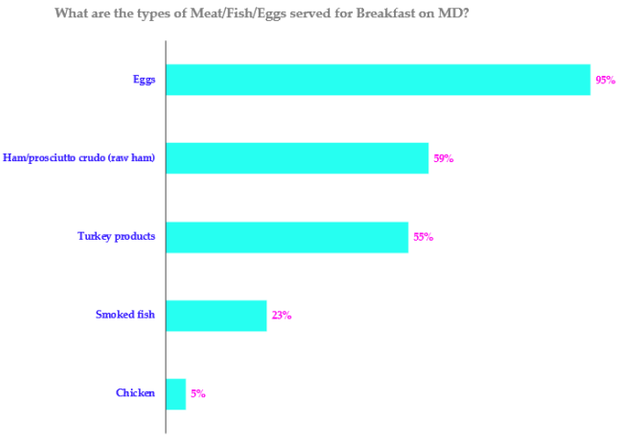

Fig. 24. Various types of Meat/Fish/Eggs served for Breakfast on MD.

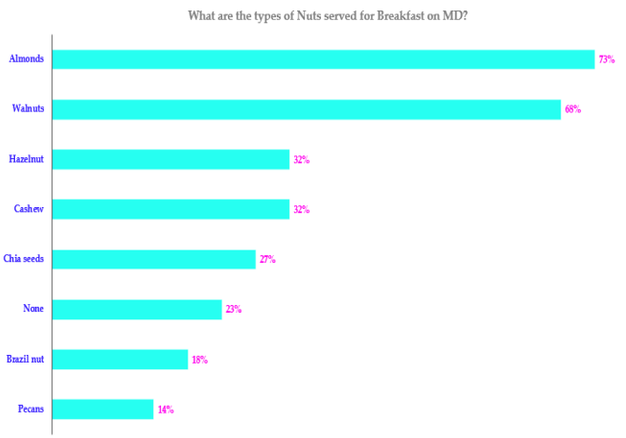

Fig. 25. Various types of Nuts served for Breakfast on MD.

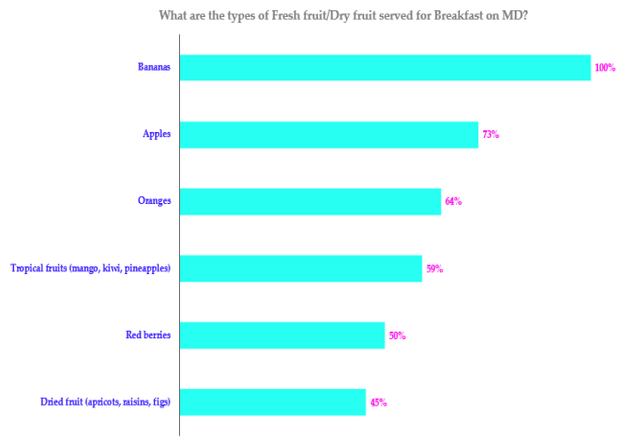

Fig. 26. Various types of Fresh fruit/Dry fruit served for Breakfast on MD.

MD Lunch

- The majority of practitioners reported providing lunch on MD (Figure 27 and 28), most of the time served in a hotel (with a greater frequency for away than home matches, 98% vs 86%, which is kind of 'automatic' when the team travels a day ahead of MD, Figure 28).
- For a match played >7 pm, this meal is mainly served from 12 (33%) to 1 pm (60%) (Figure 29) in the form of a large buffet (food self-selected by players, Figure 30) avoiding junk food (81%) and food that are known to increase digestive discomfort (56%) (Figure 29), with an emphasis on high CHO contents; protein servings are moderate, and fat and fiber content are low (Figure 30).
- Interestingly, many specific foods including lactose-free, gluten-free, vegetarian, vegan, and religious-related options are also offered (Figure 29).

There is a large variety of actual drinks and food served (Figures 31 to 39), with the following being the most representative of general practices/players' favorites:

- Still water (100%), coffee/tea (64%), and fruit juice (64%) (Figure 31)
- White (86%) and whole wheat/grain cereals (64%) (Figure 31)
- Chicken (100%), white fish (64%), and eggs (36%) - note that these dishes are served with clearly more frequency than red meat on that day (27%) (Figure 34)
- Raw/cooked veggies (77/68%), soup (59%), and avocado (41%) (Figure 32)
- Pasta (100%), rice (86%), and mashed potatoes (68%) (Figure 35)
- Pasta bolognese sauce (59%) or other sauce (45%) (Figure 36)
- Parmesan (64%) and grated (27%) cheese (Figure 33)
- Fat is almost restricted to olive oil (100%) and nuts/grains (32%) that are generally offered with the yogurts (Figure 37)
- Greek (27%) and sweetened low fat (23%) yogurts (Figure 33)
- Fruit salad (59%), rice pudding (36%), cake (23%) (Figure 38)
- Oranges (100%), tropical fruits (73%), and dried fruits (55%) (Figure 39)

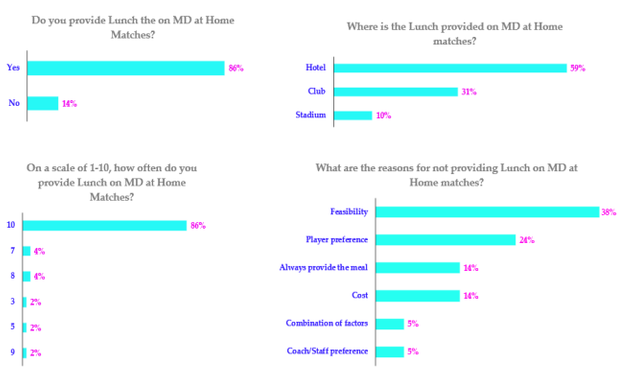

Fig. 27. (a): Top-left: Administration of Lunch by the participants on MD at Home matches. (b): Top-right: Location of Lunch on MD at Home matches. (c): Bottom-left: Frequency of administration of Lunch by the participants on MD at Home matches. (d):Bottom-right: A few potential reasons for not providing Lunch on MD at Home matches.

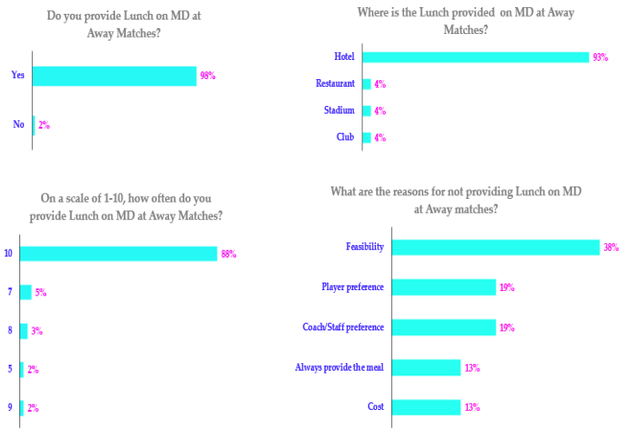

Fig. 28. (a): Top-left: Administration of Lunch by the participants on MD at Away matches. (b): Top-right: Location of Lunch on MD at Away matches. (c): Bottom-left: Frequency of administration of Lunch by the participants on MD at Away matches. (d):Bottom-right: A few potential reasons for not providing Lunch on MD at Away matches.

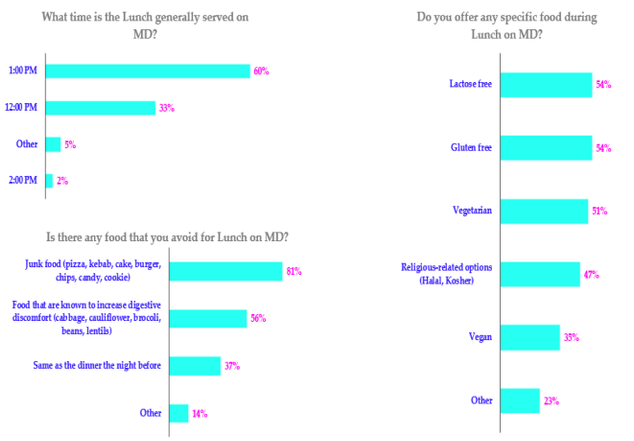

Fig. 29. (a): Top-left: Various times at which the Lunch is served on MD. (b): Bottom-left: Food that are avoided for Lunch on MD. (c): Right: Specific food served for Lunch on MD.

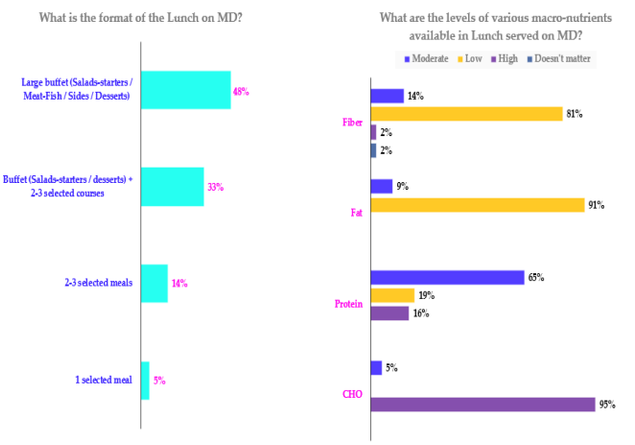

Fig. 30. (a): Left: Format of the Lunch served on MD. (b): Right: Various macro-nutrients available in the Lunch provided on MD.

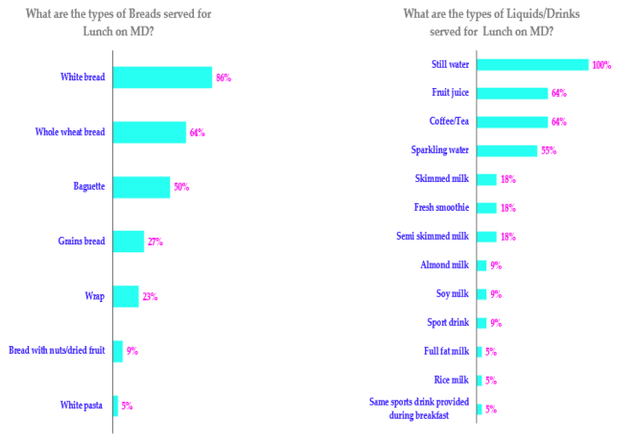

Fig. 31. (a): Left: Various types of Breads served for Lunch on MD. (b): Right: Various types of Liquids/Drinks served for Lunch on MD.

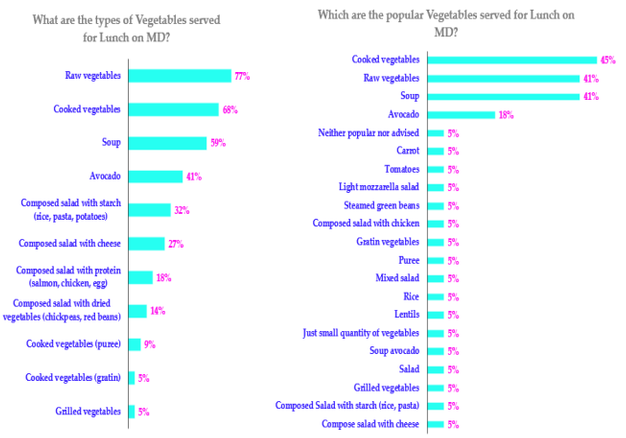

Fig. 32. (a): Left: Various types of Vegetables served for Lunch on MD. (b): Right: Popularity of the various types of Vegetables served for Lunch on MD.

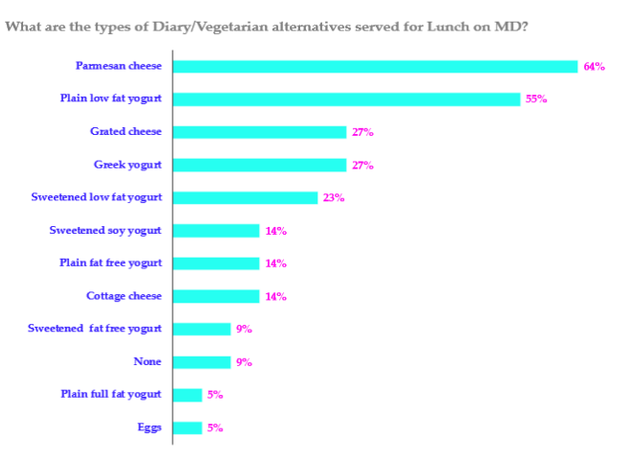

Fig. 33. Various types of Diary/Vegetarian alternatives served for Lunch on MD.

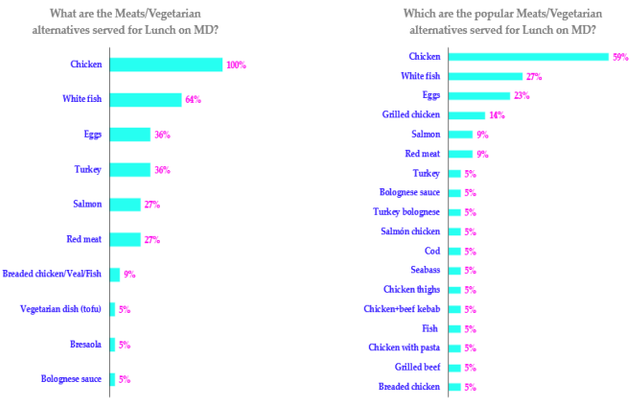

Fig. 34. (a): Left: Various types of Meat/Vegetarian food served for Lunch on MD. (b): Right: Popularity of the various types of Meat/Vegetarian food served for Lunch on MD.

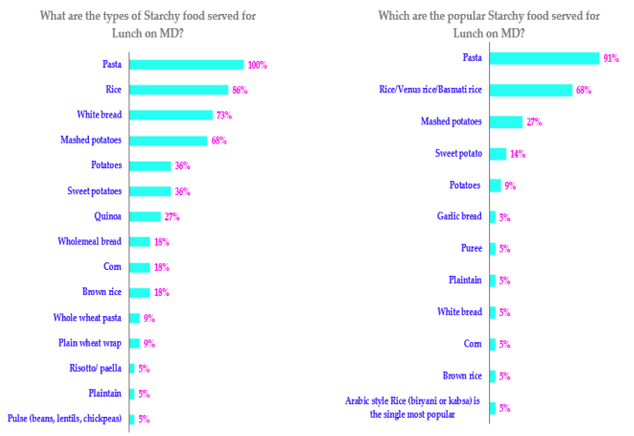

Fig. 35. (a): Left: Various types of Starchy food served for Lunch on MD. (b):Right: Popularity of the various types of Starchy food served for Lunch on MD.

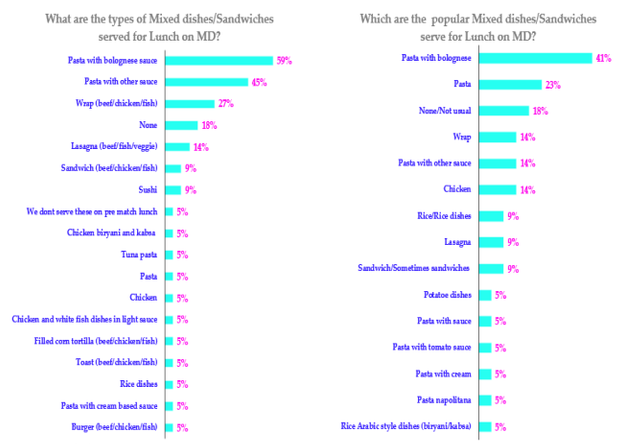

Fig. 36. (a): Left: Various types of Mixed dishes/Sandwiches served for Lunch on MD. (b): Right: Popularity of the various types of Mixed dishes/Sandwiches served for Lunch on MD.

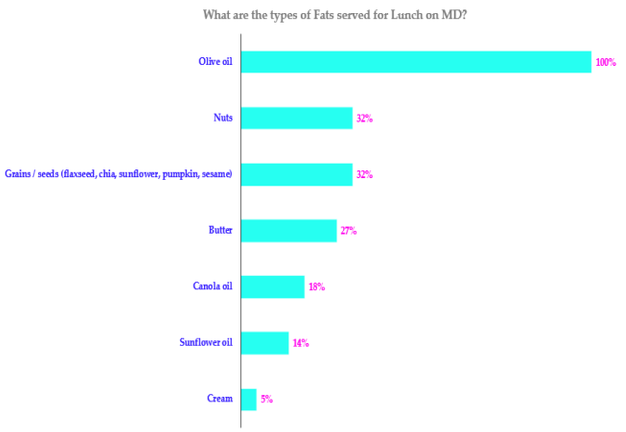

Fig. 37. **Various types of Fats served for Lunch on MD.**

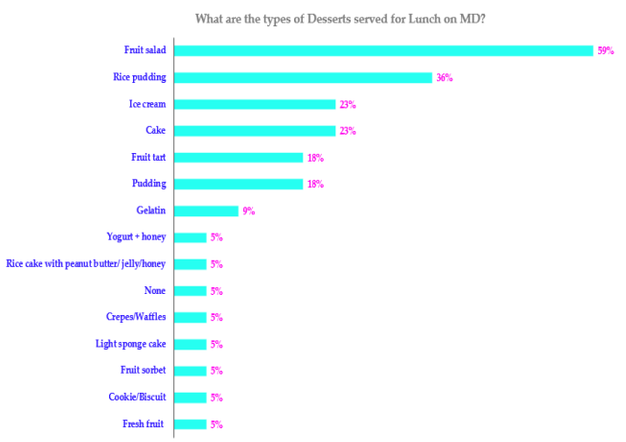

Fig. 38. **Various types of Desserts served for Lunch on MD.**

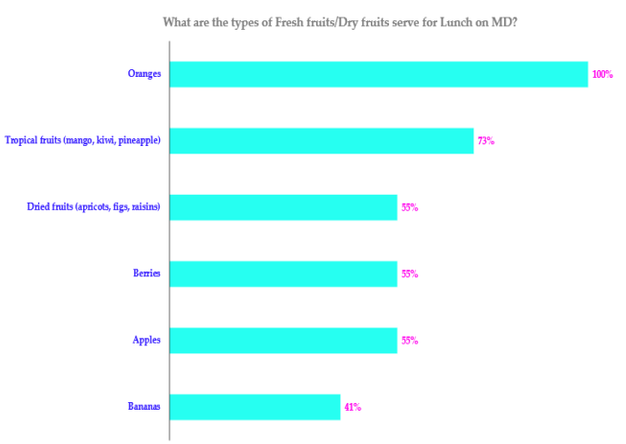

Fig. 39. **Various types of Fresh fruits/Dry fruits served for Lunch on MD.**

MD Pre-match meal

The pre-match meal is served in the format of a small buffet (36%) or 2-3 selected meals (33%) (Figure 43) about >3 (42%) to 3 (35%) hrs before kick-off (Figure 42) by 98% (home match, at the stadium, 45% or in a hotel, 33%, Figure 40) to 100% (away, hotel, 56%, Figure 41) of practitioners. They avoid junk food (65%) and food that are known to increase digestive discomfort (63%) (Figure 42), with an emphasis on high CHO contents; protein servings are moderate, and fat and fiber content are low (Figure 43). Interestingly, many specific foods including lactose-free, gluten-free, vegetarian, vegan, and religious-related options are also offered (Figure 42). Finally, the pre-match meal was the one for which practitioners had the lowest tendency to change contents (Figure 77).

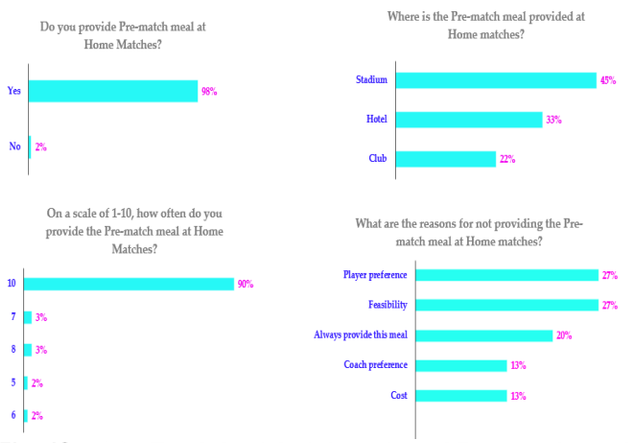

Fig. 40. **(a): Top-left: Administration of Pre-match meal by the participants on MD at Home matches. (b): Top-right: Location for providing Pre-match meal on MD at Home matches. (c): Bottom-left: Frequency of administration of Pre-match meal by the participants on MD at Home matches. (d): Bottom-right: A few potential reasons for not providing Pre-match meal on MD at Home matches.**

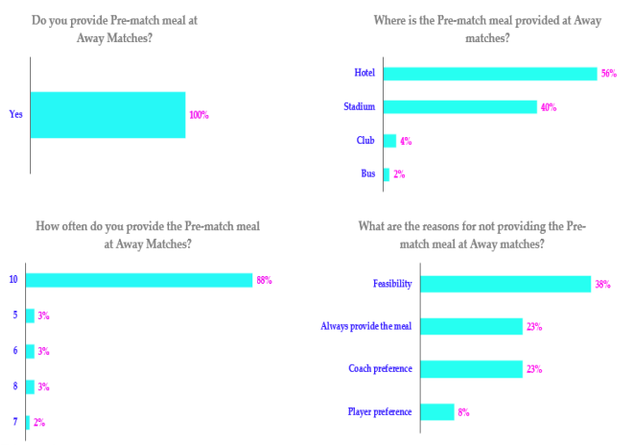

Fig. 41. **(a): Top-left: Administration of Pre-match meal by the participants on MD at Away matches. (b): Top-right: Location for providing Pre-match meal on MD at Away matches. (c): Bottom-left: Frequency of administration of Pre-match meal by the participants on MD at Away matches. (d): Bottom-right: A few potential reasons for not providing Pre-match meal on MD at Away matches.**

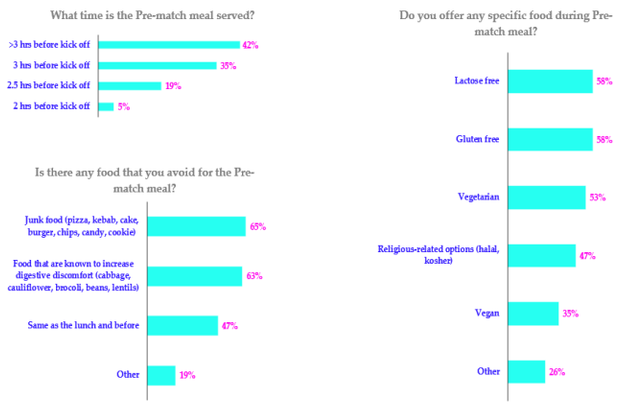

Fig. 42. (a): Top-left: Various times at which the Pre-match meal is served on MD. (b): Bottom-left: Food that are avoided for Pre-match meal on MD. (c): Right: Specific food served for Pre-match meal on MD.

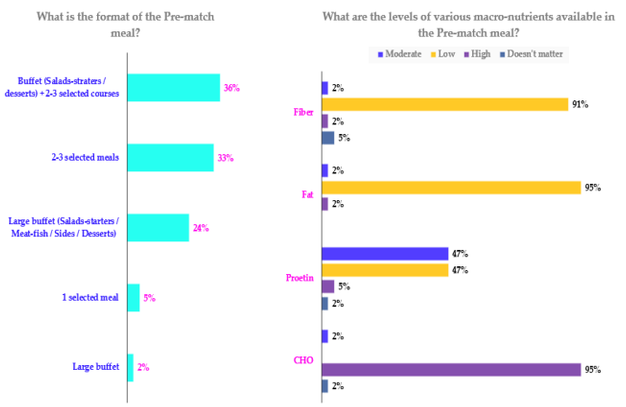

Fig. 43. (a): Left: Format of the Pre-match meal served on MD. (b): Right: Various macro-nutrients available in the Pre-match meal served on MD.

MD Locker nutrition and half-time

Before the match

- Food is consistently provided to players in the locker (93% for both home and away matches, Figures 44 and 45), with CHO- (98%) and protein-based (29%) elements (Figure 48)
- The majority of the food is offered in the form of natural food (fruits, dried fruits, 86%), sport-specific food (gel, bars, gummies, 84%) and drinks (78%) and natural drinks (water, fruit juice, 72%) (Figure 47 and 48)
- Practitioners rate sports energy drinks as the most important element of pre-match nutrition, followed by sport-specific food and caffeine (Figure 49)
- Liquids: half of the practitioners report providing 2 different sports drinks (51%), mainly to cover players' specific needs (58%) and accommodate their preferences in terms of taste (53%) and beliefs (37%) (Figure 50)
- When asking about the total of liquid that practitioners advise players to drink, the responses were pretty mixed, with some advising 0.5-1 L (30%), and others offering individualized plans (21%), or letting players self-select their intake to accommodate their thirst (19%) - and of course, all of this being dependent on weather conditions (21%) (Figure 46)
- Carbohydrates with a high (47%) and moderate (44%) glycemic index are mainly provided in the forms of gels (81%), fresh fruits (77%, with bananas offered by 91% of the practitioners), pre-made drinks (58%) and cereal bars (53%), for a target quantity of either 31-45g (44%) or 15-30 g (37%) (Figure 51)
- Caffeine is provided by a large majority of practitioners in the form of pills (49%), gums (49%), or CHO gels (49%), for a target quantity of 100 (33%) to 200 mg (30%) (Figure 51).
- Pre-workout mixes, mainly composed of caffeine, CHO, Beta-alanine, creatine, and Branched Chain Amino Acid (BCCA) are provided 30-60 min before kick-off (62%) (Figure 53)

Half-time

- Food is consistently provided to players in the locker (93% and 96% for home and away matches, respectively, Figure 54), with CHO- (93%) and protein-based (7%) elements (Figure 55).
- The majority of the food is offered in the form of sport-specific food (gel, bars, gummies, 91%), Sport-energy drinks (87%), and natural food (fruits, dried fruits,72%) (Figure 55).
- When asking about the total of liquid that practitioners advise players to drink, the responses were pretty mixed, with some advising 0.5-1 L (33%), and others offering individualized plans (19%) or letting players self-select their intake to accommodate their thrust (42%) - and of course, all of this being dependent on weather conditions (51%) (Figure 57).
- Carbohydrates with a high (70%) and moderate (35%) glycemic index are mainly provided for a target quantity of either 15-30 g (47%) or 31-45g (40%) (Figure 58).
- Caffeine is provided by a large majority of practitioners in the form of CHO gels (53%) or gums (44%) for a target quantity of 50 (30%) to 100 mg (40%) (Figure 59).

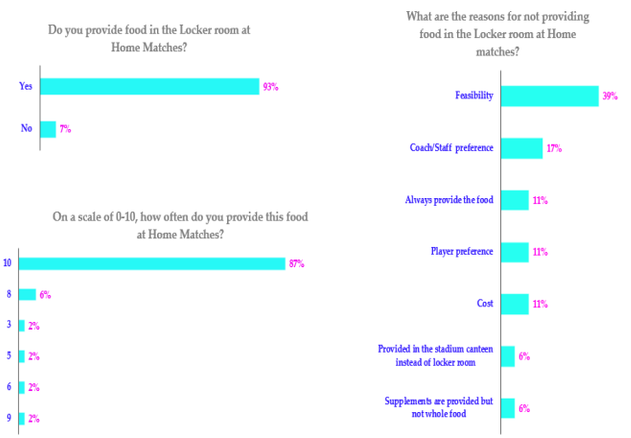

Fig. 44. (a): Top-left: Administration of food by the participants on MD in the Locker room at Home matches. (b): Bottom-left: Frequency of administration of food by the participants on MD in the Locker room at Home matches. (c): Right: A few potential reasons for not providing food on MD in the Locker room at Home matches.

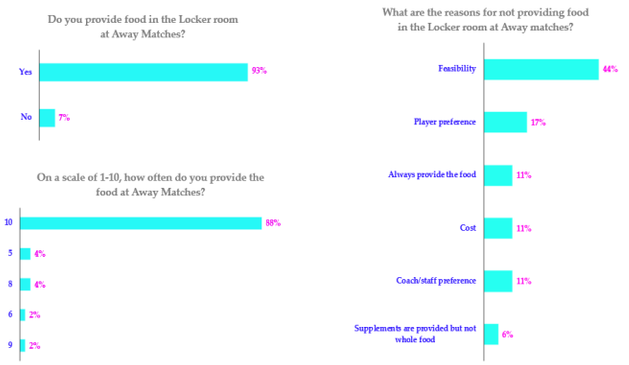

Fig. 45. (a): Top-left: Administration of food by the participants on MD in the Locker room at Away matches. (b): Bottom-left: Frequency of administration of food by the participants on MD in the Locker room at Away matches. (c): Right: A few potential reasons for not providing food on MD in the Locker room at Away matches.

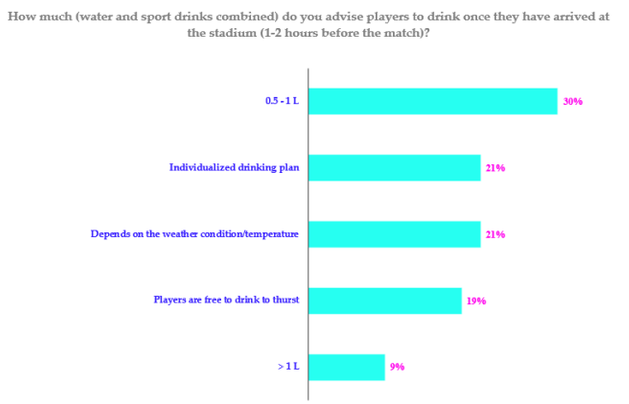

Fig. 46. Recommended water intake for the players at the stadium 1-2 hours prior to the match.

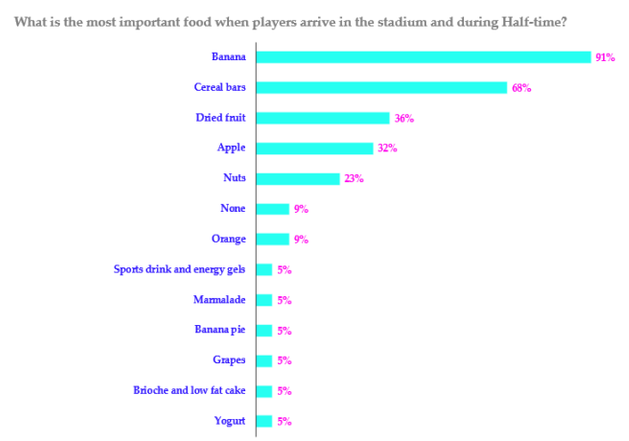

Fig. 47. A list of various important food provided to players during their arrival in the stadium and Half-time.

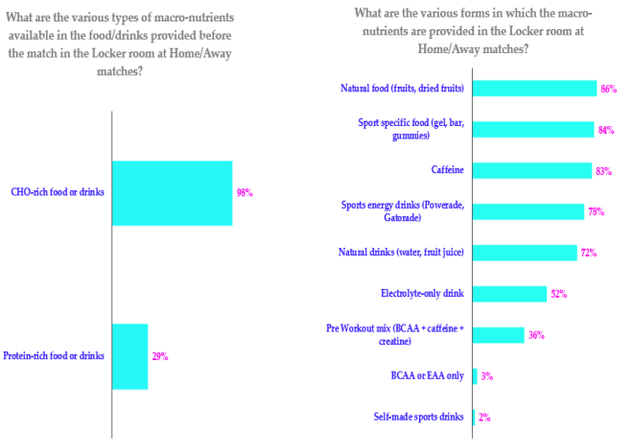

Fig. 48. (a): Left: Various macro-nutrients available in the food provided on MD in the Locker room at Home/Away matches. (b): Right: Various forms in which the macro-nutrients are administered in the Locker room at Home/Away matches. Abbreviations: BCAA– branched chain amino acids; EAA– essential amino acids.

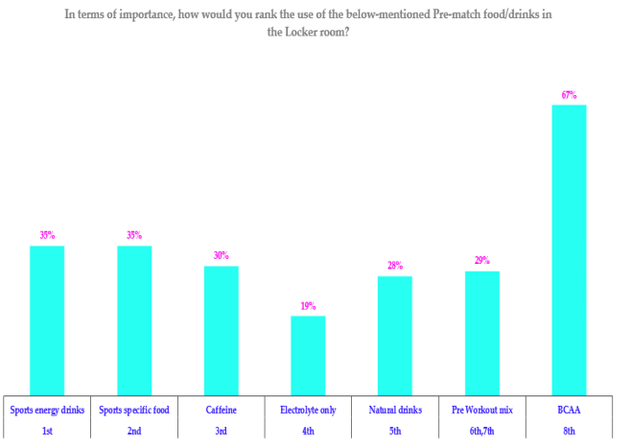

Fig. 49. Ranking the use of various Pre-match food/drinks in the Locker room on MD.

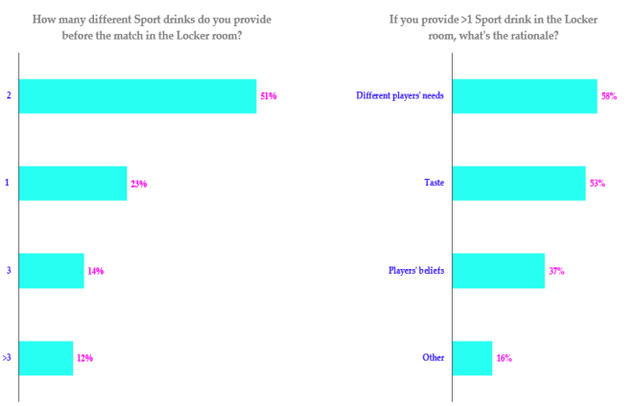

Fig. 50. (a): Left: Various sport drinks provided before the match in the Locker room on MD. (b): Right: A few potential reasons for providing more than one sport drink before the match in the Locker room on MD.

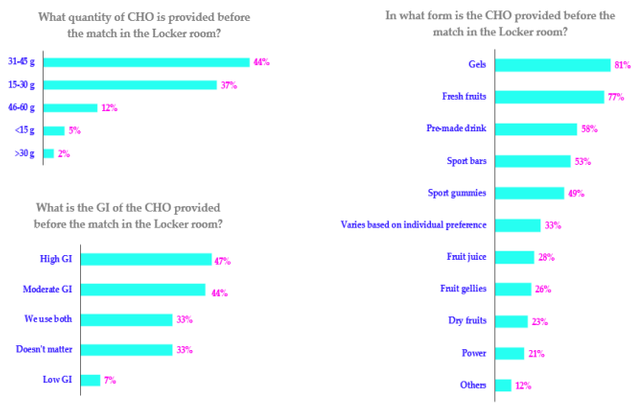

Fig. 51. (a): Top-left: Quantity of CHO provided before the match in the Locker room on MD. (b): Bottom-left: GI content of the CHO provided in the locker room on MD. (c): Right: Different ways in which CHO is provided before the match in the Locker room on MD. Abbreviations: GI– glycemic index.

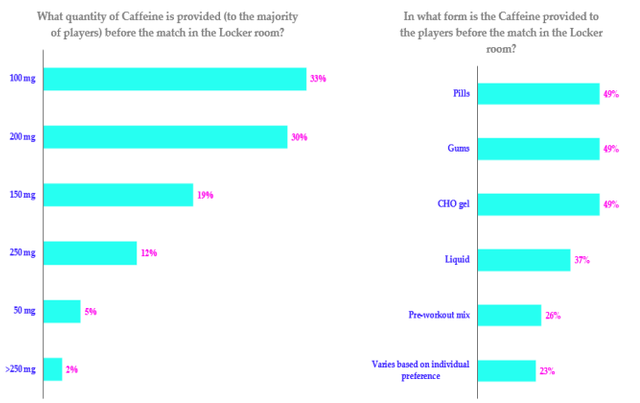

Fig. 52. (a): Left: Caffeine content provided before the match in the Locker room on MD. (b): Right: Different ways in which caffeine is provided before the match in the Locker room on MD.

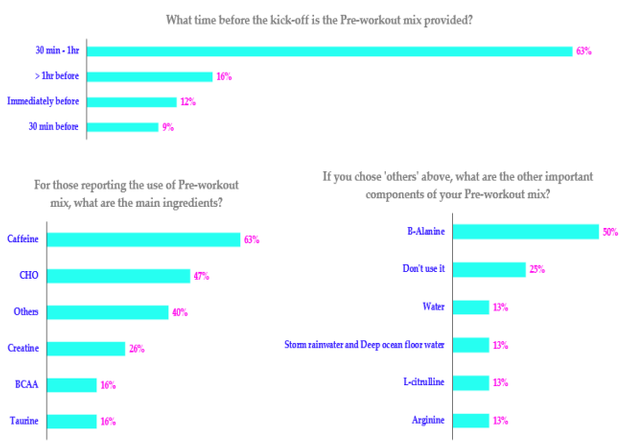

Fig. 53. (a): Top: Various times at which Pre-workout mix is served before kick-off. (b): Bottom-left: Main ingredients in the Pre-workout mix before kick-off. (c): Bottom-right: Other ingredients used in the preparation of Pre-workout mix served before kick-off.

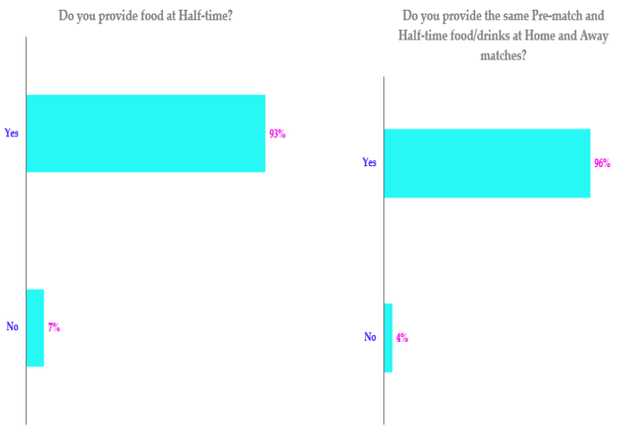

Fig. 54. (a): Left: Administration of food by the participants at Half-time. (b): Right: Administration of similar food/drink at Half-time at Home/Away match.

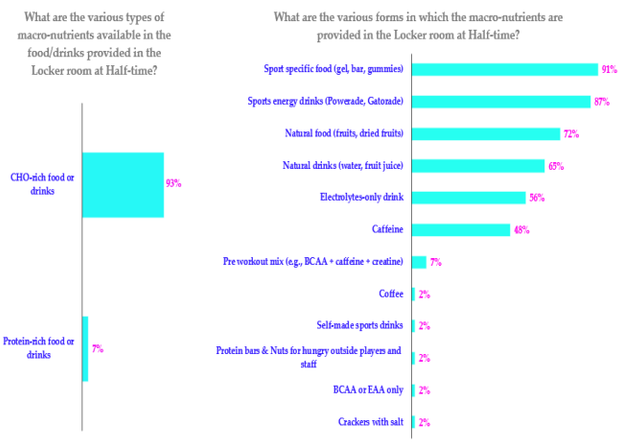

Fig. 55. (a): Left: Various macro-nutrients available in the food served in the Locker room at Half-time. (b): Right: Various forms in which the macro-nutrients are provided in the Locker room at Half-time. Abbreviations: BCAA– branched chain amino acids; EAA– essential amino acids.

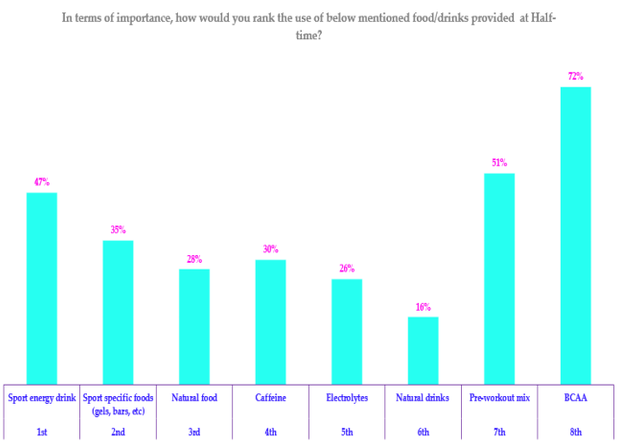

Fig. 56. Ranking the use of various food/drinks in the Locker room at Half-time.

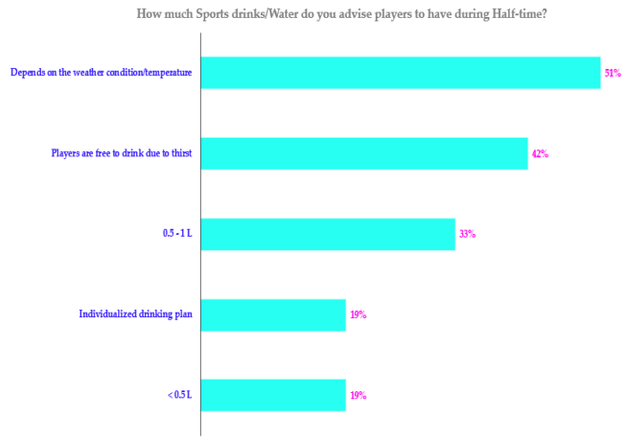

Fig. 57. **Recommended Sports drinks/Water intake for players at Half-time.**

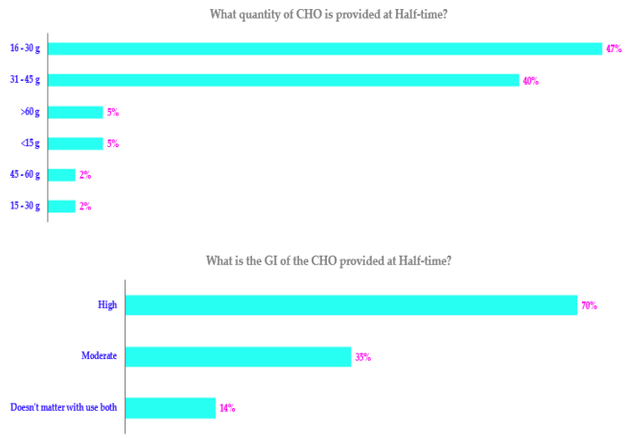

Fig. 58. **(a): Left: Quantity of CHO served at Half-time. (b): Right: GI content of the CHO served at Half-time.**

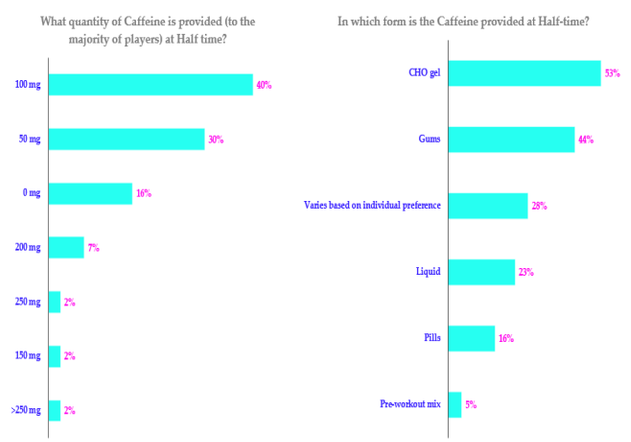

Fig. 59. **(a): Left: Quantity of Caffeine provided at Half-time. (b): Right: Various forms in which caffeine is provided at Half-time.**

MD Immediate Post-match Locker nutrition

- Food is consistently provided to players in the locker (97% for both home and away matches), with CHO- (93%) and protein-based (93%) elements (Figure 60).
- Practitioners report providing 2 different sports drinks (40%), mainly to cover players' specific needs (acute 72%, long-term 48%) and accommodate their preferences in terms of taste (69%) and beliefs (17%) (Figure 61). When asking about the total of liquid that practitioners advise players to drink, the responses were pretty mixed, with the majority offering individualized plans (33%), or letting players self-select their intake to accommodate their thirst (23%) - and of course, all of this being dependent on weather conditions (19%) (Figure 62)
- Carbohydrates with a high (72%) and moderate (44%) glycemic index are mainly provided in the forms of shaker mixes (88%), fresh fruits (86%), and fruit juices (47%), for a target quantity of either 46-60 g (47%) or >60 g (26%) (Figure 63).
- Protein and Amino Acids are mainly provided in shakers (65%) in the form of whey (88%) or milk (44%) (Figure 64) for a target quantity of either 20-30 g (65%) or 31-40 g (21%), mixed (65%) or not (49%) with CHO (Figure 65). Those shakers are mainly prepared with water (67%), cow milk (67%), or vegetal milk (33 and 20% for Almond and soja milk, respectively, Figure 66). Alternative solutions involve of course natural food for a large portion of practitioners too (60%) (Figure 65).
- Following the above, practitioners also offer specific food or supplement such as tart cherry (33%) or pomegranate (16%) juice, or omega 3 (21%) (Figure 67).

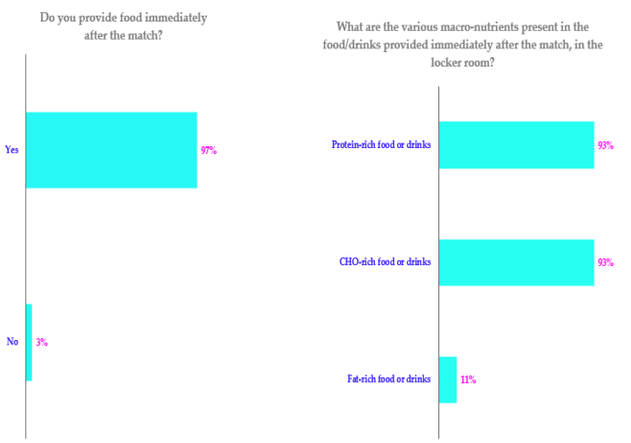

Fig. 60. **(a): Left: Administration of food by the participants immediately after the match. (b): Right: Various macro-nutrients available in the food/drinks provided immediately after the match in the Locker room.**

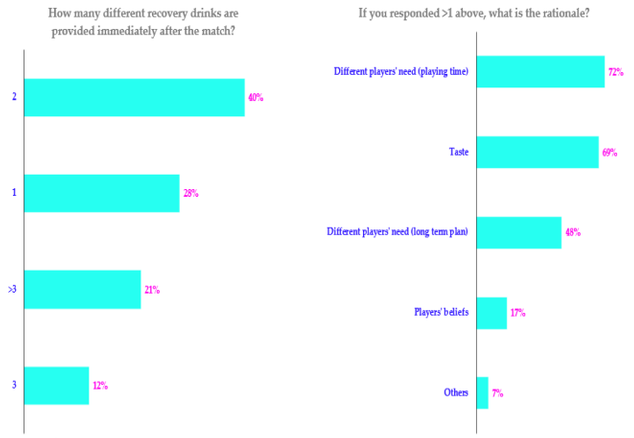

Fig. 61. (a): Left: Various recovery drinks provided in the Locker room immediately after the match. (b): Right: A few potential reasons for providing more than one recovery drink in the Locker room immediately after the match.

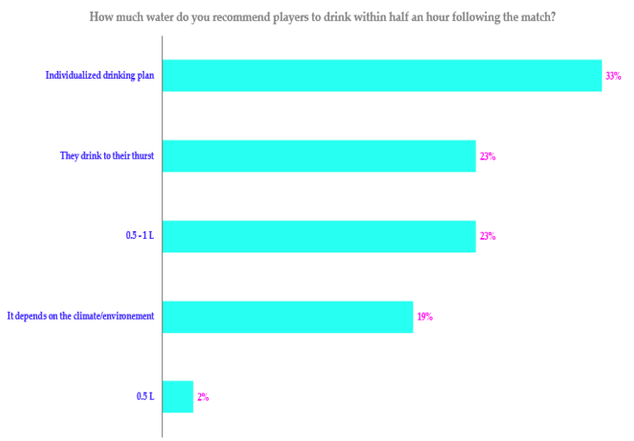

Fig. 62. Recommended water intake for players within half an hour following the match.

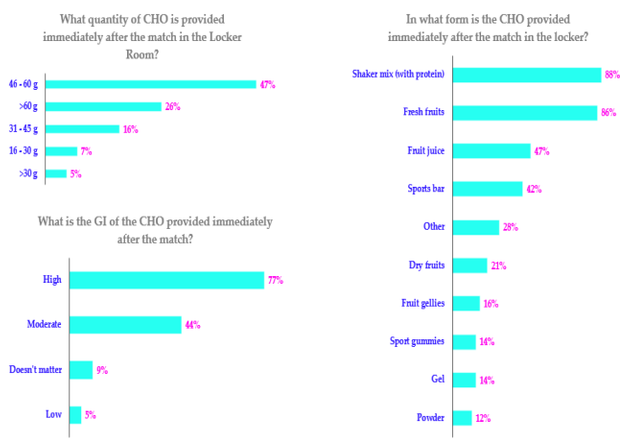

Fig. 63. (a): Top-left: Quantity of CHO provided immediately after the match. (b): Bottom-left: GI content of the CHO provided immediately after the match. (c): Right: Different ways in which CHO is provided immediately after the match.

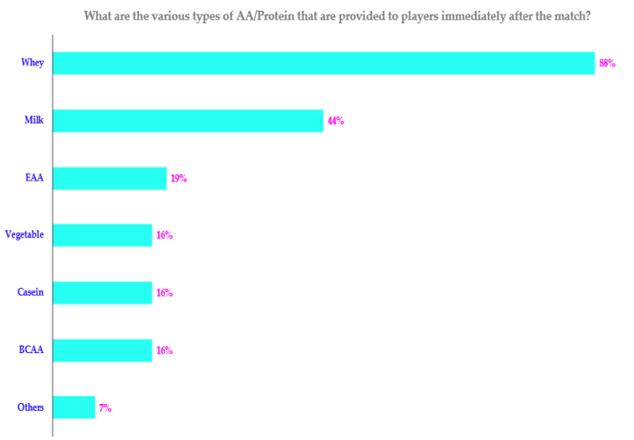

Fig. 64. Types of AA/Protein provided immediately after the match.

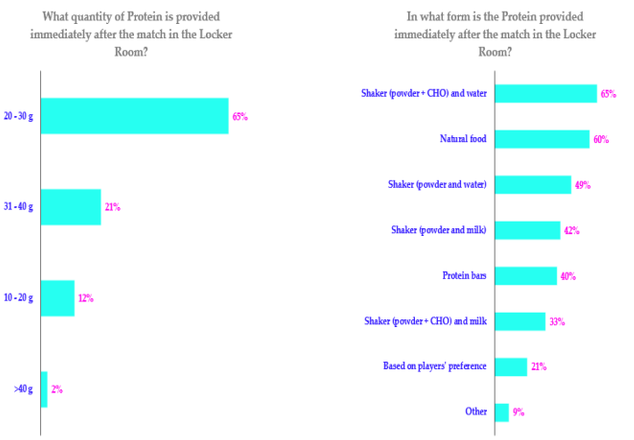

Fig. 65. (a): Left: Quantity of Protein provided immediately after the match. (b): Right: Different ways in which Protein is provided immediately after the match.

Fig. 66. Various ways in which the protein shake is prepared.

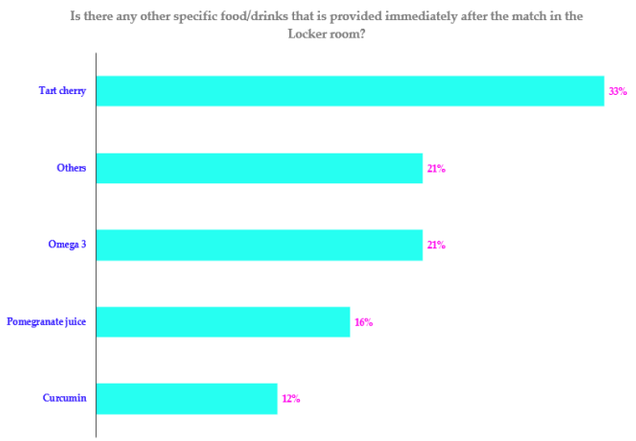

Fig. 67. Food/drinks provided in the Locker room immediately after the match.

MD Post-match meal

The majority of practitioners reported providing post-match dinner on MD, with a greater frequency for away than home matches (95 vs. 81%, Figures 68 and 73). At home, this meal is most of the time served in the locker (43%), stadium room/restaurant (36) (Figure 68). Interestingly, while the locker is the most cited location for this meal, it was not the preferred option for practitioners. Having a proper and dedicated area for this meal is reported to be ideal (Figure 69). This likely ensures that food is better prepared by either the club's chef or its caterer, with a higher level of dedication, details, and hygiene (Figure 70). The meal is generally served immediately once players are back from the pitch (42%, especially when served in the locker) or a maximum of 30 min after the end of the match to let players shower first (Figure 71), in the form of a large buffet (food self-selected by players, Figure 72).

After away matches, the meal is mainly served on the bus (51%) or in the locker room (20%). The bus remains both the most practical and preferred option for practitioners since there is generally little space and time to organize it in the locker and of course, the option of a dedicated area/room is rarely (if not, never) an option (Figure 74 and 75). The food is generally prepared at the team's hotel and then carried on on the bus or brought to the stadium (48%). An alternative option is to organize a food delivery at the stadium while contracting a local caterer (29%) (Figure 76). Interestingly, the post-match meal was the one for which practitioners had the greater tendency to slightly change contents (Figure 77), and let players be more autonomous in their choices (Figure 79) both for logistical (Figure 78) and psychological (Figure 81) reasons. In fact, the need to be more relaxed with food after a match (Figure 80) while still providing the right amount and quality of food is probably the greater challenge for practitioners.

In terms of content, this is the meal of the match preparation/recovery cycle that contains the higher levels of both CHO and proteins (Figure 82). This meal also contains moderate levels of fat and fiber contents (Figure 82), which also contrasts with the other pre-match meals when those latter contents were kept as low as possible (Figures 6, 19, 30, and 43).

There is a large variety of actual drinks and food served (Figures 83 to 89), with the following being the most representative of general practices/players' favorites:

- Still water (100%), fruit juice (59%), sparkling water (46%), coffee/tea (46%), and sport drinks (Figure 46%) (Figure 83)
- Grilled white meat (77%), grilled red meat (68%), meat with sauce (e.g., curry or bolognese, 59%), and grilled fish (45%) served - with all those grilled options being by far the most popular among players (Figure 86)
- Raw/cooked veggies (64/50%), soup (46%) (Figure 84)
- White pasta (73%), slices of white bread (64%), and white rice (59%) are served and also preferred by players (Figure 87)
- Mixed dishes such as sandwiched (73%), pizzas (68%), burgers (64%), wraps (55%) sushis (45%), and lasagnas (45%) are the most served - with burgers (50%) and pizzas (45%) being by far the most preferred by players (Figure 88)
- Parmesan (32%) and grated (27%) cheese (Figure 85)
- Plain low-fat (32%) and greek (32%) yogurts (Figure 85)
- Fresh fruits (60%), cakes (55%), and chocolate bars of good quality (35%) (Figure 89)

MD Post-match pre-bed nutrition

The majority of practitioners did not provide post-match pre-bed nutrition on MD (67%), but if so, they were likely to do it for both away and home matches (79%, Figures 90). When served, this nutrition is generally composed of protein-rich food or drinks (89%); offered in the forms of natural drinks (63%) or food (53%), or shakers (53%) (Figure 91).

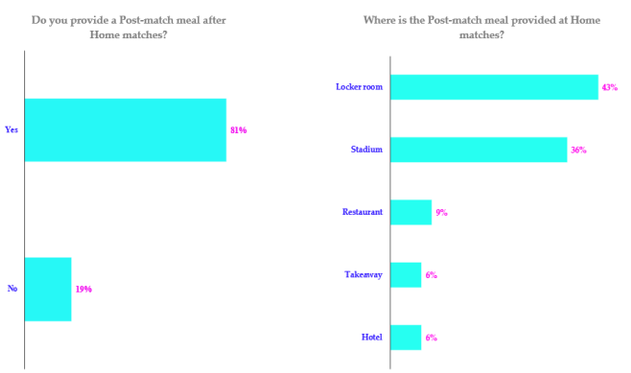

Fig. 68. (a): Left: Administration of Post-match meal by the participants at Home matches. (b): Right: Location of the Post-match meal at Home matches.

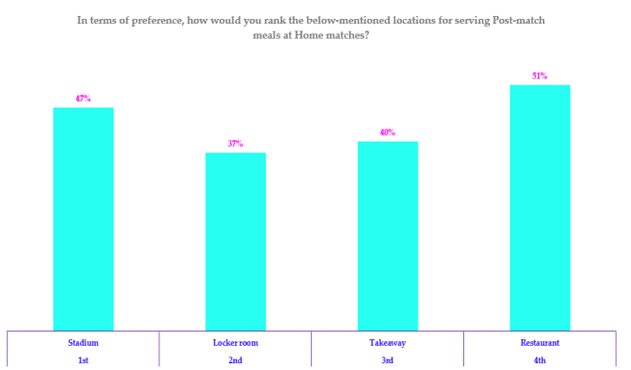

Fig. 69. Ranking the preference for various locations to provide Post-match meals at Home matches.

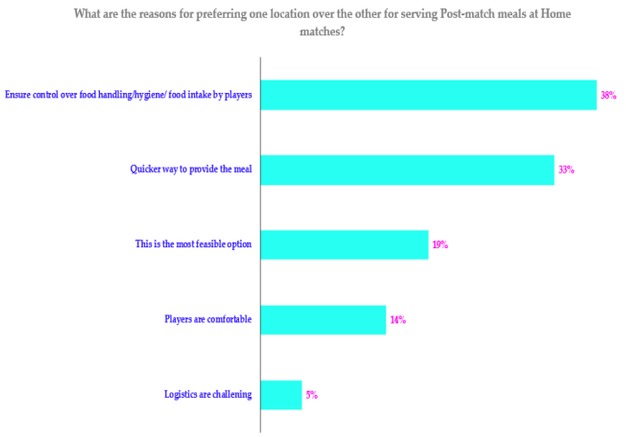

Fig. 70. A few potential reasons for preferring a particular location over other at Home matches.

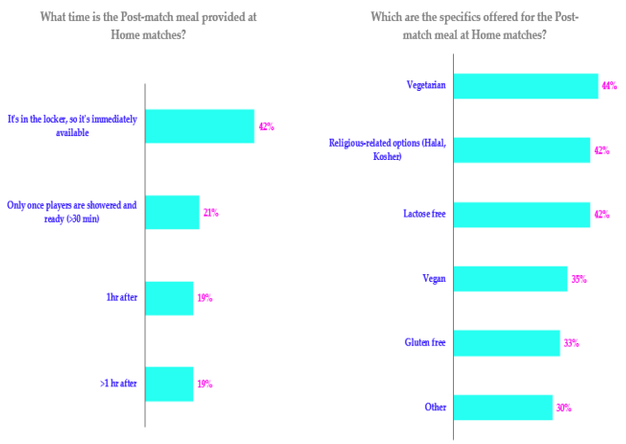

Fig. 71. (a): Left: Various times at which the Post-match meal is served at Home matches. (b): Right: Specific food options provided for Post-match meal at Home matches.

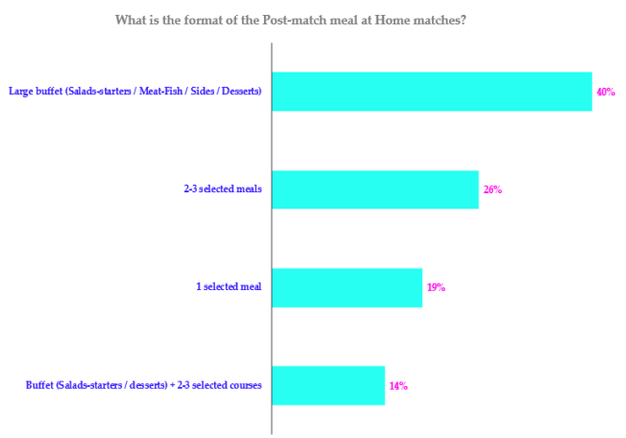

Fig. 72. Format of the Post-match served at Home matches.

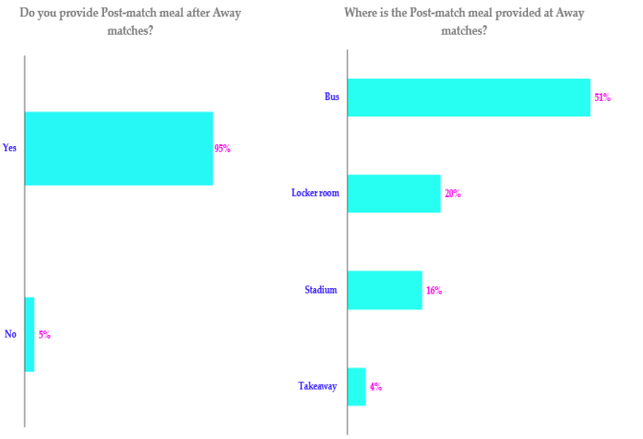

Fig. 73. (a): Left: Administration of Post-match meal by the participants at Away matches. (b): Right: Location of the Post-match meal at Away matches.

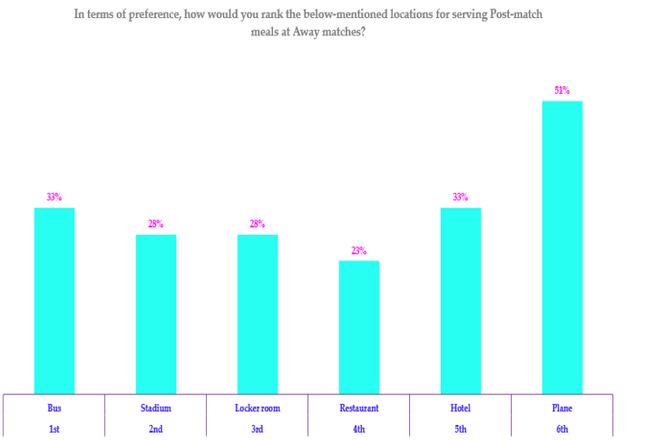

Fig. 74. Ranking the preference for various locations to provide Post-match meals at Away matches.

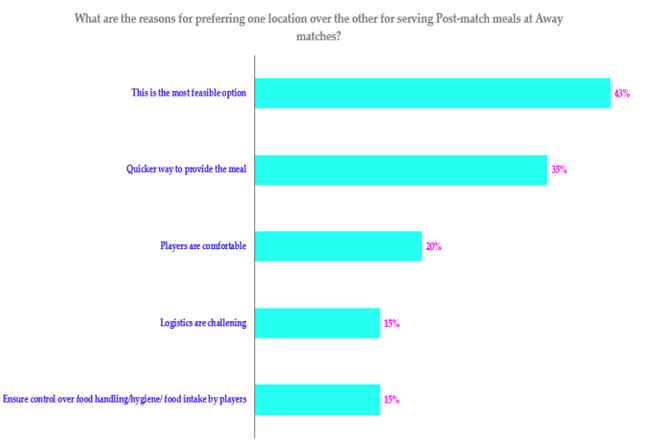

Fig. 75. A few potential reasons for preferring a particular location over other at Away matches.

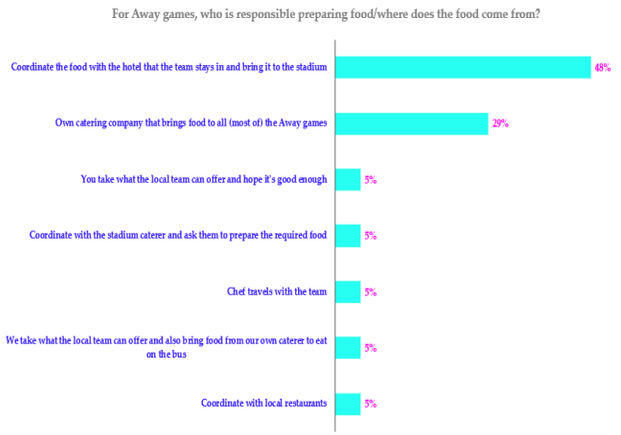

Fig. 76. Information regarding the preparation and arrangement of the food at Away matches.

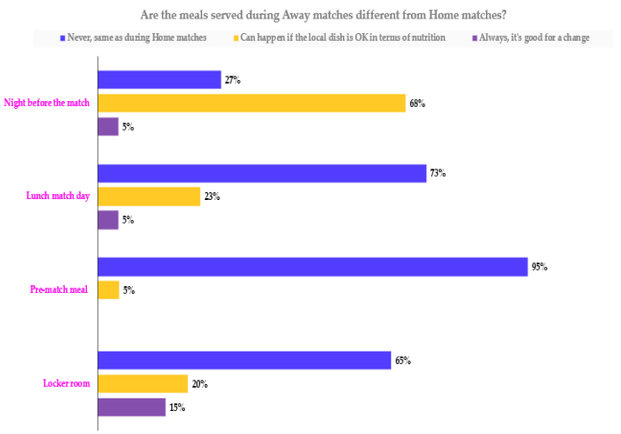

Fig. 77. Distribution of the variation in the meals served at Home and Away matches.

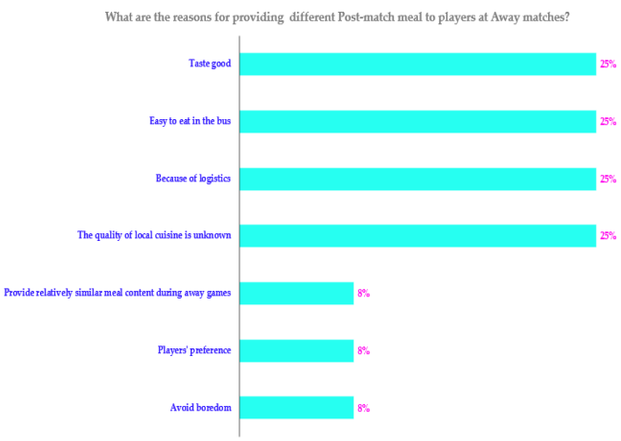

Fig. 78. A few potential reasons for providing different meals at Away matches.

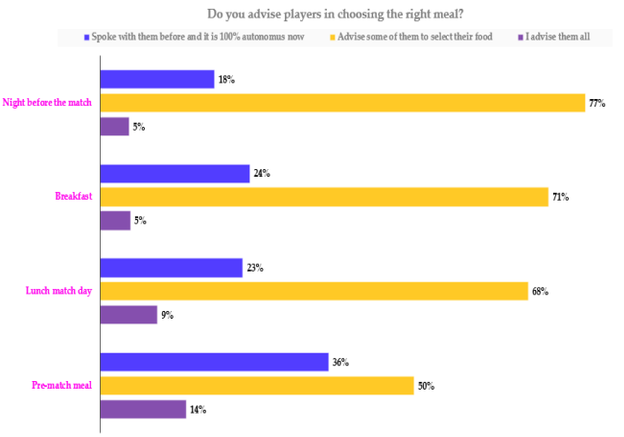

Fig. 79. Distribution of the response of the participants regarding their advise to the players in choosing the right meal.

Fig. 80. (a): Left: Specific food avoided for Post-match dinner. (b): Right: Specific food that are included in Post-match dinner but not in any other meal.

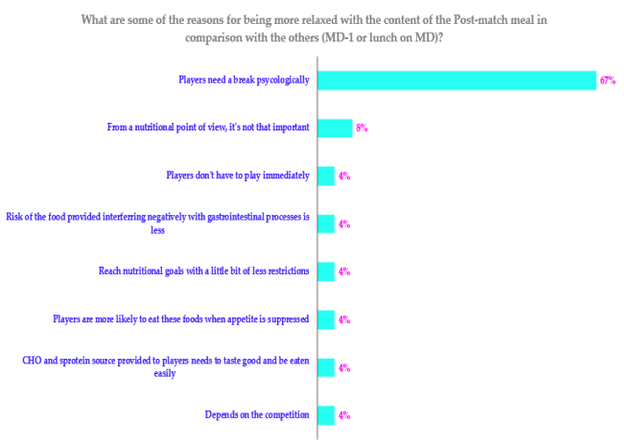

Fig. 81. A few potentials reason for being more relaxed during Post-match meal in comparison to other meals (i.e., lunch on MD, dinner on MD-1).

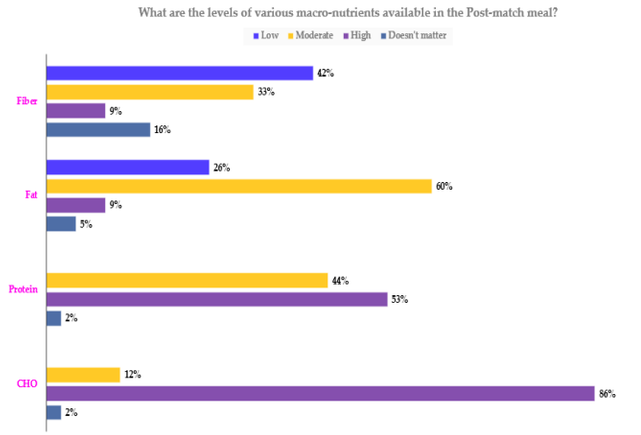

Fig. 82. Various nutritional content available in Post-match dinner.

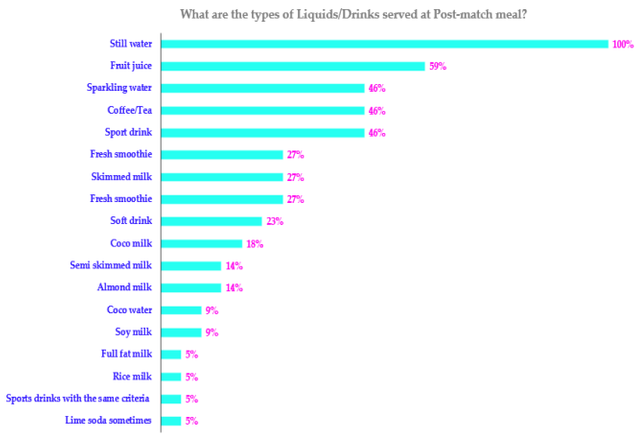

Fig. 83. Various types of Liquids/Drinks served for Post-match meal.

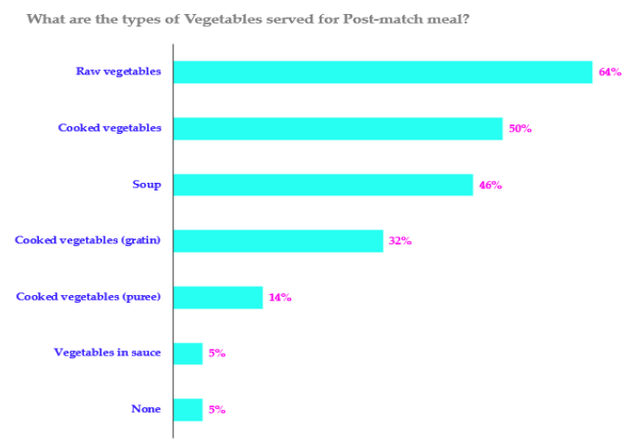

Fig. 84. Various types of Vegetables served for Post-match meal.

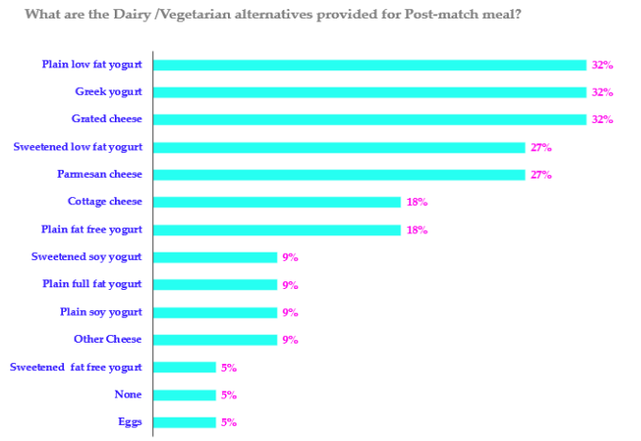

Fig. 85. Various types of Dairy/Vegetarian alternatives served for Post-match meal.

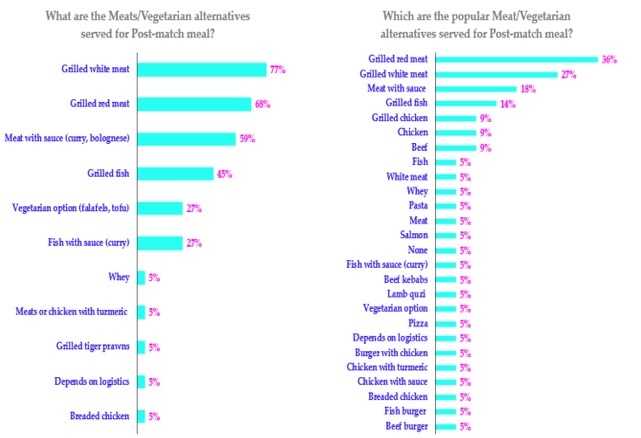

Fig. 86. (a):Left: Various types of Meat/Vegetarian options served for Post-match meal. (b): Right: Popularity of the various types of Meat/Vegetarian options served for Post-match meal.

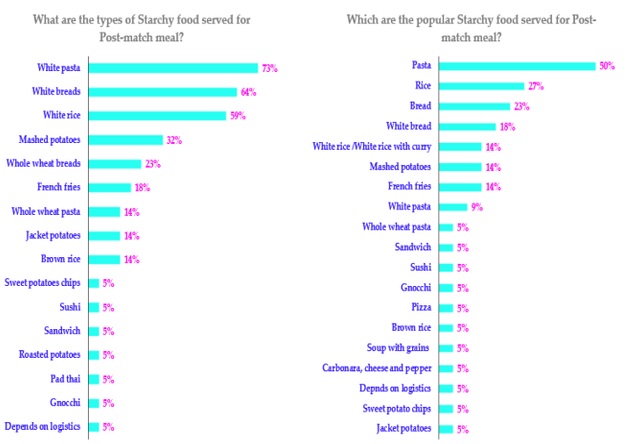

Fig. 87. (a):Left: Various types of Starchy food served for Post-match meal. (b): Right: Popularity of the various types of Starchy food served for Post-match meal.

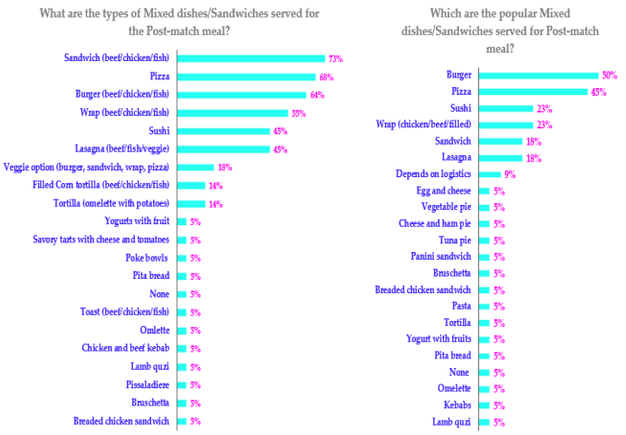

Fig. 88. (a): Left: Various types of Mixed dishes/Sandwiches served for Post-match meal. (b): Right: Popularity of the various types of Mixed dishes/Sandwiches served for Post-match meal.

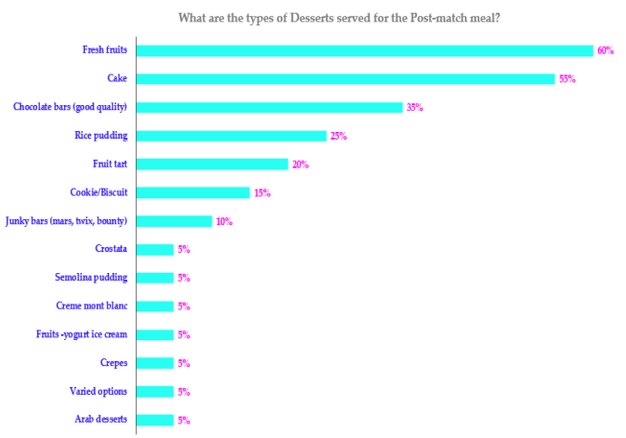

Fig. 89. Various types of Desserts served for Post-match meal.

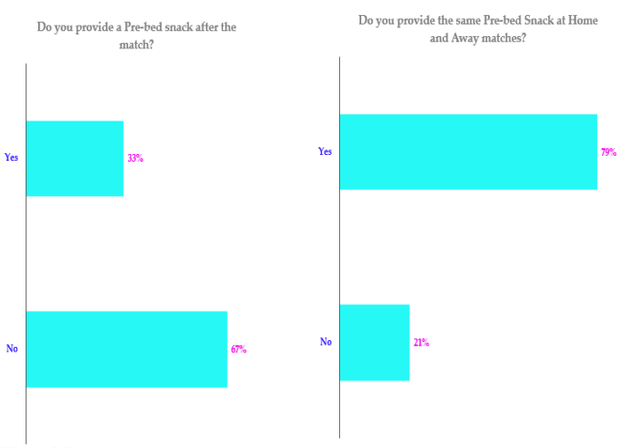

Fig. 90. (a): Left: Administration of Pre-bed snack by participants after the match. (b): Right: Administration of similar Pre-bed snack by participants during Home and Away matches.

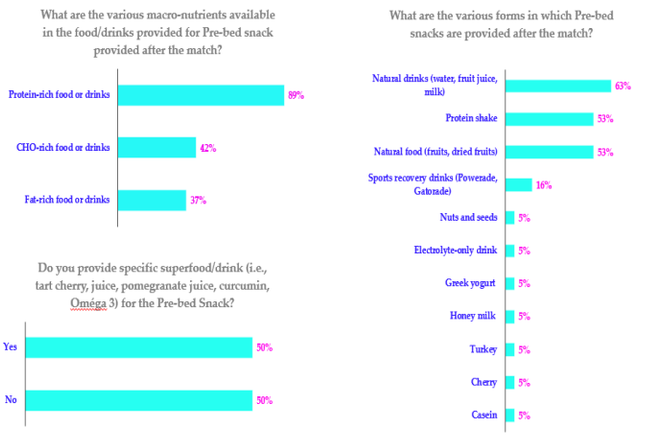

Fig. 91. (a): Top-left:. Various macro-nutrients available in the Pre-bed snacks provided by the participants. (b): Bottom-left: Administration of specific food/drinks provided as Pre-bed snacks by the participants. (c): Right: Various forms in which the Pre-bed snacks are provided by the participants.

Snacks for travels

Snacks for travel are always a challenge to organize, for multiple reasons including for example logistics (cold vs. hot food), ability to choose products (bus/flights own caterers), cost, and ingestion timing. The timing of food serving is mainly dictated by the timing of the other meals (i.e., whether the travel is in the middle of the day, morning, or late afternoon). It is mainly composed of the following (Figure 92):

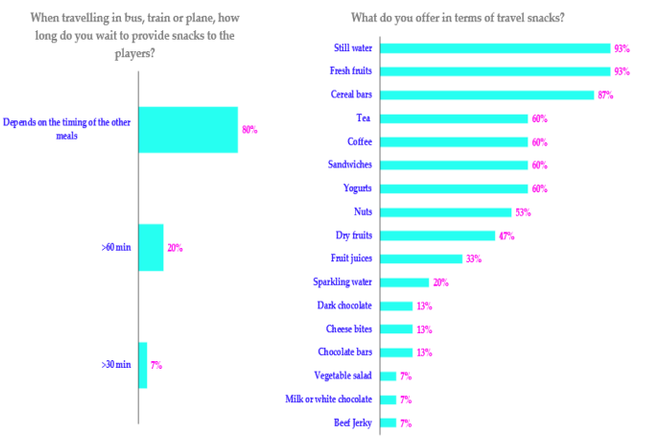

Fig. 92. (a): Left: Various times at which the travel snacks are provided by the participants. (b): Right: List of various travel snacks provided by the participants

- Still water (93%), Tea and coffee (63%), and fruit juices (33%)
- Fresh fruits (93%)
- Cereals bars (87%) and sandwiches (60%)
- Yogurts (60%)
- Nuts (53%) and dry fruits (47%)

Specific use of supplements

Among the different supplements regularly offered to players, the top 7 were (all >50%) (Figure 93):

1. Caffeine (91%) - essentially consumed on match day (see locker room nutrition for usage and dosage; Figures 52 and 59) - some players request it to train sometimes though.
2. Creatine monohydrate (84%): maintenance phase all year-long, dually dose of 3-5 g (86%) (Figure 95)
3. Omega 3 (75%)
4. Vit D (68%): all year-long for all players, (47%), with daily doses from 2000 to 4000 UI (Figure 96)
5. Antioxidants (65%), Nitrate (65%; mostly match day only, 64% or 2-5 days before an important match, 45% in the form of natural food, 73%, for a total of 400 - 800 mg, 67%, Figure 97) and Beta-alanine (65%; 2-4 weeks blocks, <4 g / day in the form of power or pills, 45% for both, Figure 98)
6. Collagen (57%): mainly for injured players (40%), specific player profiles (33%) or during congested fixtures (27%), for about 10 g / day, in the form of powder (33%) or home-made foods or drinks rich in collagen (33%) (Figure 99).
7. Probiotics (55%) - mainly individual cases (53%) (Figure 100)

This supplementation strategy followed that of the Australian Institute of Sports (AIS, Figure 94), e.g., essentially evidenced-based supplementation (AIS Category A), while still using some supplements that may have less evidence (yet), but with no proven risk of harm (AIS Category B).

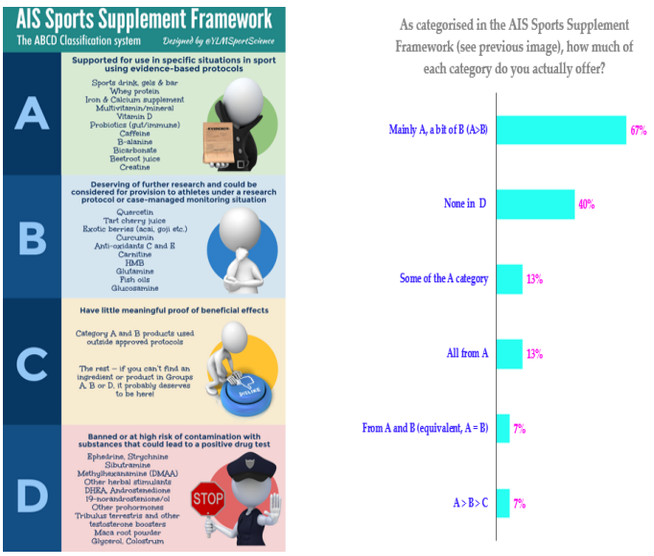

Fig. 94. **(a): Left: The guidelines issued by AIS regarding the use of sports supplements. (b): Right: Distribution of responses of the participants with regards to the use of supplements mentioned in each category of the AIS Sports Supplement Framework. Abbreviations: AIS– Australian Institute of Sports.**

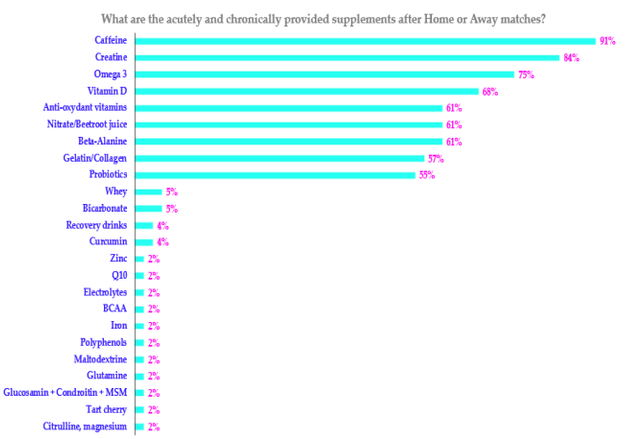

Fig. 93. **Acutely and chronically administered supplements after Home and Away matches. Abbreviations: MSM– Methylsulfonylmethane; Q10 - coenzyme Q**

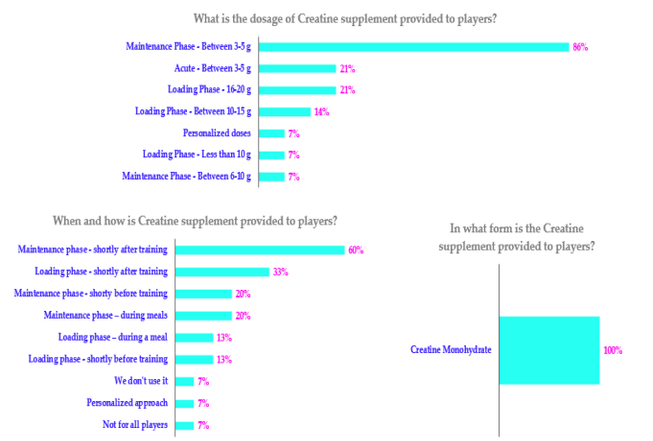

Fig. 95. **(a): Top: Quantity of Creatine provided to players. (b): Bottom-left: Various phase of training and modes in which the players are supplemented with Creatine. (c): Bottom-right: Various forms in which the players are provided with Creatine.**

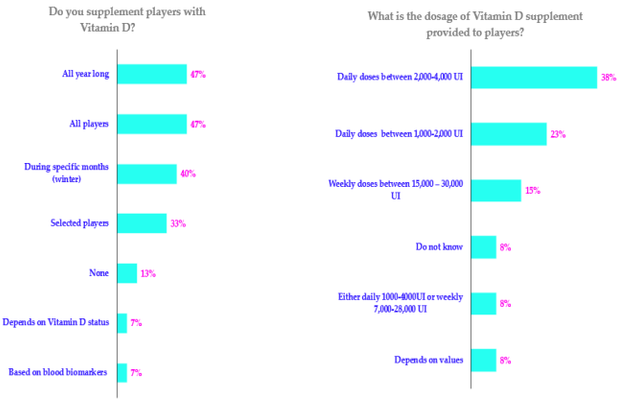

Fig. 96. (a): Left: Distribution of participants response regarding the use of Vitamin D as a supplement. (b): Right: Quantity of Vitamin D provided to players.

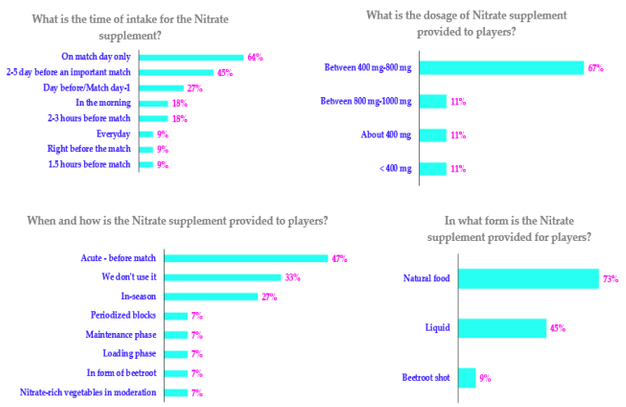

Fig. 97. (a): Top-left: Various times at which the players are supplemented with Nitrate. (b): Top-right: Quantity of Vitamin D provided to players. (c): Bottom-left: Various phases of training and modes in which the players are supplemented with Nitrate. (d): Bottom-right: Various forms in which the players are provided with Nitrate.

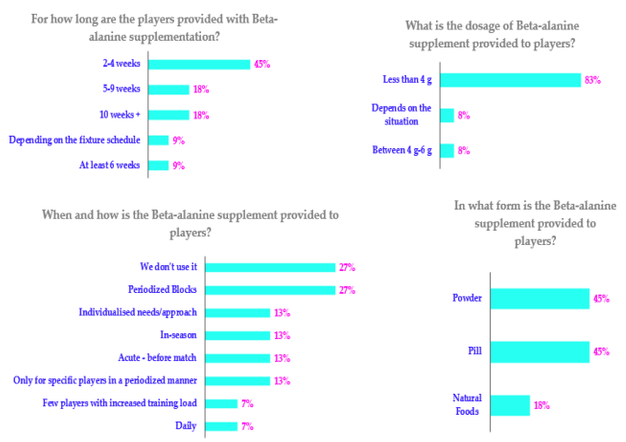

Fig. 98. (a): Top-left: Duration for which the players are supplemented with Beta-alanine. (b): Top-right: Quantity of Beta-alanine provided to players. (c): Bottom-left: Various phase of training and modes in which the players are supplemented with Beta-alanine. (d): Bottom-right: Various forms in which the players are provided with Beta-alanine.

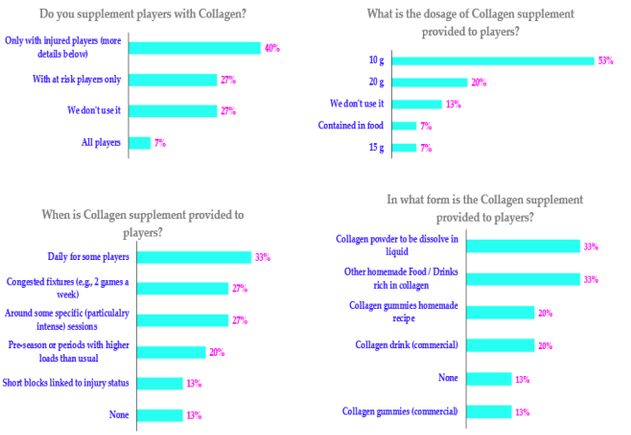

Fig. 99. (a): Top-left: Distribution of participants response regarding the use of Collagen as a supplement. (b): Top-right: Quantity of Vitamin D provided to players. (c): Bottom-left: Frequency of use of Collagen as a supplement by the players. (d): Bottom-right: Various forms in which the players are provided with Collagen.

Fig. 100. Distribution of participants response regarding the use of Probiotics as a supplement.

Nutrition of the injured player

During the different phases of muscle/tendon injuries: (Figures 101 to 102)

- Acute (initial): practitioners focus on whey (87%), omega 3 (67%) and collagen (76%).
- Second phase: whey (80%), creatine (73%) and omega 3 (67%).
- Last phase: whey (87%), omega 3 (67%) and collagen (60%).

For bone-related injuries, practitioners also provide vit D (73%) and calcium (27%)

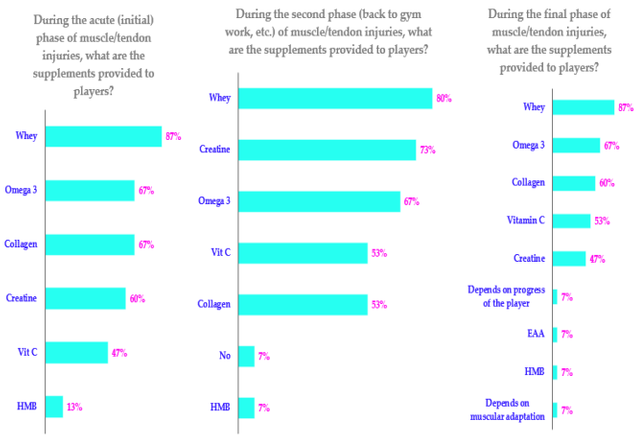

Fig. 101. (a): Left: Various supplements provided by participants to injured players during the initial phase of muscle/tendon injury. (b): Centre: Various supplements provided by participants to injured players during the second (gym work, etc.) phase of muscle/tendon injury. (c): Right: Various supplements provided by participants to injured players during the final phase of muscle/tendon injury. Abbreviations: Vit– vitamin; HMB– β-hydroxy-β-methylbutyrate.

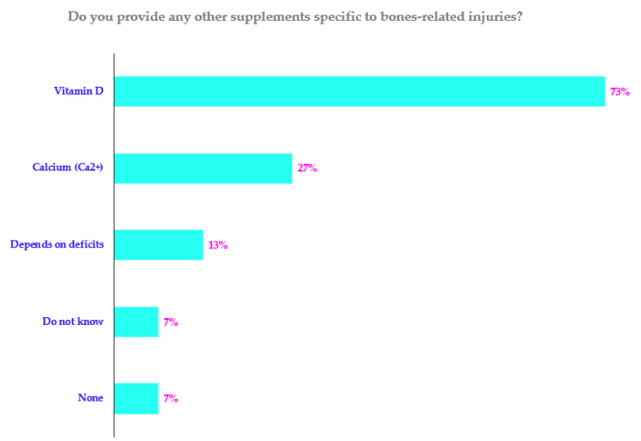

Fig. 102. Other supplements provided by participants to injured players with bone-related injuries.

Discussion and conclusion

This is to our knowledge the first comprehensive survey that uncovers the real practices of elite practitioners (Figures 1 and 2) when it comes to selecting various types of food during meals, and organizing their nutritional and supplementation strategies in real-life conditions (Figures 3 to 102).

The first findings of the present survey are that the actual practices reported (i.e., meal content or supplements use) tended to be well aligned with current nutritional guidelines (Collins, 2021; Close, 2022; Hulton, 2022) - both in terms of content and programming. While this suggests that the practitioners surveyed were all well educated (most of the respondents had reached a bachelor (49%) or Ph.D. (25%), Figure 2), it also shows that most guidelines are actually applicable in real-life scenarios - but only once practitioners have managed to translate those guidelines into real practices, i.e., FOOD! (Hulton, 2022; Little, 2022). It is with this latter objective in mind that we believe that there is great (and novel) value in the current manuscript. There is however at least one topic that would deserve more attention in a follow-up survey: the place of CHO in the acute context of the immediate post-match recovery window. The need to heavily feed players with CHO has been recently challenged, and curious and open-minded practitioners are directed to the Training Science Podcast for further insights into this topic (Episode 22).

The other major findings of the present survey are that the implementation of all the different meals is often the direct product of multiple compromises between ideal food content, feasibility, cost, and coach/player preferences. Overall, every situation across the match preparation/recovery continuum highlights the challenges faced by practitioners, who have to navigate and do their best between ideal scenarios and real practices and possibilities. Therefore, while specific nutrition skills/knowledge is obviously required for successful practitioners (Figure 2), planning and the capacity to adapt feeding strategies to different contexts should not be overlooked when it comes to organizing nutritional strategies in real-life conditions.

The practical application section summarizes the main practices for each meal, ordered chronologically from the diner at MD-1 to MD post-match meal. Practices in terms of travel snacks content and supplements use (healthy and injured players) are also briefly summarized below.

Practical applications

Logistics

- Planning and the capacity to adapt feeding strategies to different contexts are highly important skills when it comes to organizing nutritional strategies in real-life conditions.
- The preferred meal structure is pretty constant across the different meals before and after a match, in the form of a large buffet where players can choose their food based on their preferences and dietary requirements.
- Having access to a dining area/restaurant is compulsory in this situation, with most of the teams organizing meals in hotels for MD-1 and MD breakfast/lunch (both home and away matches). An alternative is to serve breakfast/lunch at the training ground restaurant on MD for home matches.
- Post-home match meals are often served in the locker. Still, the ideal scenario remains to have a dedicated area directly at the stadium for players to sit and have a proper and complete meal as they would have in a restaurant.
- For away matches, the post-match meal is often the most challenging to organize, with players eating in the locker what is often prepared by a local caterer (stadium or hotel). The ideal scenarios can include eating in the club's bus some food that had been either prepared by the club's chef at the hotel or delivered by the club's own caterer.
- Blockers for the implementation of all the different meals are a mix of feasibility, cost, and coach/players preferences, which highlights well the challenges for practitioners who have to navigate and do their best between ideal scenarios and real practices and possibilities.

Meals content and food planning

- Interestingly, many specific foods including lactose-free, gluten-free, vegetarian, vegan, and religious-related options are almost systematically offered to accommodate individual players' preferences, allergies, and dietary restrictions - this applies to any meal across the match preparation/recovery continuum.

- Practitioners tend to periodize the food they offer from one meal to the next as they get closer to the match (from the diner at MD-1 to the pre-match snack on MD) while:
  - increasing CHO contents as they get closer to the match
  - optimizing digestive comfort (e.g., overall less fat and fewer fibers); for example, ham/turkey/chicken and eggs are preferred on MD; salmon and red meat are only offered at MD-1 by the majority of practitioners.
- The MD-1 dinner meal is the one for which practitioners had the greatest tendency to change some dishes, especially when the local cuisine or regional food can offer some healthy and relevant alternatives.
- Conversely, the pre-match meal on MD is the one for which practitioners had the lowest tendency to change contents; likely to maintain players' routines and decrease any risk of digestive discomfort or unknown adverse reaction of the body.
- The post-match meal content is also the most challenging to put together since while most of the players need to unwind and probably dream about eating fast foods, practitioners still need to find feeding strategies for them to ingest enough macronutrients (especially proteins) and fibers while factoring in the uncertainty about the stadium caterer (e.g., whether the food will be warm and good enough).
- The post-match meal is the one for which practitioners have the greater tendency to slightly change contents, and let players be more autonomous in their choices both for logistical and psychological reasons.
- Even in the context of such an elite and professional sport as football, many practitioners offer burgers, pizzas, and chocolate bars to players; but having quality (homemade) and timing (post-match exclusively) as safeguards.
- In the complex above-mentioned post-match context, using shakers with large amounts of both CHO and protein may be the best solution to secure a minimum quantity of (good) macronutrients (especially CHO and proteins); the place of CHO in this acute context has however been recently challenged, and curious and open-minded practitioners are directed to the Training Science Podcast for further insights into this topic (Episode 22).
- Snacks for travel are always a challenge to organize, for multiple reasons including for example logistics (cold vs. hot food), ability to choose products (bus/flights own caterers), cost, and ingestion timing. It is mainly composed of easy-to-pack-and-grab items (e.g., fruit juices, fresh fruits, cereals bars, and sandwiches).

Supplementation

- Practitioners tend to follow the Australian Institute of Sports (AIS) framework, e.g., essentially evidenced-based supplementation (AIS Category A), while still using some supplements that may have less evidence (yet) but with no proven risk of harm (AIS Category B).
- The top 9 supplements include (by order of use); caffeine, creatine, omega 3, vit D, antioxidants, nitrate, beta-alanine, collagen, and probiotics.
- Supplementation is generally tailored to the individual player, and provided chronically (i.e., caffeine, creatine, omega 3) or in phases (e.g., collagen) depending on the context of the individual player (e.g., injury) and/or the season (e.g., congested fixtures).
- When it comes to supplementing injured players (muscle/tendon injuries), practitioners prioritize whey protein (to maintain body composition), creatine, omega 3, and collagen, with slight variations in the prioritization as a function of the return-to-play phase (i.e., more creatine to support phase 2, when transitioning from the gym to the pitch)

References

1. Close GL, Kasper AM, Walsh NP, Maughan RJ. "Food First but Not Always Food Only": Recommendations for Using Dietary Supplements in Sport. Int J Sport Nutr Exerc Metab. 2022 Mar 12:1-16.

2. Collins J, Maughan RJ, Gleeson M, Bilsborough J, Jeukendrup A, Morton JP, Phillips SM, Armstrong L, Burke LM, Close GL, Duffield R, Larson-Meyer E, Louis J, Medina D, Meyer F, Rollo I, Sundgot-Borgen J, Wall BT, Boullosa B, Dupont G, Lizarraga A, Res P, Bizzini M, Castagna C, Cowie CM, D'Hooghe M, Geyer H, Meyer T, Papadimitriou N, Vouillamoz M, McCall A. UEFA expert group statement on nutrition in elite football. Current evidence to inform practical recommendations and guide future research. Br J Sports Med. 2021 Apr;55(8):416. doi: 10.1136/bjsports-2019-101961. Epub 2020 Oct 23.

3. Hulton AT, Malone JJ, Clarke ND, MacLaren DPM. Energy Requirements and Nutritional Strategies for Male Soccer Players: A Review and Suggestions for Practice. Nutrients. 2022 Feb 4;14(3):657. doi: 10.3390/nu14030657.

4. Little T. The Colour-Fit Method: The secret nutrition and fitness plan used by elite athletes that will transform your body shape, energy and health, Piatkus, 2022.

5. Training Science Podcast. MORE FAT = MORE GAINS?! INDIVIDUAL Training in Team Sports?! Science, but WITHOUT Science?! – Recap Episode Part 3. Apple / Spotify.

Aknowledgements
Richard Allison, Mona Nemmer, Ian Rollo, David Rydings, Vinicius Martini Capovilla, Karina Sanabria Rizzo, Beatriz Boullosa, Thomas Lebegue, Paolo Rongoni, Dieter Deprez, Gregory Hirschfeld, Jose cabello, Cristian Petri, Sergio Polo, Salah eddine Haddou, Esteban Rivarola Quevedo, Nuria Granados, Nikoleta Michaelidoi, Carlos Caetano, Tindaro Bongionanni, Marcelo Pudelka, Miguel Kazarez, Naomi Brinkmans, Luis Patricio, Nick Dontje, Şengül Sangu Talak, Alejandro Gemignani, Alberto Cervantes Lopez, Chrysostomos Eliades, Anna Carceller, João Almeida Lopes, Antonio Gabriel, Ricardo Pinto, Ana García, Diogo Ferreira, Ian Rollo, Anja Horina, Alessio, Guillermo Gómez, Victoria Correia, Sacha moreno, Wojciech Zep, Marcus Shortall, Cristian Petri, Pablo Corinaldesi, Christopher Rosimus, James Morehen, Jorge Cancino, Tara Ostrowe, Hernâni Gomes, Noelia Bonfanti, Andrea Gilmond, Rich Chessor, Hannah Sheridan, Luciano Spena, Jean Carlos Lucena, Sofía Alejandra Olivares Díaz, Chris Short, David Díaz de Vivar and Dave Carolan.


HIIT
SCIENCE


THE TRAINING
SCIENCE
PODCAST
ATHLETICA


Sportsmith


playermaker