Development of the Social Support Questionnaire for Injured Athletes (The SSQIA)

Running title
An examination of social support for injured university-student athletes

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Abstract
The aim of the current study was to develop a questionnaire to measure social support in the context of sport injury throughout two studies. In Study 1, 105 athletes who have an experience of sport injury completed an open-ended format of the questionnaire regarding social support in sport injury context and gathered data was categorised to identify social support for injured athletes. In Study 2, four hundred and thirty-six university student-athletes completed the preliminary version of the Social Support Questionnaire for Injured Athletes (The SSQIA) and other measures. The results indicated that social support for injured is recovery assistance support, understanding and respect support, empathy and acceptance support, and sense of belonging support. The SSQIA was identified to be a valid and reliable measurement with four-dimensions to examine social support for injured athletes in the current study.

Keywords
Social support, sport injury, university-student athletes, validity and reliability
Introduction

Sport injury is commonly experienced by competitive athletes at various levels and ages (Malinauskas, 2010; Clement and Shannon, 2011). Sport injury can be a stressful event for athletes since it keeps them away not only from training sessions or games but also from smooth actions in daily life and maintenance of their well-being (Heil, 1993: Bianco et al., 1999). The literature has shown that injured athletes often report their experience of psychological burdens such as depression, anxiety, anger, and emotional confusion due to sport injury (Grantio et al., 1995). Furthermore, athletes often face psychological challenges throughout injury recovery process (Tracey, 2003), and the feelings of inability to perform to pre-injury standard, feeling of isolation, a lack of athletic-identity are reported as common issues (Podlog et al., 2015). Recently, Clement et al. (2015) stated that injured athletes tend to feel frustrated and depressed after occurring of injury or at the beginning of rehabilitation, and they struggle with apathy during the injury repair phase. Such psychological issues can hinder injured athletes' rehabilitation adherence which possibly leads them to delay of recovery or reinjury (Bianco et al., 1999). To recover from sport injury, injured athletes need to cope with negative psychological states and prevent such serious problems (Udry, 1997).

Social support, several activities that are believed to fulfil support functions, has been considered to be a salient as one of the coping with psychological challenges for injured athletes.
In general sport context, social support has been recognised as one of the key factors for an athlete in a successful athletic life in terms of building self-confidence (Katagami and Tsuchiya, 2017). Similarly, social support in a context of sport injury is salient in terms of relieving stress, motivating in rehabilitation, and improving rehabilitation adherence (Bianco, 2001). For instance, an injured athlete reported that social support in forms of a provision of encouraging words from teammates made them stay positive and feel comfortable during the rehabilitation phase (Clement et al., 2015). In their research, various types of social support such as emotional support (e.g. provision of encouragement, and listening to the athlete), informational support (e.g. provision of advice, and words of wisdom), and tangible support (e.g. pack for the athlete, accompany athlete to the airport) were reported as helpful to deal with difficulties in the duration of sport injury. Moreover, it was pointed that social support plays a significant role specifically when an injured athlete is facing to "a crisis point" during the injury process, which includes when they received uncertain diagnose, and when rehabilitation does not progress as planned (Bianco, 2001). As such, support from athletes' significant others has been identified as salient in applied settings.

Commonly, social support is provided by athletes’ significant others such as coaches, teammates, support staffs, family members, and friends (Rock and Jones, 2002). Coach is one
of the key support providers in terms of maintaining their motivation in rehabilitation and setting a realistic goal to return. Several elite skiers stated that coaches’ support including advice and encouragement helped them to relief from pressure, which lead them to stay in the sport (Bianco, 2001). Teammates can be important to learn how to overcome fears of injury and maximize their time during injury (Clement et al., 2015). When athletes get injured, medical specialists such as athletic trainers can also be recognised as a significant other who can provide specific knowledge and guidance regarding recovery from sport injury (Yang et al., 2010). In a decade, research focusing on social support from athletic trainers for an injured athlete has been increasing. It denotes the importance of athletic trainers’ understanding of injured athletes’ psychological changes throughout injury phase and preparation for an effective support provision (Clement et al., 2015; Yang et al., 2010; Yang et al., 2014).

For decades, the importance of social support for injured athletes has been acknowledged based on qualitative research; however, some researchers pointed out the need of quantitative research to gain more decent evidence for the necessity of social support for injured athletes. Weiss (2003) discussed the past research examining injured athletes is limited in terms of sampling, and methods used. More specifically, most studies adopt an interview method with a small number of participants to examine the impacts of social support in the
context of sport injury. Qualitative research methods are useful in terms of collecting informative data regarding injured athletes’ experience or feelings; however, the use of alternative research methods with a large sample is suggested as the next possible direction for future research in sport injury.

For further comprehensive understanding of the mechanisms of social support in sport injury context, research examining the relationship between types of social support received and athletes’ psychological states using a questionnaire and collect data from a large sample would be helpful. It would lead to gain strong evidence of the effectiveness of social support and to clarify the function of each type of social support. Though the Athlete Received Support Questionnaire (Freeman et al., 2014) is useful in order to examine social support for athletes in a general context, as it focuses solely on general competitive athletic life, it is not enough to examine social support for injured athletes. Social support should be measured using context-specific measurements to capture actual situations of individual experience (Rees, 2007). Injured athletes might need more practical support when their body movement is restricted due to injury, which is basically not required in normal conditions. To examine social support for injured athletes, a context-specific questionnaire which is reflecting their demands of sport injury situation would be needed. Considering the demands of injured athletes can be different from that of athletes in general, a
questionnaire to measure social support for injured athletes should be developed for further examination. Accordingly, the current study aimed to develop a scale to measure social support for injured athletes and examine its validity and reliability through Study 1 and 2. In Study 1, we aimed to explore social support for injured athletes and to generate an item pool for the Social Support Questionnaire for Injured Athletes (the SSQIA). In Study 2, factorial validity, internal consistency, and criterion-related validity of the SSQIA were assessed.

2. Study 1

2.1. Method

2.1.1. Participants

University student-athletes who had experienced sport injury participated in this study ($N = 105$, male $= 73$, female $= 32$, $M_{\text{age}} = 18.8 \pm 0.5$ years). The participants played either technical sports (e.g., Karate, lifesaving, dance), endurance sports (e.g., track & field, triathlon), artistic sports (e.g., gymnastics, cheerleading), weight-class type sports (e.g., Judo), or ball sports (e.g., basketball, baseball, football, tennis, rugby, American football, volleyball, softball, lacrosse, ultimate, and field hockey) at least university competition level. The participants were asked to fill an open-ended questionnaire with questions regarding “supportive behaviours for injured
athletes from the point when they get injured until when they return to field after recovery” and face information (e.g. gender, type of sport, details of injury experience, duration of rehabilitation etc.). Participants recalled “sport injury” which occurred after entering university. That is, they recalled sport injury they experienced within the past 1—3 years.

2.1.2. Procedures

After approval was obtained from the first author’s university ethics committee, research participants were recruited during lectures at Japanese universities. After the explanation of the aim of the current study, participants were provided with a letter that contained a brief explanation of the study and that stated they were free to withdraw from the study at any given time without prejudice. Subsequently, the athletes were asked to sign the informed consent form if they agreed to participate. No participants chose to withdraw. The same procedure was adapted both in Study 1 and 2.

2.1.3. Data analysis

Thematic analysis (Braun and Clarke, 2006) was used to identify social support for injured athletes. The principal author and the second author examined all the data and categorized respectively and then discussed until to reach an agreement on each category. In the next step, the third and fourth author joined the discussion to check for bias and to identify an
inappropriate item or categorization.

2.2. Results

A total of 531 types of supportive behaviours for injured athletes were generated. The meanings of each item were carefully assessed by the principal and second author whether it represented social support for injured athletes according to the standard definition of social support (Freeman et al., 2014). Similar expressions were combined when the authors agreed that the items have the same meaning or content. For example, items denoting the same type of support behaviour but written with different support providers (e.g., “encouragement from the coach” and “encouragement from teammates”) were treated as one item (“encouragement from others”). Finally, 55 initial items were chosen as social support for injured athletes.

3. Study 2

The aim of Study 2 was to examine the factorial validity and reliability of the preliminary version of the SSQIA.

3.1. Method

3.1.1. Participants

The participants were recruited at sport psychology lectures from two Japanese universities. A
total number of 436 university student-athletes who had ever experienced sport injury (male = 292, female = 144, $M_{\text{age}} = 19.7 \pm 0.83$ years) agreed to participate in this study. The participants played either technical sports (e.g., Kendo, Naginata), endurance sports (e.g., marathon, track & field, triathlon), artistic sports (e.g., gymnastics, rhythmic gymnastics), weight-class type sports (e.g., wrestling, Judo), or ball sports (e.g., baseball, football, rugby). The participants for the current study had competed at regional level ($n=59$), prefecture-level ($n=77$), district level ($n=72$), national level ($n=208$), and others ($n=20$). At the time of injury occurred, they had competed as a regular member ($n=146$), semi-regular level ($n=83$), non-regular ($n=182$), and others ($n=25$). The injured parts of the participants for the current study were categorised into the upper limb ($n=161$), the lower limb ($n=257$), and others*1 ($n=18$). The time duration of sport injury rehabilitation of participants were less than 1 month ($n=86$), 1 month ($n=108$), 2 months ($n=79$), 3 months ($n=58$), 4 months ($n=21$), 5 months ($n=5$), 6 months ($n=30$), 6 months—12 months ($n=16$), more than 12 months ($n=4$), and others*2 ($n=29$).

3.1.2. Measures

The questionnaire has consisted of three sections.

(1)The preliminary version of the SSQIA A preliminary version of the SSQIA with 55 items was used to assess social support for injured athletes. The participants recalled the past
sport injury experience within athletic life at university and rated the frequency of social support received during that time on a 5-point scale from 1(not at all) to 5(very often). Sport injury experience was defined as “being unable to engage in the sport for at least 3 weeks due to injury”. The criteria were determined by reference to sport injury research, which recognized an absence of 3 weeks or beyond as major injury (Robbins and Rosenfeld, 2001; Malinauskas, 2010). If a participant has sport injury experience several times, the most serious one was chosen to answer for this questionnaire. High scores on the SSQIA indicates that the athlete received frequent social support from others during the time of sport injury.

(2) The Japanese version of the Athlete Received Support Questionnaire

Received social support was measured using the Japanese version of Athlete Received Support Questionnaire (The ARSQ-J; Katagami and Tsuchiya, 2017), which is a scale to measure received social support for athletes originally developed by Freeman et al. (2014). The ARSQ-J is composed of four dimensions: emotional, esteem, informational, and tangible support. The participants rated the frequency of social support they received on a 5-point scale ranging from 1 (not at all) to 5 (very often) during the same time duration. High scores on the ARSQ-J indicate that the individual frequently received social support.

(3) Face information

The participants answered questions regarding face information (e.g.
gender, type of sport, details of injury experience, duration of rehabilitation etc.). Face sheet information was gathered to illustrate the features of the participants in the current study since demonstrating the details of the participants is common in sport injury research (see Clement et al., 2015 etc.).

3.1.3. Data analysis

(1) Factor analysis Factorial validity was examined in two steps: Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). In Step 1, SPSS ver. 24. was used for EFA. In Step 2, Amos 21.03 was used for CFA, and the fit of the model was examined using the Comparative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), and TLI (Tucker-Levis Index).

(2) Internal consistency Internal consistency was assessed by Cronbach’ α using SPSS 24.

(3) Criterion-related validity Criterion-related validity of the SSQIA was assessed via correlation analysis with the ARSQ-J, which is social support scale in the sport context. Criterion-related validity examines how a developed measurement relates to external measurements (i.e. existing similar scales). The ARSQ is one of the well-established measurements to examine social support in sport contexts developed based on a theoretical model of social support. Also, the validity and reliability of both the original ARSQ and The
Japanese version of the ARSQ (ARSQ-J) were confirmed respectively (Freeman et al., 2014; Katagami and Tsuchiya, 2017). The correlations between the SSQIA and the ARSQ-J indicates that the validity of the SSQIA as a measurement of social support in sport context is confirmed.

3.2. Results

3.2.1. Factor analysis

(1) Step 1: EFA By considering the proportion of variance explained, we adopted a four-dimension model for the 55-item SSQIA. Then, items with factor loadings less than .35 were eliminated. Similarly, items with factor loadings greater than .35 on more than two factors were deleted. Finally, 37 items remained as the final items of the SSQIA (Table 1). Literature suggests that looking for the point at which the last significant drop takes place to identify the number of factors (Cattel, 1966). Although there is a discussion that the definition of the “drop point” is unclear (Ledesma et al., 2015), it is a commonly used method to guess or determine the number of components. In the current study, as it was recognised the line-level off between three to four, we assumed four components in further analysis.

<Insert: Table1>

(2) Step 2: CFA Since the factorial validity of the SSQIA was assured through the EFA, CFA was conducted assuming a four-factor model with 37-items. Since the model fit was
insufficient (CFI = .796, TLI = .782, RMSEA=.087), the model was altered based on the Modification Index (MI). When we assumed correlations between several items (e.g., items 8 and 7, and 10 and 11), the results indicated that a four-dimensional model of the SSQIA was acceptable (CFI = .909, TLI = .901, RMSEA = .058). The first dimension including the items “to provide rehabilitation menu based on the progress of recovery”, or “to provide information for clinic and hospital” was named recovery assistance support. The second dimension with items “to behave and interact as usual”, or “to understand the situation of injury” was named understanding and respect support. The third dimension with items “to cheer up”, or “to prevent from feeling lonely” was named empathy and acceptance support. The final dimension with items “to share training information which my team is now working on”, or "to keep my place in the team" was named sense of belonging support.

3.2.2. Internal consistency

Reliability was examined using Cronbach's alpha. The values of Cronbach’s alpha for each dimension were .920 for recovery assistance support, .874 for understanding and respect support, .915 for empathy and acceptance support, and .853 for the sense of belonging support, indicating adequate internal consistency in each case.
3.2.3. Four Criterion-related validity

All the dimensions of the SSQIA were positively correlated with the total score of the ARSQ-J ($r=.814$, $p<.05$) and each dimension of the ARSQ-J, indicating adequate validity of the SSQIA for measuring social support within a context of sport (Table 2).

<Insert:Table 2>

3.2.4. Gender differences in the frequency of received social support

Since gender difference is often discussed in social support research (Neff and Karney, 2005; Day and Livingstone, 2003), $t$-test was used to examine if there is a gender difference in the receipt of social support in sport injury context. The results of the current study indicated that female athletes received more understanding and respect support and empathy and acceptance support (Table 3). There were no gender differences in other types of support.

<Insert:Table 3>

3.3. Discussion

3.3.1. Types of social support for injured athletes

The results of the current study indicated that social support for injured athletes were four types: recovery assistance support, understanding and respect support, empathy and acceptance support, and sense of belonging support.
First, recovery assistance support can be defined as “guidance or information contributes to injured athletes’ recovery from injury”. Recovery assistance support includes a provision of informative advice or practical aid for recovery which seem to be compatible with informational support and tangible support in the existing general types of support (Freeman et al., 2014). Since good progress of recovery is one of the biggest psychological concerns for injured athletes, it was assumed that support to assist their recovery by providing practical information or treatment was raised as one type of support for injured athletes. As noted in several previous research, such specific support can be provided primarily by athletic trainers or other medical specialists (Yang et al., 2010). One unique feature founded in the current study was that some items contain collaborative or interactive behaviours (e.g. “to consider…” together” or “work on … together”) in addition to a conventional one-way style of support (e.g. “to provide…”). This might imply that more collaborative forms of support would be perceived as support by injured athletes. This suggests that social support providers might be more careful of the way to provide social support for injured athletes by using an effective mutual communication style. For instance, injured athletes might expect that rehabilitation menu or its progress can be determined with an agreement between athletic trainer and athlete rather than simply receipt of rehabilitation menu itself from athletic trainers.
Understanding and respect support was found to refer to “to show attitudes to respect the person’s self-esteem and identity as an athlete”. Generally, athletes tend to be treated carefully since their body parts are damaged or they often have difficulties or restrictions in movement; therefore, they tend to be treated as “special” by coaches or teammates. Support providers should remind that they are still an “athlete” who make an effort to return to the sports field even though they physically damaged or disabled. Items in this dimension included considering an injured athlete as “an athlete” and not as “an injured person”. This seems to be similar to esteem support in a general sport context, which is to assure and bolster one's self-esteem. It might be important to respect their identity as an athlete even though they are not participating in training sessions at the moment.

Empathy and acceptance support included support “to express the empathy of a tough situation or painful feelings because of sport injury”, which is similar to emotional support in the general sport context. Some items such as “to encourage the person” or “to cheer the person up” were also seen in the items of social support in a general sport setting (Freeman et al., 2014). This indicates that emotional types of support play a significant role regardless of contexts; hence, support providers for athletes might keep in mind that emotional support is one of the expected types of support within broad sport contexts from general to sport injury.
Besides, the results of the current study showed features of emotional support specific to sport injury context. It was shown that emotional support in the context of sport injury would include not only direct contact form of provision but also indirect form. For instance, it included “to keep a good distance”, or “to watch over warmly without too much interference” as one way of showing emotional encouragement for injured athletes. It seems that provision of emotional type of support not only using verbal communication but also nonverbal communication which an injured athlete can feel being emotionally supported would be important in the context of sport injury.

Finally, sense of belonging support was found to define as “to show attitudes to enhance one’s sense of being a member of the group and being cared as a team member” based on the results in our study. This type of support is not included as social support for athletes in general (Freeman et al., 2014); therefore, it can conclude that the sense of belonging support can be recognised as a type of social support specifically important in the context of sport injury. A previous study reported that injured athletes often experience isolation from their team while they are away for sport injury. For instance, university student-athletes reported their experiences of having nobody with whom to share their feelings, and some athletes concerns if they lost the position in their team (Bianco et al., 1999). Moreover, the items of this
dimension also include both direct and indirect forms of support. It was found that “to share training information which my team is now working on” or "to design a training menu which enables to work together with team" were a direct form of support. It would be beneficial for injured athletes to keep up with their team without being isolated even though they cannot join normal training. Injured athletes often spend most of their time in a training room to engage in rehabilitation, which means they can be away from a training site. Supportive behaviours which make injured athletes feel to be a member of the team even when they cannot participate in a training session seems to be important to keep their motivation to return.

On the other hand, creating a supportive environment in a team such as “to design an environment in which I can feel easy to return” can be an indirect approach to support injured athletes’ sense of belonging. This type of support might help injured athletes to focus on recovery from sports injury without a feeling of sorry for team or pressure. Athletes reported that coaches' or teammates' showing an excessive expectation to return as one of undesirable behaviour, which hider a progressive recovery of injury (Podlog et al., 2015). Creating an environment in which injured athletes can keep their own pace in rehabilitation or return would be needed in order to avoid re-injury or return with inadequate physical and psychological readiness.
3.3.2. Gender difference in the receipt of social support

The results indicated that female athletes received more understanding and respect support, and empathy and acceptance support. In research examining social support among university students reported a gender difference in specific support types. More specifically, women utilized more emotional support while there was no difference in other types of support such as informational, appraisal, and instrumental support (Day and Livingstone, 2003). This is similar to our results that female athletes received more support which effects on emotional aspects. Similarly, in sport injury context, it was shown that female athletes received higher levels of listening support and emotional support (Rock and Jones, 2002). It can conclude that there is a gender difference in the frequency of social support received, but it varies depending on types of social support.

4. General Discussion

4.1. Future research directions

The current study aimed to examine the types of social support for injured athletes and to develop a questionnaire to measure social support for injured athletes through a sequence of two studies. The SSQIA with four dimensions were identified to be a valid and reliable scale
to measure the social support received in the context of sport injury. The results showed that social support for injured athletes includes recovery assistance support, understanding and respect support, empathy and acceptance support, and sense of belonging support. Since seeking social support is known as a common behavioural response of injured athletes at various phases from when they got injured to they return to normal practice sessions (Clement et al., 2015), social support providers (e.g. coaches, teammates, trainers, and family members) are expected to comprehend what types of social support are helpful for athletes.

Interesting findings in this study were that social support for injured athletes can contain various communication forms such as direct-indirect and verbal-nonverbal communication style. That is, though social support is generally assumed to be one-way communication style (i.e. providing something to a recipient), it would be salient to consider mutual communication style of social support in the context of sport injury. Sports psychologists or practitioners might need to broaden the concept of support from “provision something to an injured athlete” to “co-working behaviour to solve the problem”. They can encourage athletes’ significant others such as coaches, teammates, and other support staffs to provide expected support considering not only effective types but ways of providing.

Nevertheless, the significance of social support has been broadly acknowledged in the
context of sport injury, the number of empirical research is limited in sport psychology research. More specifically, the types of social support for injured athletes have not been clarified concerning its effectiveness. Also, the details of effective social support considering athletes' types of injury, duration of rehabilitation, the timing of support provision has not been fully discussed yet. As Weiss (2003) suggested, an examination of the function of social support with the large sample is needed to clarify the effectiveness of social support for injured athletes and generalise the results in sport injury context.

Researchers can develop this research area using the SSQIA in several ways. First, it would possibly be used to examine social support concerning common psychological issues (e.g. anxiety or depression) to see if social support can moderate such negative states using sample who are currently injured. This would provide empirical evidence to show the importance of social support in sport injury context. Besides, it would be useful to explore and to identify an effective type of support in different phases using the same measurement of social support several times to see effective types of support in each phase. Past research revealed that social support can be changed depending on phases of injury. Quantitative data using the SSQIA would help to see the more clear difference by comparing the amount of social support in each phase. Even though the different term is used in each study (see Clement et al., 2015;
Bianco, 2001), it is common to divide injured athletes' injury time frame into three: injury phase (or “acute injury phase”), rehabilitation phrase (or “repair phase”), and return to full activity phase (or “remodelling phase”). As it is stated that the demands of injured athletes might alter depending on these phases (Johnston and Carroll, 1998; Bianco, 2001), athletes might face phase-specific needs and expect particular types of social support corresponding to the demand; therefore, a study examining an effective type in each phase would be needed.

Moreover, the recent study insists that effective social support for injured athletes leads them not only to successful return but also Sport Injury Related Growth (SIRG: Roy-Davis, et al., 2016; Salim et al., 2015). This includes injured athletes’ changes in behavioural (e.g. pro-social behaviours, healthy behaviours), physical (caring body, strength and conditioning), and psychological and social growth (e.g. intelligence, social relationship, and personal growth). To prevent injured athletes’ drop out from the sport due to sport injury and lead them to successful recovery and return with a growth, further research to identify effective and appropriate types of social support which leads to SIRG would be needed.

4.2. Possible usage of the SSQIA in applied settings

The SSQIA enables practitioners to identify expected support or support preference. Possible usage of the SSQIA is to investigate injured athletes’ preference for a type of support
in each phase during rehabilitation. A lack of understanding of injured athletes' specific needs and support preference may result in the provision of insufficient social support. For instance, it is assumed that recovery assistance support would be more important in the acute injury stage, while the sense of belonging support is critical as they are preparing for a return. To avoid misunderstanding of "effective social support" between athletes and support providers, athletes' preferences for social support at each phase should be examined using the SSQIA. It would be important to examine the differences in the effectiveness of social support depending on types of sport, competitive levels, and injury parts. In applied settings, such evidence-based information regarding effective social support would help support providers such as coaches, teammates, and medical staff to understand and provide effective support.

4.3. Limitations

The current study was limited in several points. First, though the participants in the current study were competitive athletes in the various sport who are competing at a different level from university competition level to the national level, most of them competed mainly as a university student-athlete. Athletes in different categories should be recruited for further examination of the validity of the measurement. For instance, athletes in an early career such as junior athletes might need more practical support (e.g. transportation to a hospital or training...
venue) compared to university student-athletes who are financially independent and live apart from parents independently. Similarly, professional athletes might receive practical support from their company or sponsors in case of injury. Second, the current study focused on social support for injured athletes who are supposed to return after the completion of rehabilitation. That is, we excluded the athletes who already left the sport because of a severe injury. Future research should examine social support for injured athletes in a severe degree of injury in order to prevent their dropout and assist their psychological concerns after injury. Third, it is important to note that the correlations between components of the SSQIA were relatively high, which implies that there is a possibility of a uni-dimensional model of the SSQIA. Finally, it is difficult to exclude the possibility of the influence of recall effect (Eisenhower et al., 1991) since the participants in the current study answered over the past injury and social support experience. Further research should consider these limitations to gain more detailed information regarding the psychological aspects of injured athletes.

Note*1 “others” included several difficult cases to separate into the upper and lower limb (e.g., backache in the broad area) and unmarked answer.

Note*2 “others” included chronic pain syndrome or illness and unmarked answer.
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Table 1

Table 1: The results of the four-dimension of the SNQA according to the principal axis factoring analysis with promax rotation and the internal consistencies of each dimension

| F1: recovery assistance support (α=.920) | F2 | F3 | F4 |
|-----------------------------------------|----|----|----|
| 21 To design a training room for building body besides the injured part | .829 | - .096 | .047 | -.085 |
| 25 To provide rehabilitation menu based on the progress of recovery | .786 | .157 | .036 | -.092 |
| 22 To design a training menu based on the condition of the body | .779 | -.124 | .052 | .083 |
| 24 To provide a training menu for building body muscle | .741 | -.146 | .021 | .162 |
| 27 To provide a training menu to prevent re-injury | .741 | .175 | -.093 | -.057 |
| 26 To provide treatment including massage and tapping | .734 | .059 | -.122 | -.070 |
| 23 To design a training menu for maximizing muscle and fitness level | .763 | -.169 | .065 | .217 |
| 19 To treat the injured part | .084 | -.094 | .007 | .020 |
| 28 To think together for schedule and plan for a return | .876 | .299 | -.085 | -.099 |
| 7 To provide information for clinic or hospital | .513 | -.037 | .163 | -.023 |
| 3 To share knowledge of treatment of the injury | .466 | -.058 | .065 | .199 |
| 8 To encourage engagement in rehabilitation | .418 | .044 | .273 | -.059 |

| F2: understanding and respect support (α=.874) | |
|-------------------------------------------|---|---|
| 34 To understand the situation of injury | 1.29 | .795 | -.120 | -.101 |
| 32 To behave and interact as usual | -.153 | .741 | .078 | -.073 |
| 36 To admit splitting up from team to care for injury | .203 | .715 | -.002 | -.257 |
| 31 To show that the person is waiting for return | -.044 | .528 | .224 | .072 |
| 30 To show that the person is caring for me | -.094 | .590 | .192 | .112 |
| 35 To show that the person is trying to understand my feelings | .028 | .495 | .222 | .067 |
| 39 To give a role or a task which can do even being injured | .149 | .094 | -.032 | .182 |
| 51 To treat equally to other members in the team | -.039 | .659 | .161 | .093 |

| F3: empathy and acceptance support (α=.915) | |
|-------------------------------------------|---|---|---|
| 50 To cheer up | -.060 | .020 | .915 | -.130 |
| 49 To encourage | -.016 | -.016 | .914 | -.122 |
| 48 To reduce anxiety | .052 | .002 | .662 | .087 |
| 54 To lead to think positively | .085 | .070 | .633 | .048 |
| 57 To realize reduction in rehabilitation | .272 | -.138 | .590 | .112 |
| 45 To lead to looking at the bright side | .399 | .026 | .570 | -.007 |
| 17 To lead to mind off | -.090 | .043 | .549 | -.156 |
| 18 To keep me as is | -.140 | .218 | .461 | -.002 |
| 47 To lead to face myself | .261 | -.025 | .458 | .079 |
| 16 To prevent from feeling lonely | -.094 | .134 | .417 | .246 |
| 14 To try not to interfere too much | -.132 | .257 | .409 | .084 |

| F4: sense of belonging support (α=.853) | |
|-------------------------------------------|---|---|---|
| 10 To design a training room which enables to work together with the team | .054 | -.004 | -.148 | .366 |
| 11 To design an environment in which I can feel comfortable | -.103 | .157 | -.038 | .779 |
| 12 To design an environment in which I can feel safe to return | -.121 | .177 | .106 | .607 |
| 2 To share training information which my team is now working on | .487 | .063 | .003 | .527 |
| 9 To keep my place in the team | .125 | .034 | .144 | .521 |
| 5 To think together for a goal in the future | .279 | .076 | -.029 | .394 |

| Inter-factor correlations | F1 | F2 | F3 | F4 |
|---------------------------|----|----|----|----|
| F2 | .54** |    |    |    |
| F3 | .73** | .73** |    |    |
| F4 | .68** | .65** | .70** |    |

**p<.01
Table 2

|                      | M    | SD   | Emotional | Esteem | Informational | Tangible |
|----------------------|------|------|-----------|--------|---------------|----------|
| F1: recovery assistance support | 42.89| 10.26| .48**     | .51**  | .63**         | .60**    |
| F2: understanding and respect support | 30.25| 5.83 | .64**     | .66**  | .61**         | .61**    |
| F3: empathy and acceptance support | 38.21| 8.49 | .77**     | .79**  | .74**         | .74**    |
| F4: sense of belonging support   | 20.21| 5.35 | .61**     | .66**  | .67**         | .66**    |

**p < .01
Table 3

Table 3 Gender differences in the receipt of social support

|                          | Male          | Female        | t    | p   |
|--------------------------|---------------|---------------|------|-----|
| F1: recovery assistance support | 42.50, 10.11  | 43.68, 11.78  | -1.08 | 0.28 |
| F2: understanding and respect support | 29.74, 5.57  | 31.28, 6.47   | -2.57 ** | 0.01 |
| F3: empathy and acceptance support | 37.46, 8.31  | 39.72, 8.94   | -2.60 ** | 0.01 |
| F4: sense of belonging support | 19.86, 5.20  | 20.91, 5.70   | -1.92 | 0.06 |

**p < .01
Appendix 1

Appendix 1. Japanese version of the SSQIA

F1: 回復・復帰サポート (α=.920)
21 受傷箇所以外を動かせるトレーニングを教えてくれる
25 回復速度に合わせたリハビリを提供してくれる
22 重度合併症を考慮したトレーニングを教えてくれる
24 体力・耐力を向上させるメニューや考えてくれる
27 再発防止のためのトレーニングを提供してくれる
20 テーピング・マッサージなどのケアをしてくれること
23 体力・耐力を維持させるメニューを考えてくれる
19 受傷箇所の処置をしてくれる
26 練習復帰までのリハビリを一緒に計画してくれる
7 病院を紹介してくれる
3 治療に関する知識を提供してくれる
8 リハビリへの期待感を覚えてくれる

F2: 認解・専門サポート (α=.874)
34 体調の状態を把握してくれる
32 受傷者と変わりらず、普段通り接してくれる
36 チームがリハビリや逆境によるパフォーマンスを理解し、認めてくれる
31 “復帰を期待している”と示してくれる
30 “気にかけていない”と示してくれる
35 “気持ちを理解しようとしている”と示してくれる
39 病棟をしてもなくても仕事・復帰を教えてくれる
51 適切な物置きを設けて、操作手と平等に接してくれる

F3: 共感・参照サポート (α=.915)
50 元気付けてくれる
49 緊急してくれる
48 不安を解消できるようにしてくれる
54 病院見取り図を教えてくれる
55 リハビリに対するモチベーションを上げてくれる
43 体調を観察することなくするように促してくれる
17 気を細めるようにしてくれる
15 見守ってくれる
45 自分自身と向き合うように促してくれる
18 働きの気持ちにさせないでくれる
14 下を向けないでくれる

F4: 所属関係サポート (α=.853)
10 体調をみていて、チームと一緒にできるメニューを提供してくれる
11 受傷選手が安心できる環境をつくれる
12 受傷選手が後悔しやすい雰囲気をつくってくれる
2 受傷選手がチームに再入されず、復帰が難しくなった際、練習を伝えてくれる
9 チーム内の調整をつくれる
5 今後も目標を一緒に考えてくれる

Instructions
English version:

Please indicate the frequency with which you received each type of support during sport injury and rehabilitation phase. Please check one of the following response options per question (1 = Not at all—5 = Very often).

F1: Instructions

“回復・復帰サポート”には受傷箇所以外を動かせるトレーニングを教えてくれる、回復速度に合わせたリハビリを提供してくれる、重度合併症を考慮したトレーニングを教えてくれる、体力・耐力を向上させるメニューや考えてくれる、再発防止のためのトレーニングを提供してくれる、テーピング・マッサージなどのケアをしてくれること、体力・耐力を維持させるメニューを考えてくれる、受傷箇所の処置をしてくれる、練習復帰までのリハビリを一緒に計画してくれる、病院を紹介してくれる、治療に関する知識を提供してくれる、リハビリへの期待感を覚えてくれる。

F2: Instructions

“認解・専門サポート”には体調の状態を把握してくれる、受傷者と変わりらず、普段通り接してくれる、チームがリハビリや逆境によるパフォーマンスを理解し、認めてくれる、“復帰を期待している”と示してくれる、“気にかけていない”と示してくれる、気持ちを理解しようとしている”と示してくれる、病棟をしてもなくても仕事・復帰を教えてくれる、適切な物置きを設けて、操作手と平等に接してくれる。

F3: Instructions

“共感・参照サポート”には元気付けてくれる、緊急してくれる、不安を解消できるようにしてくれる、病院見取り図を教えてくれる、リハビリに対するモチベーションを上げてくれる、体調を観察することなくするように促してくれる、気を細めるようにしてくれる、見守ってくれる、自分自身と向き合うように促してくれる、働きの気持ちにさせないでくれる、下を向けないでくれる。

F4: Instructions

“所属関係サポート”には体調をみていて、チームと一緒にできるメニューを提供してくれる、受傷選手が安心できる環境をつくれる、受傷選手が後悔しやすい雰囲気をつくってくれる、受傷選手がチームに再入されず、復帰が難しくなった際、練習を伝えてくれる、チーム内の調整をつくれる、今後も目標を一緒に考えてくれる。

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- Japan Society of Physical Education, Health and Sport Sciences
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