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KNOWLEDGE, ATTITUDES and BEHAVIOURS (KAB) SURVEYS ON CONCUSSION IN SPORTS: PARENTS 2018 SURVEY

REPORT #2 TO ACCIDENT COMPENSATION CORPORATION (ACC)

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OVERVIEW

The purpose of the study was to compare the knowledge, attitudes and behaviours of a group of New Zealand Secondary School Parents to sports related concussion (SRC) before and after a social media intervention from the Accident Compensation Corporation (ACC). This report is the second report in a series presenting the changes in Knowledge Attitudes and Behaviours (KAB) around concussion in sport.

The 'Sports Concussion in New Zealand ACC National Guideline' was released in 2014. The KAB studies aim to assess current knowledge and attitudes of secondary school sports students, equestrian riders, parents, coaches, referees, and health professionals towards concussion in sport following release of the guideline and to see if the social media campaign from ACC had an impact on KAB.

The results from the *Parents September 2018 Survey* suggest that the parents of school children involved in coached sports (127) have shown a small improvement in their knowledge regarding concussion and continue to show positive attitudes towards correct management of the injury. Of note one third of parents in the 2018 survey still believe head gear can prevent concussion. Parents continue to express a need to know more about how concussion happens, and its prevention and management. Compared to 2017, awareness that brain damage is a potential complication of multiple concussions has increased as has the awareness of the increased risk of returning to sport too early. While knowledgeable of concussion parents continue to have a poor understanding of appropriate return-to-learn and return-to-activity protocols post-concussion and only half realise that return to sport should be guided by symptoms. The percentage who recognise ACC as a source of information and guidance for concussion remains low (17%). Also of concern is that most parents reported having witnessed a player who had played on with a suspected concussion when they thought they should not have and many had witnessed a coach pressure a player to play on.

Recommendations:

- While there has been an improvement, further education of parents is required to increase understanding of some of the symptoms of sports concussion, including amnesia and insomnia.
- Further education of parents is needed to emphasise that return to sport should not occur until symptoms have resolved.
- Further education of parents is required regarding appropriate 'return to learn' and 'return to play' protocols post-concussion.
- Continued education regarding the true benefits of headgear are needed.
- Education should consider providing parents with appropriate strategies to intervene when a player suspected of concussion is under pressure to continue to play.
- Attitudes to playing on with concussion remain a concern in secondary school sport and need to be a target of future initiatives.

INTRODUCTION

The aims of the KAB concussion research programme are to undertake surveys of secondary school students, coaches, parents, referees, equestrian riders and health practitioners to understand their current knowledge and attitudes towards the management of concussion. This report overviews the findings from parents of secondary school students involved in key team sports and how these KAs may have changed compared to the 2017 survey.

Purpose

The purpose of the *Parents September 2018 Survey* was to assess the current state of knowledge and attitudes around concussion guidelines and management for parents of secondary school players in 2018 and to look for any changes in knowledge and attitudes compared to the 2017 survey.

METHODOLOGY

Participants and their recruitment

A sample of convenience of parents attending the secondary school sports tournaments listed in Table 1 below was undertaken. Participants had to be parents of a student 16 years of age or older, who was involved in organised coached secondary school sports.

Table 1: *Parents September 2018 Survey* venues and sports.

Event	Sport	Venue and date
National Secondary Schools Tournament	Rugby League	Bruce Pulman Park, Auckland, September 3rd - 7th Sept 2018
Jock Hobbs U19s Tournament	Rugby	Taupo, September 8th–15th 2018
Schick Premierships AA Zone 2	Basketball	Rotorua Events Centre September 5-7th 2018
AA Secondary Schools Premierships Zone 2	Basketball	Tauranga, September 5th–8th 2018
Harbour - Schick Premierships AA Zone 1	Basketball	North Shore Events Centre September 5th–8th 2018
Schick Northern Cup	Basketball	Bruce Pullman Park Papakura, September 5-7th 2018
NZ Secondary School Champs	Netball	Blake Park Maunganui Road. Mt Maunganui 3rd to 6th September, 2018
National Age Groups Tournament.	Football	Wellington December 10th-15th, 2018

Intervention

Between the 2017 and 2018 data collection points ACC delivered a social media campaign to all school students, parents and coaches attending tournament week (3-7 September 2018). This coincided with the same week as the KAB data collection at the tournaments listed in Table 1 above. There was one post via the ACC SportSmart Facebook page each day of the tournament on a different aspect of concussion management. The following key messages were delivered:

- Suspect a concussion? If in doubt, sit them out. Concussion is serious - a doctor needs to check the player before they get back into the game.
- If you have a concussion, patience is key. It can take time for the brain to heal so it's important to allow yourself time out to ensure you are symptom free. Only get back onto the field once your doctor has said it's ok.
- What does a concussion look like? If a player seems confused, slower than usual, or is unbalanced remove them from play and get them checked by a doctor.
- If a mate takes a knock in the game and looks like they're having a hard time with easy tasks, talk to them. A lack of concentration, blurry vision and feeling sick or vomiting can be symptoms of concussion.
- Recognise the signs - https://accsportsmart.co.nz/concussion/

The posts had a combined reach of 3,938 people, 521 engagements, 33 likes, 19 shares, and one comment.

Data collection process and ethical approval

The methodology used to ascertain the knowledge, attitudes and behaviours (KAB) of the parents of the secondary school students used a cross-sectional questionnaire design. The 35-item multi-choice questionnaire for the parents was designed based on previous studies of this nature by Murphy et al., (2015), Sye et al., (2006) and Register Mihalik et al., (2013). The questionnaire was handed out in paper format at tournaments as listed in Table 1.Ethical approval was provided by AUTEC application #16/187. The ACC Ethics Committee also approved the study.

Data analysis

All data were analysed via SPSS. Descriptive statistics (percentages) were used to report the frequency of responses to the questions in the survey (percentages for both the 2018 and 2017 surveys are presented). Chi-Square tests were used to analyse for differences in proportion of responses between the 2017 and 2018 surveys (where visual observation suggested a difference was present) and a T-test was used to analyse for differences in the average total knowledge score.

RESULTS

Participants

Table 2 details the demographic characteristics of the 127 participants who completed the survey. There were more female than male participants (67% vs 33% respectively). The majority of participants were of New Zealand Pakeha ethnicity (66%).

Table 2: Demographics of the 127 parents who completed the *Parent 2018 Survey.*

Demographic characteristics	Mean (SD) or Frequency (%)
Age	Mean 48.2 (SD 7.1)
Gender	Female 85 (67)
	Male 42 (33)
Ethnicity	NZ European 84 (66)
	Maori 37 (29)
	Pacific Islander 16 (12)
	Asian 3 (2)
	Other 5 (4)

SD Standard deviation

Knowledge of concussion

Table 3 summarises the responses for 20 knowledge items in the 2018 survey. Participants were able to choose more than one answer in this section of the questionnaire. The term concussion was known to 98% of participants and the same proportion clearly understood concussion was a brain injury. The majority (>80%) recognised the signs/symptoms of concussion included confusion, nausea, headaches, dizziness, blurred vision and loss of consciousness. There was a small (5%) improvement in signs/symptom knowledge overall compared to 2017. Fewer parents knew that insomnia (20%) and amnesia (60%) were potential symptoms of concussion.

As in the 2017 survey the majority of participants obtained their information on concussion from a medical professional, teachers and coaches, television, and ACC. Regarding decision-making related to returning to training and games after a concussion, a doctor was correctly identified by 68% of respondents as the most competent person to judge when a player was ready to return to sport (up from 48% in 2017). The proportion of participants who believe headgear can reduce concussion (31%) was higher in 2018 compared to 2017 (15% increase; p=0.02).

As in 2017 there were low levels of awareness (<50%) that blue screen devices such as a phone to deliver text messages and similar activities that require cognitive function may need to be avoided until symptoms have settled. Only 23% were aware of the need to reduce school work. Comparatively there was greater awareness of the need to avoid jogging (66%) and gym training (74%) until symptoms had settled. As in 2017, only half of respondents recognised that it was safe to return to sport only when symptoms had resolved.

Recognition of players who are potentially concussed was up on 2018 with >80% recognition across all the scenarios presented. Additionally, awareness that brain damage was a potential complication of multiple concussions (92%) has increased in 2018 (27% increase; p<0.01), as was awareness of increased risk of injury if return too soon (25% increase; p<0.01)

Table 3: Knowledge of concussion of the parents who completed the *Parent 2018 Survey* (n=127) and *Parent 2017 Survey (n=69).* Data are presented as frequency (%) unless otherwise stated.

Knowledge items	Frequency (%) of correct answers
Please indicate which statements you would consider to be a sign of symptom of concussion	**2017** **2018**

Abnormal sense of smell (false)	62 (90)	114(90)
Abnormal sense of taste (false)	61 (88)	112 (88.2)
Amnesia (true)	23 (33)	76 (60)
Joint stiffness (false)	68 (99)	119(93.7)
Blurred vision (true)	44 (64)	103(81)
Black eye (false)	63(91)	116(91)
Bleeding from the ear (false)	53 (77)	101(79.5)
Bleeding from the mouth (false)	62 (90)	118(93)
Bleeding from the nose (false)	63 (91)	113(89)
Confusion (true)	40 (58)	109(86)
Fever (false)	67 (97)	120 (95)
Dizziness (true)	43 (62)	107(84.3)
Headache (true)	41 (59)	107(84.3)
Insomnia (true)	17 (24)	25(20)
Loss of consciousness (true)	45 (65)	102(80)
Nausea (true)	34 (49)	86(68)
Numbness or tingling in the arms (false)	17 (25)	103(81)
Skin rash (false)	67 (97)	126 (99)
Sharp burning pain in neck (false)	52 (75)	107(84.3)
Weakness in neck movements (false)	53 (77)	93 (74)
Which of the following player would you say might be "concussed"		
After a big knock/fall/head clash the player starts making wrong decisions or actions during the game (true)	33 (48)	112 (88)
A team mate is complaining of headaches and blurred vision (true)	39 (56)	110(87)
After a ruck/fall/head clash a player is left on the ground not moving (true)	39 (56)	104(82)
A player complains of stinging or burning in his calf muscles (false)	68 (99)	116(91)
In the team room a couple of hours after the game a team mate complains of feeling sick with a headache (has not been drinking alcohol) (true)	41 (59)	105(83)
Concussion is an injury to the _ (correct answer brain or head)	66 (93)	125 (98)
A Concussion only occurs if you lose consciousness (false)	53 (75)	110(86)
If you are experiencing any signs and symptoms of concussion after a blow to the head or sudden movement of the body you should not return to play (true)	63 (89)	118 (93)
If a player gets concussed, how long should they have to stay away for before practicing fully or playing again		
Get straight back on		1 (.8)
1 week (false)		3 (2.4)
2 weeks (false)	4 (6)	15 (12)
3 weeks (false)	12 (17)	23 (18)
4 weeks (false)	6 (9)	12 (9.4)
When symptoms have fully resolved (true)	33 (48)	72 (57)
Don't know	14 (20)	12(9.4)
What are the possible complications of multiple concussions?		

No complications exist (false)	67 (97)	126(99)
Increased symptoms (true)	25 (36)	67(51)
Increased risk of future injury (true)	26 (38)	79 (63)
Brain damage (true)	45 (65)	117(92)
Memory problems (true)	46 (66)	108(85)
Joint problems (false)	64 (92)	119(94)
Unsure of answer (false/not selected)	67 (97.)	5(4)
What are the complications of returning to play too early		
No complications exist (false)	69 (100)	125(99)
Increased risk of further injury (true)	43 (62)	111(87)
Paralysis (false)	52 (75)	88(70)
Brain damage (true)	49 (71)	112 (88)
Reduced sports performance (true)	36 (52)	83(65)
Joint problems (false)	67 (97)	118 (92)
If a player has suffered a concussion who is the best person to decide if you were able to train/play again		
Self (no)	2 (3)	114 (89)
Coach (no)	5 (7)	102 (80)
Doctor (yes)	33 (48)	86 (68)
Parents/caregiver (no)	6(9)	119 (93)
Other (yes)	1(1)	3 (2.4)
Have you ever had any information about concussion from any of the following		
Teacher/Coach	10 (14)	29 (23)
Other players	1 (1.0)	9(7)
Doctor/Physiotherapist	16 (23)	52(41)
School nurse	2 (3)	5(4)
Other medical staff	4 (6)	14 (11)
Accident Compensation Corporation	9 (13)	22 (17)
Your sports club	5 (7)	28 (22)
Seen on TV	13 (19)	28 (22)
Other	2 (3)	15 (11)
No Information	11 (16)	13 (10)
What does head gear prevent		
Cuts and grazes (true)	17 (25)	33 (26)
Cauliflower ears (true)	17 (25)	54(42.5)
Concussion (false)	58 (84)	88 (69)
Neck injury (false)	67 (97)	123 (97)
Skull fracture (false)	58 (84)	99(78)
Unsure of answer (false/not selected)	66 (96)	9(7)
Don't have contact with any sports that use head gear	4 (6)	10 (8)
Which activities should be avoided following concussion		
Texting (true)	26 (38)	52(41)
Facebook (true)	25 (36)	54(42.5)
TV (false)	46 (67)	54(42.5
Long walks (true)	9 (13)	37(29)
Jogging (true)	35 (51)	84(66)
Gym training (true)	40 (58)	94(74)
School work (true)	14 (20)	30(23)
Going to sleep (false)	45 (65)	57(45)

Attitudes and behaviours towards concussion

Table 4 outlines the responses of the parents to the attitude items of the survey. These questions examined the current awareness of concussion and how effectively it is presently being managed. Attitudes were very similar to those reported in 2017 with participants tending to "strongly agree" and "agree" that guidelines should be followed at school level and that there was a need to provide better education around concussion and improve reporting.

Table 5 summarises the responses to the behaviour items of the survey which were an addition to the 2018 survey. Of note, although some reported it as rare, 78% of parents had seen a player play on with a suspected concussion when they thought they shouldn't have and only 34% reported they had never seen a coach putting pressure on a potentially concussed player to play on.

Table 4: Attitudes toward concussion of the parents who completed the survey.

Scored from a scale of 1 (strongly agree) to 5 (strongly disagree)	**Frequency (%)**	
	2017	**2018**
Concussion guidelines should be followed at school level	Strongly agree: 43 (63) Agree: 12 (18)	92 (73) 20 (16)
Concussions are not often reported	Strongly agree: 14 (21) Agree: 28 (41) Not sure 18 (26) Disagree 4 (6) Strongly disagree 4 (6)	23 (18) 72(57) 29 (23) 5 (4) 3 (2)
Seriousness of headache & dizziness after a head knock	Mildly serious: 5 (7) Moderately serious 20 (30) Very serious 23 (34) Extremely serious 19 (28)	4(3) 14 (11) 75(59) 33(26)
It is important to avoid physical activity when signs and symptoms of concussion are present	Strongly agree 42 (63) Agree 18 (27) Disagree 1 (2)	95(25) 103(81) 1(1)
Is it important to understand how concussions occur	Strongly agree 51 (77) Agree 15 (23)	93(27) 28 (22)
Is it important to be informed of how concussion can be prevented	Strongly agree 49 (74) Agree 16 (24) Strongly disagree 1 (2)	85 (67) 37 (29) 1 (1)
It is important to understand to be informed of what to do if you have a concussion	Strongly agree: 56 (84) Agree: 9 (24) Strongly disagree: 1 (1)	85(67) 37(30) 1 (1)
Is it important to report signs and symptoms of concussion to a medical professional	Strongly agree: 52 (79) Agree: 10 (15) Strongly disagree: 1 (1)	94(74) 26 (20) 1 (1)
Is it important that coaches are informed of possible concussion	Strongly agree: 54 (82) Agree: 10 (15) Not sure: 2 (3) Strongly disagree: 1 (1)	102(80) 20 (15.7) 2 (1.6) 1(0.8)
Players are not well educated about concussion	Strongly agree 26 (37) Agree: 26 (37) Not sure: 11 (17)	48(38) 49(39) 20(15)

	Disagree 3 (4)	7(6)

Table 5: Behaviours around concussion of the parents who completed the 2018 survey.

Scored from a scale of 1 (often) to 4 (never)	Frequency (%) 2018
Have you seen players playing on with a suspected concussion when you thought they should not have?	Often 16(13) Sometimes 53 (42) Rarely 29(23) Never 25 (20)
Have you seen coaches allowing players to play on with a suspected concussion?	Often 6(4.7) Sometimes 34 (27) Rarely 42 (33) Never 43 (34)
Have you seen referees/umpires allowing players to play on with a suspected concussion?	Often 5(4) Sometimes 20 (16) Rarely 38 (30) Never 59 (47)
Have you seen players putting pressure on other players to play on with a suspected concussion?	Often 4(3) Sometimes 20 (16) Rarely 36(28) Never 62 (49)

DISCUSSION

The results from the *Parents 2018 Survey,* as was the case with the 2017 survey, suggest that parents are knowledgeable regarding many aspects of concussion (with overall knowledge having increased) and appear to show positive attitudes towards correct management of the injury.

Knowledge of concussion

While knowledge has improved overall, with most symptoms of concussion recognised, insomnia and amnesia are less well known symptoms. As in 2017 less technical language may be needed with parents such as "problems sleeping" and "feeling sick" respectively. The ability to recognise disturbed sleep as a major symptom is consistent with findings of a study by Coghlin et al., (2009) investigating parents' ability to accurately report concussion occurrence in children.

The negative impact of using technology which can over-stimulate a recovering brain—such as texting, Facebook, and school work—remain poorly acknowledged. This indicates that parents are unaware of the impact cognitive exertion can have on recovery after a concussion, and information on "cognitive rest" needs further emphasis. Cognitive activity imposes additional neurometabolic demand on the brain, and an exacerbation of symptoms can indicate that the recovering brain is operating beyond its limits (McLeod et al., 2010). According to McLeod et al., (2010), cognitive rest can be defined as avoiding excessive cognitive activity in the early post-concussion stage, such as using a computer, texting, watching television or schoolwork.

Awareness that brain damage was a potential complication of multiple concussions was increased over 2017, as was the increased risk of returning to sport too early. There was also much better awareness of scenarios where players may have been concussed. However, many still do not realise that return to sport should be delayed until symptoms have resolved. It was disappointing to see that overall only 48% of the parents would wait until all the symptoms had resolved before returning their child to play. This is again consistent with findings of the study by Sye et al., (2006), where there was poor knowledge of time frames of secondary school rugby players for stand down and return to sport.

Parents should be further educated on why returning to sport too soon may be detrimental to long-term health, which should subsequently result in a reduction in serious associated conditions such as post-concussion syndrome and secondary impact syndrome.

Attitudes towards concussion
As with 2017 parents have a very positive attitude to the management of concussion overall and recognised that guidelines should be followed, and that recognition of symptoms is important. They also had strong views that concussion is not well managed, and symptoms are often not reported. They did recognise that symptoms need to be reported to medical professionals but also that coaches and referees equally need to be informed when players have symptoms.

Behaviours towards concussion
Many parents reported having witnessed a player play on with concussion when they thought they shouldn't have and seeing coaches put pressure on players to play on. This is consistent with other studies of general injuries in youth sport that have reported that pressure to play injured is not uncommon (Whatman et al., 2018)

CONCLUSIONS

The results from the *Secondary School Parents 2018 Survey* suggest parent knowledge has maintained or improved compared to 2017. Parents remain relatively knowledgeable regarding concussion and appear to show positive attitudes towards correct management of the injury. There is still need for further education regarding recognising some symptoms and appropriate return to school and return to screen protocols and that any return to sport should be delayed until symptoms are resolved. Based on the parental reports, attitudes and behaviours to playing on with concussion are still of concern.

Recommendations:

- While there has been an improvement, further education of parents is required to increase understanding of some of the symptoms of sports concussion including amnesia and insomnia.
- Further education of parents is needed to emphasise that return to sport should not occur until symptoms have resolved.
- Further education of parents is required regarding appropriate return to school and return to activity protocols post-concussion.
- Continued education regarding the true benefits of headgear are needed.
- Education should consider providing parents with appropriate strategies to intervene when a player suspected of concussion is under pressure to continue to play.
- Attitudes to playing on with concussion remain a concern in secondary school sport and need to be a target of future initiatives.

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