

Can running-related injuries be prevented through an online behavioural intervention in adult novice runners? Results of a randomised controlled trial

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ABSTRACT

Objective To evaluate the effectiveness of the Runfitcheck on time until the onset of a new running-related injury (RRI) among adult novice runners.

Methods A three-arm randomised controlled trial was conducted over 7 months. Adult novice runners completed a baseline online questionnaire on their characteristics, running activity, RRIs and injury preventive behaviour. Runners were randomly allocated to one of two intervention groups or the control group (n=238). One intervention group obtained access to the Runfitcheck (n=252), an online intervention to encourage injury preventive behaviour, and was fortnightly promoted to use Runfitcheck; the other intervention group (n=251) was directed towards the Runfitcheck once. Runners were followed for 4 months, not all starting at the same time over 7 months. The main outcome measure was time to a new RRI using the Oslo Sports Trauma Research Centre Overuse Injury Questionnaire, and was analysed with survival analysis Cox regression. Generalised estimating equations (GEE) were used to gain insight into the effectiveness of the Runfitcheck.

Results The time to the occurrence of the first RRI did not differ between the study groups (Wald $\chi^2=0.893$). GEE analysis showed no difference in the risk of a new RRI in the group that was referred to the Runfitcheck once (OR 1.22, 95% CI 0.86 to 1.74) nor in the active approach group (OR 1.01, 95% CI 0.71 to 1.45) compared with the control group. Furthermore, the onset of the new RRIs did not change over time (OR 0.96, 95% CI 0.91 to 1.01).

Conclusions The online intervention Runfitcheck was ineffective in reducing the instantaneous risk of new RRIs in adult novice runners. More research is needed to determine how injuries in novice runners can be prevented.

Trial registration number Dutch Trial Registry (ID: NL7823).

BACKGROUND

In running, the injury risk is high. Experienced runners have an injury rate of 2.5–4 running-related injuries (RRI) per 1000 running hours,^{1 2} and recreational runners have been shown to have an injury rate of six to eight RRIs per 1000 running hours.^{2 3} In novice runners, the risk for injuries is the

WHAT IS ALREADY KNOWN ON THIS TOPIC

⇒ The online intervention Runfitcheck is effective in encouraging preventive behaviour in novice runners.

WHAT THIS STUDY ADDS

⇒ The online intervention Runfitcheck using the runner's profile for a tailor-made injury prevention programme was ineffective in reducing the chance of new running-related injuries in adult novice runners.

HOW THIS STUDY MIGHT AFFECT RESEARCH, PRACTICE OR POLICY

⇒ This study showed that changing behaviour does not automatically lead to the prevention of injuries. It remains important to gain more insight and to do more research in preventing injuries in novice runners.

highest, ranging from 9 to 18 RRIs per 1000 running hours.^{1 2} Despite the high injury risk, running is one of the most popular and fastest growing forms of physical activity worldwide.⁴ Running is an easily accessible sport; you do not need much equipment to start and you can run at any time of the day at almost any place. Furthermore, running also has health benefits.^{5–7} These are some reasons, among others, why it is also one of the most popular sports for starting to become physically active. In the Netherlands, 12.5% of the population participate in running, of which about 30% are novice runners.¹

The popularity of the sport, in combination with the high injury risk, warrants good injury prevention interventions. To develop effective interventions for injury prevention insight in the risk factors for injuries is necessary. Previous studies showed several important risk factors for RRIs in (novice) runners,^{8–10} such as lack of running experience.^{8 9} Measures such as an individualised training programme, listening to signals from your body and favourable training behaviour (a graded training programme) seem important to prevent RRIs.^{10–12} Novice



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runners, since being inexperienced runners, lack the experience to assess their training load accordingly^{8,9} and should be more encouraged to implement injury preventive behaviour.

Therefore, interventions for preventing RRI in novice runners are important.^{8,9} Although such interventions are limited, the studies available have shown their positive effect on behavioural aspects in runners.^{13,14} Studies evaluating the effect of such online interventions on RRIs are limited as well.^{15,16} One of the studies showed no effect of an online intervention programme on RRIs in recreational runners. It was proposed that this may be due to the intervention being too generic.¹⁶ By contrast, the study by Hespanhol *et al*¹⁵ showed a positive effect of online tailored injury prevention advice on RRIs in trail runners.

Given the high RRI risk in novice runners, there is a great interest in developing appropriate RRI preventive interventions in this population. Runfitcheck is a tailored online intervention (see online supplemental file 1), which promotes injury preventive behaviour and provides tools to runners to listen to their body's signals based on the load-taking capacity profile and running motivation of novice runners.¹⁷ This intervention was found effective in encouraging preventive behaviour,¹⁴ but the effectiveness of RRIs is unknown. Therefore, this study aimed to evaluate the effectiveness of the Runfitcheck on time until the onset of a new RRI among adult novice runners.

METHODS

Design and setting

To evaluate the effectiveness of Runfitcheck on RRIs, a three-arm randomised controlled trial with a follow-up of 4 months was conducted between October 2019 and April 2020.

Participants, recruitment and randomisation

The inclusion criteria were: (1) to be 18 years or older and (2) considering themselves to be inexperienced, little experienced or somewhat experienced runners, or having less than 1 year of running experience. There were no criteria on the frequency or the distance they ran. From August 2019 to January 2020, runners were recruited via social media networks (Facebook, websites, Twitter, LinkedIn and newsletters) of the collaborating organisations (Dutch Consumer Safety Institute, Runner's World and Royal Dutch Athletics Association) or online registration for a running event of Le Champion (an event organiser for runners, cyclists and walkers in the Netherlands). Runners that applied for a running event of fewer than 10 km received a confirmation email with a short promotion for the study and a link to the study information, including an electronic consent form and the baseline questionnaire. The messages on social media contained the same information. Runners willing to participate gave their electronic informed consent and were included in the study.

After giving consent and filling out the baseline questionnaire (T0; online supplemental file 2), the runners were randomly allocated to one of the two intervention groups or the control group using a computerised random number generator (Research Randomizer, <https://www.randomizer.org/>). No restrictions were imposed to achieve a balance between groups in size or characteristics for the allocation, and simple randomisation was performed. Concealed allocation was used. All steps in the randomisation process were performed by one researcher (HvdD). Neither runners in the intervention groups nor researchers were blinded in this study.

Patient and public involvement

Runners were first involved in the study when developing the Runfitcheck intervention. They were also involved in evaluating the first version of the intervention. Novice runners and running experts suggested the content, and during its development, these two groups were involved in feedback sessions. The intervention is presented based on novice runners' wishes and needs. More detailed information on the development of the intervention is published elsewhere.¹⁵ Previous research in novice runners was used as input for developing the research design, outcome measures and research question. The evaluation at the end of the study focused on the time spent on the intervention. The burden of the intervention was not discussed.

The intervention

In this study, there were two intervention groups; one group was given access to the Runfitcheck through an active approach (RFC-a), and the other was referred to the Runfitcheck once (RFC-o). For a full description of the intervention, see online supplemental file 1. The RFC-a group was referred to the intervention every 2 weeks through the health monitor email, and the RFC-o was referred to the Runfitcheck just once in the first health monitor email. The control group was given no information regarding the Runfitcheck and continued running as usual.

Outcome measures

The main outcome measure was time to a new RRI. An RRI was defined as any physical complaint sustained by a runner during running, resulting in the runner quitting the current running activity or not being able to start a new running activity,^{18,19} including at least 1 day of time loss. To measure new RRIs, all groups received the Dutch version of the Oslo Sports Trauma Research Centre Questionnaire^{20,21} every 2 weeks, in this study, referred to as the health monitor. The runners scored between 0 and 25 on each of the health monitor's four key questions (severity score), where 0 point meant no physical complaints. The maximum score for all the questions was 100 points. A score above 8 on the health monitor combined with at least 1 day of time loss was indicated as an RRI. The injury score was also used as an outcome

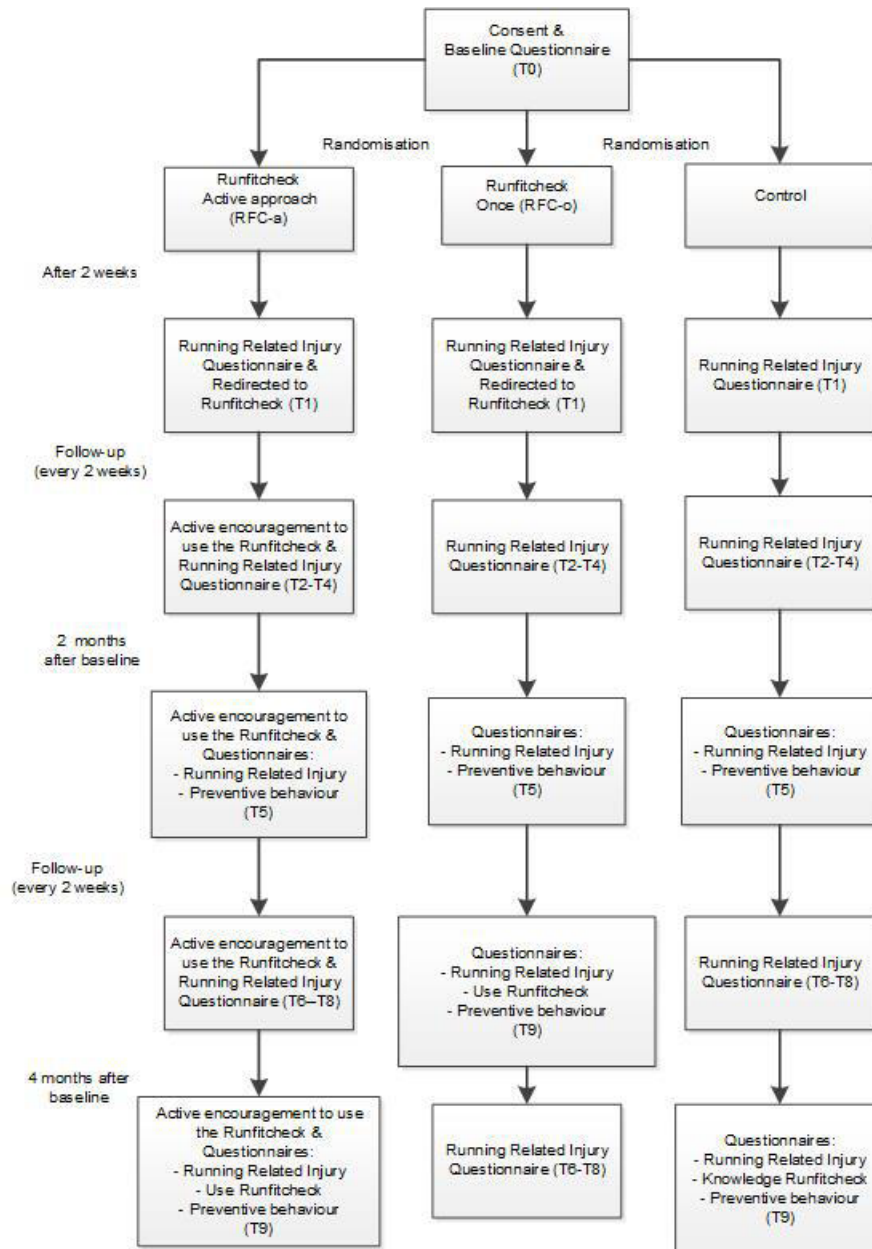


Figure 1 Study design.

measure in this study for severity, with 8 being not severe and 100 being the most severe. The questionnaire (T1 through T9, [figure 1](#)) is designed and validated to register sports-related health problems, including acute and overuse injuries over time. It uses four key questions on the influence of physical complaints on running participation, training volume, running performance and to what degree physical complaints are experienced while running. Additional information on running exposure and exposure to other sports was collected. All questions referred to complaints and exposure in the preceding 2 weeks.

If the runner experienced minimal complaints, the questionnaire was finished by filling in a minimum score on these questions.²¹ However, if the runner reported complaints that affected their ability to run,

the questionnaire continued by asking whether the complaint referred to an illness or injury. In the case of an injury, the runner was asked about the date the injury occurred, the nature of the injury and the body location (see online supplemental file 3). The number of time loss days (the total inability to run) was also registered. Subsequently, participants were asked if there had been another physical complaint in the last 2 weeks, for which they were asked the same questions as for the first injury. After these questions had been answered, the health monitor was finished.

Procedures

At baseline, the runners were asked about their running experience, other sports activities, current injury/injuries, injury preventive behaviour and knowledge of

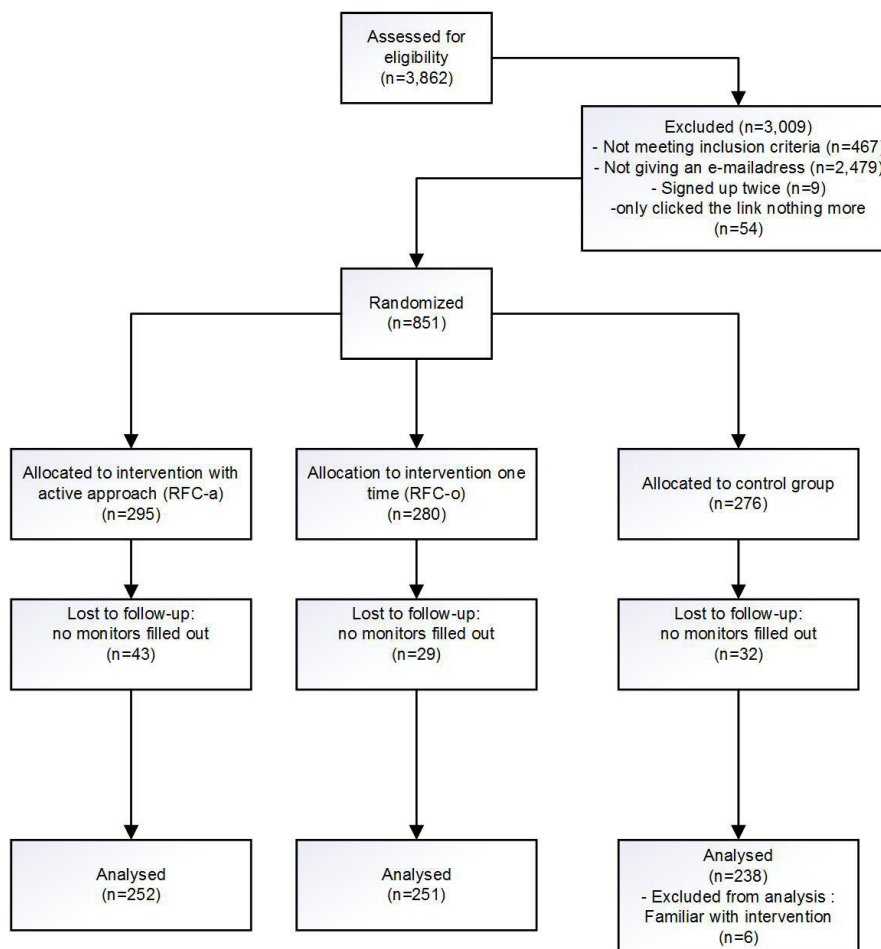


Figure 2 Flow chart of the participants. RFC, Runfitcheck.

injury prevention in running (see online supplemental file 2). All groups received their first health monitor about 2 weeks after completing the baseline questionnaire. Runners in both intervention groups (RFC-a and RFC-o) received information about Runfitcheck by email and were redirected to the Runfitcheck website after completing the health monitor.

The control group also received an email with a link to the health monitor but did not receive information about the Runfitcheck. Additionally, they were only told that this was a study to get insight into injuries of adult novice runners. For the remainder of the study period, all groups received an email with a link to the health monitor every 2 weeks. In the accompanying email of the RFC-a group, they were stimulated to use the Runfitcheck by different calls to action and the email containing a link to the online intervention.

After 2 months and at the end of the study, all groups received a more elaborate questionnaire (T5 and T9, figure 1, online supplemental file 4). Participants were asked about injury preventive behaviour in the past 2 months. Finally, after 4 months, participants in both intervention groups were asked questions about their use and view of the Runfitcheck (T9, figure 1). Participants in the control group were asked whether they had heard about the Runfitcheck and whether they had used it or

not. The design study is presented in figure 1. Participants who completed at least six of the nine health monitors, including the last one, were entered into a draw offering a possibility to win either one of three running magazine subscriptions or one of three sports packages to the value of €50.

Sample size

In this study, it was hypothesised that the use of Runfitcheck would lead to a reduction of 33% in RRI. The sample size calculation was based on calculations for longitudinal studies with repeated measures.²² To achieve 80% power with a significance level of 0.05, taking into account eight repeated measures (every 2 weeks for 4 months) and a within-person correlation of 0.3,¹⁵ the sample size calculation revealed that 98 participants per study group were needed in this study. Expecting a response rate of 70% and a loss to follow-up of 10%,¹⁵ the sample size was estimated at 150 participants for each study group (a total of 450 participants).

Data analysis

Descriptive characteristics were conducted for the baseline variables of the three groups. These baseline variables were analysed for differences between the groups using

Table 1 Baseline characteristics of the runners (n=741)

Baseline characteristics	RFC-a (n=252)	RFC-o (n=251)	Control (n=238)	Total (n=741)
Age, years (%)				
18–24	5	8	8	7
25–34	25	25	26	26
35–44	33	27	22	28
45–54	25	27	27	27
55–64	9	9	15	11
65 or older	3	2	2	2
Gender (%)				
Male	34	34	30	33
Female	66	66	70	67
Height (cm), mean (SD)	174.0 (14.5)	174.4 (11.0)	173.9 (8.5)	174.1 (11.7)
Weight (kg), mean (SD)	73.0 (11.8)	73.0 (12.5)	71.0 (12.2)	72.4 (12.2)
Running experience, months (%)				
None, starting	<1	–	–	–
<6	6	5	5	6
6–12	11	9	14	11
13–18	10	10	11	10
19–24	11	12	13	12
>24	61	63	56	60
Running level (%)				
Inexperienced (novice)	6	7	7	7
Little experienced	31	30	30	30
Somewhat experienced	62	63	63	63
Experienced	–	–	–	–
Very experienced	–	–	–	–
Running frequency (%)				
Didn't start yet	1	1	2	2
Less than once a week	3	3	5	4
Once a week	11	13	13	12
Twice a week	37	38	34	36
Three times a week	42	39	39	40
Four or more times a week	5	6	7	6
Running minutes each time, mean (SD)	55.2 (31.9)	55.5 (32.4)	54.2 (31.2)	55.0 (31.8)
Injured at baseline (%)				
No	55	56	54	55
Yes, RRI	29	34	32	32
Yes, injury, different sport	15	9	13	12
No answer	1	1	1	1
Severity score baseline, mean (SD)	19.4 (27.1)	17.8 (25.8)	19.7 (26.7)	18.9 (26.5)

RFC-a, Runfitcheck through an active approach; RFC-o, Runfitcheck once; RRI, running-related injury.

the χ^2 test for the categorical variables and a one-way analysis of variance for the continuous variables.

Runners that only completed the baseline questionnaire and runners in the control group that used the Runfitcheck were excluded from analysis. To determine

if the missing data were random, the pattern of missing data was analysed in two ways.²³ First of all, it was assessed whether baseline variables (age, gender, running experience and running level) were associated with missing follow-up data by using univariate logistic regression.

Table 2 Compliance with the study protocol, running exposure and RRI characteristics such as severity score and number of RRIs displayed per study group

	RFC-a (n=252)	RFC-o (n=251)	Control (n=238)
Compliance with the study protocol (%)			
Complete	30	31	30
Missing	25	25	17
Dropout	46	44	53
Running exposure			
Duration (min/2 weeks)*	52.9 (23.0)	51.8 (21.1)	53.3 (21.6)
Frequency (times/2 weeks)*	4 (2)	4 (2)	4 (3)
RRI characteristics			
RRI (n)	70	79	62
Injury rate†	13.1	15.3	12.6
Participants with new RRIs (%)	23	26	21
Time to new RRI (days)‡	40 (39)	41 (41)	36 (34)
Time loss (days/2 weeks)*	2.2 (1.6)	2.6 (2.4)	2.2 (1.9)
Total time loss (days)‡	8.9 (9.1)	9.0 (7.4)	7.7 (6.8)
Severity score, mean (SD)	63.1 (80.3)	69.5 (81.5)	64.3 (86.5)

*Mean and SD over a 2-week period.
†Injuries per 1000 running hours.
‡Mean and SD over the total monitoring period.
RFC-a, Runfitcheck through an active approach; RFC-o, Runfitcheck once; RRI, running-related injury.

Second, the outcome data of the health monitor were related to the outcome of the health monitor preceding and the one following to see whether these were related, also using univariate logistic regression.

Survival analysis Cox regression was used to assess the differences in time to new RRI between the three groups. Significance and the Wald statistic are reported, and the HR will be reported when significant. Generalised estimating equations (GEE) were used to gain insight into the difference in the risk of the occurrence of a new RRI and the development of the severity score between the three groups. Furthermore, GEE was used to see if there were changes over time (the monitor period) in the occurrence of new RRIs and/or the severity score and whether these differed between groups. The GEE accounts for the correlation of repeated outcome measures within subjects over time. Additionally, all these analyses were performed for the group runners who reported no injury at baseline and to analyse the effect of compliance to the Runfitcheck on RRIs and the severity score. These analyses are presented in online supplemental file 5.

All statistical analyses were performed using IBM SPSS (V.25), and significance was accepted at $p < 0.05$.

RESULTS

In total, 3862 participants were interested in the study, of whom 851 were eligible for participation (figure 2). Of these eligible participants, 295 were randomly allocated to the intervention group with an active approach (RFC-a), 280 were allocated to the intervention group with the

one-off referral to the Runfitcheck (RFC-o) and 276 to the control group. Eighty-seven per cent of the participants ($n=747$) completed at least one of the health monitors and were therefore included in the analyses. Six of the participants in the control group used the intervention (Runfitcheck) and were therefore excluded from the analysis, leaving 741 participants for further analysis. The complete flow of the participants can be found in figure 2.

Two-thirds (67%) of the runners were female; most were between 25 and 54 years old (table 1). Sixty per cent of the runners had more than 2 years of running experience, and a little over 60% assessed their running level as 'somewhat' experienced. Most runners ran twice or thrice a week, averaging 55 min (SD=31.8) per running session. At baseline, more than half of the runners (55%) had no (running-related) injury.

Missing data

Univariate logistic regression revealed that most baseline variables were not statistically predictive of incomplete data. Only the analysis for gender showed that men were more likely to have missing data than women (OR 1.51, 95% CI 1.10 to 2.09, $p < 0.05$). Non-response on one health monitor predicted non-response on the following health monitor. This assumes that the data are missing at random, which is accounted for in the GEE analysis.

Compliance with the study protocol, running exposure and RRI characteristics

After 4 months of follow-up in all groups, about 30% completed all health monitors (100%), while about half

Table 3 Effect of Runfitcheck on running-related injuries using generalised estimating equations

Group	RRI			Severity score		
	Beta	OR (95% CI)	P value	Beta	Wald χ^2	P value
Control	Reference			Reference		
RFC-o	0.202	1.22 (0.86 to 1.74)	0.260	0.070	0.003	0.954
RFC-a	0.013	1.01 (0.71 to 1.45)	0.944	-0.432	0.123	0.725
Linear trend*	-0.040	0.96 (0.91 to 1.01)	0.121	-0.669	30.712	0.000

*Adjusted for the intervention group.
RFC-a, Runfitcheck through an active approach; RFC-o, Runfitcheck once; RRI, running-related injury.

of the participants dropped out during the monitor period (table 2). On average, a participant filled out six health monitors. There was no significant difference between groups in the number of health monitors filled out ($F(2,738)=0.52$, $p=0.60$).

A summary of running exposure and RRI characteristics is shown in table 2. Around 25% of the participants in the intervention groups reported a new RRI, and 20% in the control group (table 2). The injury rate ranged from 13.1 to 15.3 injuries per 1000 running hours. Time to new RRI ranged from 36 up to 41 days. The number of new RRIs did not significantly differ between groups ($F(2,738)=0.61$, $p=0.55$).

Effects of the intervention on RRI

Cox regression showed no differences in time to the first RRI between the study groups (Wald $\chi^2=0.893$, $p=0.640$).

The GEE analyses showed no difference between the study groups in the risk of a new RRI nor the severity score (table 3). During the monitoring period, there was no change in the development of RRIs overall and between groups. However, the linear trend for the severity score showed a significant decrease in the severity score over the monitor period for all participants together (table 3; linear trend).

In additional analyses, the same analyses were performed for the group runners who reported no injury at baseline. Furthermore, the effect of visiting the Runfitcheck on RRIs was analysed. These analyses showed no differences between groups (see online supplemental file 5).

DISCUSSION

Principal findings

In this study, we evaluated whether the Runfitcheck affected the time until the onset of a new RRI among adult novice runners. Based on our results, the Runfitcheck did not have a protective or harmful effect on the time until the onset of a new RRI. The time until the onset of the first new RRI did not differ between the study groups, and there was no effect of the Runfitcheck on the severity scores.

Strengths and weaknesses in relation to other studies

In a previous study by Kemler *et al*, positive effects were found of the Runfitcheck on injury preventive behaviour of novice runners.¹⁴ The assumption was made that increased injury preventive behaviour using the Runfitcheck would ultimately lead to a decrease in RRIs. However, this study did not demonstrate these positive effects to prevent RRI.

Fokkema *et al*¹⁶ also showed no effect of an online intervention programme on RRIs in recreational runners. While Fokkema *et al* used a generalised intervention, in our study, we gave tailor-made advice based on running profiles rather than RRI. However, our approach was probably not specific enough to prevent RRIs. In contrast to the study of Fokkema *et al*¹⁶ and our study, Hespanhol *et al*¹⁵ did find a preventive effect of their tailor-made intervention. In their study, advice for recovery and prevention was given directly after notification of an RRI responding to the situation. This is a more 'right on time' way for (secondary) injury prevention since it is known most people take action the moment something happens and not before the onset of an injury.^{15 16}

Looking at the running population in the other studies, Fokkema *et al*¹⁶ included adult recreational runners who registered for one of three large running events between 5 and 42 195 km. Hespanhol *et al*¹⁵ studied adult trail runners participating in a recent trail running event (15–62 km). Trail and recreational runners are probably more experienced runners, while in our study, the participants were expected to be mainly novice runners and probably less experienced runners. These may need a different approach when it comes to injury prevention. Novice runners have a high injury risk but lack a sense of urgency.²⁴ Fokkema *et al* and Hespanhol *et al* showed that runners with an RRI were more inclined to participate in the intervention than runners without physical complaints.^{15 16} This was confirmed by the recent study of Verhagen *et al*,²⁵ which showed that recreational runners do not have a conscious will to prevent injuries and use self-regulation to deal with complaints and injury. When runners do not have any experience with being injured, they might not feel the urge to protect



themselves against injury. Future research in injury prevention for recreational/novice runners should consider this.

Another point of discussion is the definition of the experience level of runners, namely novice, recreational and competitive runners. There is no clear definition in the literature, and every study uses different definitions, making a comparison of research outcomes and drawing conclusions difficult.^{26 27} By reporting the injury incidence in relation to the amount of time spent running, a comparison would be possible; however, relatively few studies report this.²⁶ Hence, in consultation with the Royal Dutch Athletics Association, we based the definition mainly on the runners' feelings. However, to make research outcomes more comparable, an international consensus on the definition and/or the way of reporting the experience level of runners must be reached. This would also translate to better practical application by the running community, coaches, physical therapists, etc.²⁷

In this study, an RRI was defined as any physical complaint sustained by a runner during running, resulting in the runner quitting the current running activity or not being able to start a new one,^{18 19} including at least 1 day of time loss. This definition may have missed some RRIs, such as runners with iliotibial band (ITB) syndrome, achilles tendinopathy and patellafemoral pain (PFP) syndrome (common RRIs). Runners with these injuries rarely quit their current running activity or cannot start a new running activity (including at least 1 day of time loss). The definition used in a study impacted the outcome of the study. For comparability of future studies, consensus on definitions of runners and RRI is of major importance.

One of the strengths of the study is how the intervention is presented. This is based on the wishes and needs of novice runners. Therefore, theoretically, the Runfitcheck is expected to be attractive and stimulating enough for novice runners. However, the results show poor compliance with the Runfitcheck in both intervention groups (see online supplemental file 5). Further research could consider using the theory of planned behaviour (TPB) in evaluating the Runfitcheck since this theory may explain half of the variance around RRI preventive behaviour and intention.²⁸

Finally, the dropout rate in this study was relatively high (48%) compared with other studies.^{16 29} However, just 13% of all the participants were excluded from the analysis. When the runners completed at least one health monitor, data until they dropped out were included in the analysis. The dropout rate could (probably partly) be explained by runners with an injury (temporarily) quitting running and dropping out of our study, reflected in the significant decrease in the number of new RRIs per health monitor over the research period. Previous research has also shown that an injury is one of the main reasons to quit being active.²⁹

Meaning of the study and future research

Using a tailor-made intervention based on a runner's profile was ineffective in preventing RRIs in novice runners. Even though this study included just one group of mainly novice runners, it suggests that preventive research and creating awareness concerning injury is difficult when dealing with novice runners. As suggested before, the TPB could be used in future studies when evaluating Runfitcheck. The TPB might explain the variance around RRI preventive behaviour and intention and may give starting points to create awareness concerning injuries in more novice/less experienced runners.

The components of the Runfitcheck are developed in cooperation with several (running) experts. These components could be investigated concerning their effect on RRI individually. For example, the preventive effects of strength exercises can be studied, and proven effects can be used to prevent RRIs in novice runners. Coaches may be able to use the individual exercises in their training programme for novice/less experienced runners.

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Contributors EK was guarantor and together with HvdD responsible for the conceptualisation of the idea of the study, data analysis, interpretation of the data and preparation of the manuscript. EK and VG acquired funding. VG, EK and HvdD designed the study. EK and HvdD prepared the materials and implemented the study. HvdD collected the data and carried out the data analyses. HvdD drafted the manuscript with contribution from EK. VG was responsible for the critical review of the manuscript. All authors read and approved the final manuscript.

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1 Supplement 1 Additional information on the intervention Runfitcheck

2

3 The Runfitcheck was developed in 2016 according to an evidence- and practice-based approach to
4 stimulate injury preventive behaviour amongst novice runners (1,2). Although the intervention has
5 been described in detail in the aforementioned articles, after the first evaluation of the intervention,
6 some adjustments were made based on the users' feedback.

7 The Runfitcheck starts with a few basic, newly developed, questions classifying the runner based on
8 their running motivation, physical complaints and load-taking capacity. Based on these questions, the
9 runner directly receives tailored advice consisting of: 1) their running profile, consisting of percentage
10 match to a health-oriented, mental runner, social runner and goal-oriented runner; 2) information about
11 their injury risk; and 3) advice on their running profile in combination with the injury risk and the pitfalls.
12 Next, the runner is directed to a personal dashboard for achieving optimal running practice. This
13 dashboard consists of a training schedule, a warming-up routine through an instruction video and
14 instruction videos of strength exercises. The training schedules were adapted to their running goal. A
15 new addition to the dashboard is information on how to listen to your body's signals in terms of pain
16 signals, fatigue, recovery and resting heart rate. This information was developed in consultation with
17 running experts.

18

19 References

20

- 21 1. Kemler E, Cornelissen MH, Gouttebarghe V. Is it possible to stimulate injury-preventive
22 behaviour in adult novice runners with an online intervention? Results of a randomized
23 controlled trial. *South African Journal of Sports Medicine*. 2020;submitted.
- 24 2. Kemler E, Gouttebarghe V. A Tailored Advice Tool to Prevent Injuries Among Novice Runners:
25 Protocol for a Randomized Controlled Trial. *JMIR Res Protoc*. 2018;7(12):1.

26

27

28

Supplement 2 Baseline questionnaire Runfitecheck

Navigation block 1: Welcome

Dear runner,

Thank you for your interest in participating in research on injuries in novice runners!

VeiligheidNL is conducting this study in collaboration with Le Champion and the Athletics Union. During this study we will follow you and monitor your running activities over a period of 16 weeks and any physical complaints or injuries that you have suffered as a result of these activities. We will send you a short questionnaire once every two weeks by e-mail. You will receive a more extensive questionnaire at the beginning, after 8 weeks, and at the end of the study period.

The aim of the research is to gain insight into running and other sports activities, injuries and injury prevention behaviour of runners in order to ultimately prevent injuries among runners.

After you have read the information on the next page and given permission (informed consent) to participate in the study, we will start with the first questionnaire. It takes about 5 to 10 minutes to complete. We start with a pre-selection, to see if you belong to our target group.

Among the participants in the study, six running prizes worth 50 euros will be raffled off. This will be done at the end of the survey when all questionnaires have been completed. For more information see: <https://www.veiligheid.nl/sportblessures/home/disclaimer-onderzoek-hardlopen>>Disclaimer Research Running

Please note! When you stop filling out the questionnaire in between, your data will not be stored. So fill in the questionnaire completely at once.

Privacy

For sending the questionnaires in the study we will use your e-mail address. Your e-mail address and other data will be processed confidentially; the results will not be traceable to you as a person. Each respondent will have a unique code that is linked to your data. The entered anonymous data will be kept for 15 years and then destroyed.

Participation in the study is voluntary. You may stop participating in this study at any time, without reason. The data collected up to that point will be used for the study. You can stop by sending an email to (one of) the following researchers of VeiligheidNL:

- Henrike van der Does (h.vanderdoes@veiligheid.nl)
- Ellen Kemler ()

When you have any questions about the study, don't hesitate and ask them by e-mail.

Permission statement

- I have read the information about the study and had the opportunity to ask questions. I have had enough time to decide if I wanted to participate.

- I know that participation is voluntary and that I can decide at any time not to participate anymore. I don't have to give a reason for that.
- I consent to the collection and use of my data in the manner and for the purposes mentioned. I give permission to keep my anonymous data for another 15 years after this study for further research into running, running injuries and sports injury prevention.
- I want to participate in this study.

→ I hereby give permission for participation in the study and (re) analysis of my data.

Navigation block 2: Target group

We are very happy that you want to participate in this study! We will start with asking you several questions about you and your running experience to determine if you belong to our target group.

To what extent do you run?

- Running is a 'main sport' for me (the most important sport)
- Running is a 'for me side sports' (I also do other sports)
- I'm going to start running soon

What is your age?

- Younger than 18 years
- 18 to 24 years
- 25 to 34 years
- 35 to 44 years
- 45 to 54 years
- 55 to 64 years
- 65 years or older

If answer '<18' → (exclude)

If Leeftijd_jonger_18 go to Referral from start exclusion

How many months of running experience have you gained in the last five years?

- None, but I do plan to start running soon
- Less than 6 months
- 6 to 12 months (0.5-1 year)
- 13 to 18 months (1-1.5 years)
- 19 to 24 months (1.5-2 years)
- More than 24 months (2 years)

How do you assess your own running experience?

- Inexperienced (beginner)
- Little experienced
- Somewhat experienced
- Experienced (advanced)
- Very Experienced (expert)

In response >12 months of running experience and (very) experienced running level → go to page 24 (exclude)

Inclusion

You belong to our target group and we are happy to continue the study with you!

In order to be able to send you the following questionnaires, we would like to receive your e-mail address.

Your e-mail address will not be used for purposes other than participation in this study and for contact about the possible incentive. Your personal data will be processed by one researcher and stored in a secure environment.

After entering your e-mail address, click on 'Next' to continue the questionnaire.

E-mail address:

Navigation block 3: General questions

How did you end up with this study?

- Through a call on social media
- Through registration for the Zandvoort Circuit Run, number of km:
- Through registration for a running event, namely (name of event + number of km):
- In a different way, namely:

Following are some questions about your demographics.

What is your gender?

- Male
- Female
- Other

What is your height in centimeters?

..... Cm

What is your weight in kilograms?

..... Kg

Don't want to answer

We would like to know how you physically strain your body through running. Following are some questions about this subject.

How many times a week do you on average exercise currently?

- N/A, I'm not working out at the moment but I'm going to start
→ go to page 8; capacity questions
- Less than 1 time per week
- 1 time per week
- 2 times a week
- 3 times a week
- 4 or more times a week

How long (in minutes) do you exercise on average at a time?

Enter 0 minutes if you are not currently exercising.

..... minutes

How many times a week do you on average run currently ?

- N/A, I haven't started running yet
- Less than 1 time per week
- 1 time a week
- 2 times a week
- 3 times a week
- 4 or more times a week

How long (in minutes) do you run on average at a time?

Enter 0 minutes if you are not currently running.

..... minutes

In addition to load, capacity is also relevant. We'll ask you some questions about that now.

How is your condition?

1 stands for not good at all and 10 for very very good

1 2 3 4 5 6 7 8 9 10

How prone to injuries are you?

How often and how quickly you suffer from an injury or other physical complaints (e.g. aches and pains)?

1 stands for non-injury prone and 10 for very injury prone

1 2 3 4 5 6 7 8 9 10

To clarify the definitions in the questions, below are the definitions of an injury and a physical complaint:

An injury is defined as an event during exercise after which the athlete must stop his or her sports activity or is unable to start a subsequent sports activity.

A physical complaint is defined as another pain complaint, which does not fall under the definition of an injury.

Do you currently suffer from an injury or physical complaint caused by running?

- Yes, I suffer from an injury or physical complaint caused by running

→

go to page 10

- No, but I do suffer from an injury or physical complaint caused by another sport → go to page 10
- No, I do not suffer from an injury or physical complaint

Go to Referral from no injury, complaint

- Not applicable, I haven't started running yet

→

go to page 15

Go to Referral from no trouble injury, complaint

Navigation block 4: Injury and complaint

Following are some questions to gather more information about your injury or physical complaint.

Have you been suffering from this injury or physical complaint for more than three months?

- Yes
- No

To what extent are you currently bothered by this injury or physical complaint while running? *Do you currently have difficulties participating in normal training and competition due to injury or a physical complaint?*

- Fully participated, without health problems
- Fully participated, but with injury / physical complaint
- Reduced participation due to injury / physical complaint
- Cannot participate due to injury/physical complaint

To what extent have you currently reduced your training volume due to injury or physical complaint?

- No reduction
- To a minor extent
- To a moderate extent
- To a major extent
- I haven't been able to train at all

To what extent do you currently notice that the injury or physical complaint affects your running activities / performance?

- No effect
- To a minor extent
- To a moderate extent
- To a major extent
- I haven't been able to train at all

To what extent do you currently suffer from the symptoms of this injury or physical complaint?

- No symptoms/health complaints
- To a mild extent
- To a moderate extent
- To a severe extent

If all questions show no complains or bother go to [Referral from no injury complaint]

Where is the physical complaint/injury located?

- Upper body / upper extremities
- Lower back
- Pelvis
- Hip
- Groin
- Thigh front
- Thigh back
- Knee
- Tibia
- Calf
- Achilles tendon
- Ankle
- Foot
- Toes

What is the nature of the physical complaint/injury sustained?

- Bruise or bruising
- Muscle or tendon injury; (partial) rupture of a muscle
- Muscle or tendon injury; strain on muscle or tendon without sudden rupture
- Muscle or tendon injury; don't know what exactly
- Sprain, twisting or ligament injury; (partial) rupture of a ligament
- Sprain, twisting or ligament injury; twisting joint
- Sprain, twisting or ligament injury, don't know what exactly
- Acute bone fracture (e.g. fracture only due to sprain)
- Bone fracture; bone overload (e.g. fatigue fracture / stress fracture)
- Dislocated joint
- Nerve tightness (e.g. back hernia)
- Unknown
- Otherwise namely;

Have you been treated by a (para)medic for the physical complaint / injury? (multiple answers possible)

- No
- Yes, by a general practitioner
- Yes, by a sports physician
- Yes, by a physiotherapist
- Other, namely:

Referral from no injury, complaint

Navigation block 5: Behavior

To prevent injuries, various aspects are important. We are curious to what extent you have experience with these aspects. First of all, some questions about your knowledge of injury (prevention).

General

Do you disagree or agree with the following statements?

- I know where to find information and advices on what to do if I experience physical complaints due to or while running
- I know where to find information and advice on how to prevent running injuries
- I know where to go for treatment when I have an injury
- There are measures that help to prevent running injuries
- I know what to do to prevent running injuries

Fatigue

Do you disagree or agree with the following statements?

- Prolonged mental fatigue increases the risk of injury
- If I am mentally tired from a long day of meetings at work or a day of studying, the risk of injuries is higher
- If I'm still physically tired from the previous training, it is better to postpone running for another day

Recovery and running apps and schedules

Do you disagree or agree with the following statements?

- After 48 hours of rest I have recovered sufficiently from running
- I know what measures help to recover after running
- Following a running schedule is more important to prevent injuries than listening to my body
- I can prevent a lot of running injuries by a good load build-up in my training schedule

Resting heart rate

Do you disagree or agree with the following statements?

Answer options: disagree, agree.

- My average resting heart rate indicates how prone I am to injury
- I know when I need to adjust my running training based on the value of my resting heart rate

Pain

Do you disagree or agree with the following statements?

- In case of acute pain, it is often best to stop running
- In case of muscle strain the day after a running training, I have to postpone the next training at least 1 day
- If pain disappears quickly at the beginning of training, it doesn't hurt to keep walking and finish the training session

Now some questions about your injury awareness are asked.

Do you disagree or agree with the following statements?

- Runners are more likely to get injured than other sports athletes
- Novice runners are more likely to get injured than experienced runners
- Runners are more likely to suffer a serious injury than other sports athletes

The extent to which you think you can prevent injuries is also important and is measured with the following statements.

To what extent do you agree with the following statements?

Indicate on a scale from 1 to 10.

1 stands for completely disagree and 10 stands for completely agree.

- If I feel a running injury emerging, I am in a position to take measures to prevent worse
- I sometimes keep on going too long while experiencing a running injury
- I can well estimate whether I can continue to exercise with a running injury
- I can well estimate whether I need medical treatment for a running injury
- If I suffer from a running injury I can properly assess how serious this injury is
- I am able to listen to the signals of my body before, during and after running

Your attitude towards injuries is also important. We measure attitude with the questions below.

To what extent do you agree with the following statements?

Indicate on a scale from 1 to 10.

1 stands for completely disagree and 10 stands for completely agree.

- I think it's important to take measures to prevent running injuries
- Running injuries happen no matter how careful you are
- Most running injuries aren't that serious
- Information about running injuries only makes me afraid of getting an injury.

Navigation block 6: Injury prevention behaviour

We would like to know what actions you are currently taking to prevent running injuries.

Indicate below what you are currently doing to prevent running injuries. Enter not applicable (N/A) if you have not yet started running.

Answer options: never, rarely, sometimes, often, always, N/A (*I haven't started running yet*).

- A short warm-up (consisting of slowly running for 5 to 10 minutes followed by some stretching exercises)
- 2 to 3 times a week muscle strengthening exercises
- Exercises to improve my running technique
- Regularly changing running surfaces
- Training with a running group
- Listening to my body (e.g. delaying training in case of aches and pains or taking it easy)
- Using a personal running schedule (tailored to my running capacity)
- Using a general running schedule
- Wearing ankle brace/knee brace
- Wearing compression socks
- Good training structure (consisting of gradually building up the intensity and extent of the training to work on a better condition)

- Another injury prevention measure (fill in below)

What other injury prevention measures do you take? If you have not filled in the answer option 'Other injury prevention measure' above, you can skip this question.

.....
Skip question

If not [Blesprev_gedrag] [Spierverst_oef] contains 'rarely, sometimes, often, always' go to Referral from beginning exclusion

Can you indicate which muscle strengthening exercises you do?
Can you indicate for each muscle-strengthening exercise how many minutes you do them at a time?
Can you indicate per muscle strengthening exercises how often you do these per week?

→ go to page 26

Reference from the beginning of exclusion

Navigation block 7: Closure

If [Age] [Jonger_18 years] go to Exclude

If Running experience = Maand_13_18 OR Maand_19_24 OR Maand_meer_24 AND Running level = Experienced OR Zeer_ervaren go to Exclude

If Blesprev_gedrag → Anders = never, rarely, sometimes, often, always, n/a go to Dank

Unfortunately, you do not belong to our target group of novice runners and you cannot participate in the study.

Thank you very much for your interest in the study and good luck with your running activities!

Do you have any further questions and/or comments? Then place it below. If you don't have any questions or comments, you can skip this question.

.....
Skip this question

If you would like to contact our researchers directly, please send an e-mail to Henrike van der Does or Ellen Kemler.

- Henrike van der Does (h.vanderdoes@veiligheid.nl)
- Ellen Kemler (e.kemler@veiligheid.nl)

Go to the next page and click 'Exit' to close the survey.

→ go to page 27

Go to End_vragenlijst

Thank you for completing this questionnaire!

Within two weeks you will receive the first fortnightly questionnaire to monitor your running activities and injuries.

Do you have any further questions and/or comments? Then place it below. If you don't have any questions or comments, you can skip this question.

.....
Skip this question

If you do not want to participate in the running prize giveaway and/or you want to contact our researchers directly for another reason, please mail to Henrike van der Does or Ellen Kemler.

- Henrike van der Does (h.vanderdoes@veiligheid.nl)
- Ellen Kemler (e.kemler@veiligheid.nl)

Go to the next page and click on 'Exit' to send the questionnaire.

This is the end of the questionnaire.

Supplement 3 Health Monitor Runfitcheck

HEALTH MONITOR

Welcome

Dear Runner,

Welcome to your health monitor; a short questionnaire, every two weeks, to monitor your running-related physical complaints and injuries.

In this short questionnaire we look back at what you have done in the past two weeks, and whether you have suffered from injuries or physical complaints that have affected your running in the past two weeks.

It takes 10 to 90 seconds to complete (depending on your physical complaints).

Thanks in advance for filling in the questions!

Sports exposure

How many times have you been running in the last two weeks?
Please enter a number and if you did not run enter 0 times

How many minutes did you run on average at a time? minutes

Have you done any other sports in the past two weeks?

- Yes
- No

What other sport(s) have you done (besides running) in the last two weeks?

- Volleyball
- Football
- Hockey
- Basketball
- Fitness
- Cycling
- Tennis
- Otherwise.....

How many minutes have you done these sport(s) in TOTAL in the last two weeks? minutes

Why haven't you run in the last two weeks?

- Due to physical complaint / injury
- Aother reason namely;

Basis health questions

Now four questions about physical complaints (injuries or illness) that you have suffered during running in the past 2 weeks will be asked.

If you have not had any complaints, indicate that you did not have them in the four questions.

If you have suffered from multiple illnesses, injuries or physical complaints, think of the complaint that you have suffered the most from in the past two weeks.

Answer the next four questions about this physical complaint.

At the end of the questionnaire you will be given the opportunity to indicate another physical complaint.

Please do not indicate physical complaints that have to do with muscle pain.

Have you experienced any injury, illness or other health problems while running in the past two weeks?

- Fully participated, without health problems
- Fully participated, but with injury / physical complaint
- Reduced participation due to injury / physical complaint
- Cannot participate due to injury/physical complaint

To what extent have you reduced your training volume in the past two weeks due to an injury, illness or other health problems?

- No reduction
- To a minor extent
- To a moderate extent
- To a major extent
- I haven't been able to train at all

To what extent have you noticed that injuries, illnesses or other health problems have affected your running activities in the past two weeks?

- The performance was **not** affected
- The performance was **slightly** affected
- The performance was **moderately** affected
- The performance was **much** influenced
- I have **not been** able to run at all

To what extent have you suffered from the symptoms of the injury, a physical complaint or health problems in the past two weeks?

- I had **no** physical complaints
- I had **somewhat** physical complaints
- I had **moderate physical** complaints
- I had **many** physical complaints

Follow-up health questions

How many days in the past two weeks have you not or partly been able to participate in running due to the physical complaint / injury? days

Is this the first time you have reported this physical complaint in this study?

- Yes
- No, I have reported the same physical complaint / injury in the previous health monitor
- No, I have reported the same physical complaint / injury before but that is longer ago

When did your injury/ complaint start? > > Indicate the date in the calendar.

Does the problem which caused you pain or nuisance these two weeks concern a physical complaint / injury or an illness?

- Physical complaint / injury
- Illness

Follow-up injury

If you suffer from multiple complaints/injuries, answer the following questions about your main physical complaint/injury. At the end you will have the opportunity to indicate a second physical complaint / injury.

Is this a recurrent injury?

A recurrent injury refers to an injury that occurs again on the same part of the body on the same side of the body.

- Yes
- No

Where is the physical complaint / injury located? Upper body / upper extremities

- Lower back
- Pelvis
- Hip
- Groin
- Thigh front
- Thigh back
- Knee
- Tibia
- Calf
- Achilles tendon
- Ankle
- Foot
- Toes

What is the nature of the physical complaint/injury sustained?

- Bruise or bruising
- Muscle or tendon injury; (partial) rupture of a muscle
- Muscle or tendon injury; strain on muscle or tendon without sudden rupture
- Muscle or tendon injury; don't know what exactly
- Sprain, twisting or ligament injury; (partial) rupture of a ligament
- Sprain, twisting or ligament injury; twisting joint
- Sprain, twisting or ligament injury, don't know what exactly
- Acute bone fracture (e.g. fracture only due to sprain)
- Bone fracture; bone overload (e.g. fatigue fracture / stress fracture)
- Dislocated joint
- Nerve tightness (e.g. back hernia)
- Unknown
- Otherwise namely;

Have you been treated for this physical complaint / injury by a (para)medic in the past two weeks?

Multiple answers possible

- No
- Yes by general practitioner
- Yes by sports doctor
- Yes by physiotherapist
- Otherwise, namely:

Have you suffered from another physical complaint / injury in the past two weeks?

- Yes
- No

When did your injury/ complaint start? >> indicate the date of onset in the calendar

Is this a recurrent injury?

A recurrent injury refers to an injury that occurs again on the same part of the body on the same side of the body.

- Yes
- No

Where is the physical complaint / injury located? Upper body / upper extremities

- Lower back
- Pelvis
- Hip
- Groin
- Thigh front
- Thigh back
- Knee
- Tibia
- Calf
- Achilles tendon
- Ankle
- Foot
- Toes

What is the nature of the physical complaint/injury sustained?

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- Muscle or tendon injury; strain on muscle or tendon without sudden rupture
- Muscle or tendon injury; don't know what exactly
- Sprain, twisting or ligament injury; (partial) rupture of a ligament
- Sprain, twisting or ligament injury; twisting joint
- Sprain, twisting or ligament injury, don't know what exactly
- Acute bone fracture (e.g. fracture only due to sprain)
- Bone fracture; bone overload (e.g. fatigue fracture / stress fracture)
- Dislocated joint
- Nerve tightness (e.g. back hernia)
- Unknown
- Otherwise namely;

Have you been treated for this physical complaint / injury by a (para)medic in the past two weeks?

Multiple answers possible

Have you been treated for this physical complaint / injury by a (para)medic in the past two weeks?

Multiple answers possible

- No
- Yes by general practitioner
- Yes by sports doctor
- Yes by physiotherapist
- Otherwise, namely:

Closure

Many thanks for your time.

In two weeks you will receive the same questions again.

If you have any questions/comments, please contact (one of) the following researchers from VeiligheidNL:

-Henrike van der Does (h.vanderdoes@veiligheid.nl)

-Ellen Kemler (e.kemler@veiligheid.nl)

Click on the button below to send your answers.

Supplement 4 Additional questions Runfitcheck (T5 & T9)

RFC group (active and inactive approach)

All questions are single response unless otherwise stated in question

[RFCbekeken]

Have you viewed or used the Runfitcheck website (www.runfitcheck2.nl) in the past 4 months?

Yes - on to question 2

No – on to question 5

[RFCWatViews]

What parts of the website have you viewed or used? (multiple answers possible)

- Landing page
- Test for type of runner
- Warm-up exercises with videos
- Muscle strengthening exercises
- Knowledge test(s)
- Training Schedule
- Tips
- Other, namely

[RFCHoevaak]

How many times have you viewed or used the website?

- 1 time in total
- 1 time per month
- 1 time every 2 weeks
- 1 time per week
- Several times a week
- Otherwise....

[RFCDashboard]

Did you create a personal dashboard as a result of the determination test at the beginning?

Yes – to end (or monitor where to build in T2)

No – on to question 6

[RFCNee]

Why didn't you view/use the Runfitcheck? (multiple answers possible)

- I'm using another running app/tool
- The website didn't sound interesting
- I didn't see the point of the website
- The first look at the website did not attract me
- No time
- Otherwise.....

[RFCDashNo]

Why didn't you create a personal dashboard?

- I thought it was too much hassle
- I didn't see the point of it
- Otherwise.....

Control group

All questions: single response – unless otherwise stated

[RFC known]

Have you ever heard of the Runfitcheck?

- Yes -> on to question 2
- No -> on to next part of the question... monitor oid

[RFCknownHow to]

How did you hear about the Runfitcheck?

- Google
- Sociale Media
- Friends / family / known person
- Sporting event
- Otherwise....

[RFCbekeken]

Have you used or viewed the Runfitcheck?

- Yes -> on to question 4
- No

[RFCWatViews]

Multiple response

What have you viewed or used from the Runfitcheck? (multiple answers possible)

- Landing page
- Test for type of runner
- Warm-up exercises with videosMuscle strengthening exercises
- Knowledge test(s)
- Training ScheduleTips
- Otherwise...

[RFCHoevaak]

How many times have you viewed or used the website?

- 1 time in total
- 1 time per month
- 1 time every 2 weeks
- 1 time per week

Several times a week
Otherwise....

Supplement 5 Additional analysis Runfitcheck

Data analysis

In sub analysis only the group of runners who reported no injury at baseline was selected. Survival analysis Cox regression was used to assess the differences in time to new RRI between the three groups. Significance and the Wald statistic is reported, when significant the Hazard Ratio will be reported. Generalised estimating equations (GEE) was used to gain insight in the difference in the chance of the occurrence of a new RRI and the development of the severity score between the three groups. Furthermore, GEE was used to see if there were changes over time (the monitor period) in the occurrence of new RRIs and/or the severity score, and whether these differed between groups. Lastly, survival analysis Cox regression and GEE were used to see whether visiting the Runfitcheck had any effect on the chance of the occurrence of new RRI's. In this analysis the six participants from the control group that visited the Runfitcheck, and were excluded from other analysis, were included in the group that visited the Runfitcheck. The GEE accounts for the correlation of repeated outcome measures within subjects over time. All statistical analysis was performed using IBM SPSS (version 25) and significance was accepted at $p < 0.05$.

Results

At the start of the monitor period, 55 percent of participants had no injury ($n=405$). In a subanalysis, only these participants were included. The number of participants with no injury at the start of the study did not differ between the groups, see table 1 in the main document. The sub analyses showed no difference in the chance of RRI occurrence and severity score between the three groups (Table 1).

Table 1: Effect of Runfitcheck on running-related injuries using generalised estimating equations; participants with no injury at T0.

Group	RRI			Severity score		
	Beta	Odds ratio (95% CI)	p	Beta	Wald Chi-Square	p
Control (n=127)	reference			reference		
RFC-o (n=140)	0.283	1.33 (0.84 - 2.09)	0.221	1.703	2.751	0.097
RFC-a (n=138)	0.016	1.02 (0.63-1.63)	0.948	0.889	0.700	0.403

Use of Runfitcheck

Within the four months of monitoring, 15 percent in the RFC-o group and 29 percent in the RFC-a group had visited the online intervention (Table 2). Even in the RFC-a, group only 16 percent had visited the Runfitcheck once in total and even fewer participants had visited the Runfitcheck more often.

Table 2: Use of the Runfitcheck

	RFC-a (n=122)		RFC-o (n=133)		Control (n=108)	
	Frequency	%	Frequency	%	Frequency	%
Heard of the RFC **						
Yes					6	6
No					102	94
Visited the RFC						
Yes	35	29	20	15	-	-
No	87	71	113	85	108	100
Frequency usage						
Not	87	71	113	85	108	100
One time	19	16	11	8		
Once a month	10	8	6	5		
Once every 2 months	4	3	2	2		
Once a week	1	1	1	1		
Multiple times a week	1	1	-	-		

*n is the number of participants that replied to this questionnaire

**This question was only for the control group

Cox Regression showed no difference in time to the first RRI (Wald Chi-Square 1.333, $p=0.248$) between the group that visited the Runfitcheck and the group that did not visit the Runfitcheck.

The results for the GEE analyses, in which the group that visited the Runfitcheck ($n=61$) was compared with the group of runners that did not visit the Runfitcheck ($n = 322$) are shown in Table 3. There was no difference between the two groups in the chance of a new RRI nor in the severity score (Table 3).

Table 3: Effect of visiting the Runfitcheck on running-related injuries using generalised estimating equations

Group	RRI			Severity score		
	Beta	Odds ratio (95% CI)	p	Beta	Wald Chi-Square	p
RFC visited	reference			reference		
RFC not visited	-0.195	0.82 (0.55 - 1.24)	0.354	-2.009	1.425	0.233