SHORT REPORT

A pre-joining fitness test improves pass rates of Royal Navy recruits

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Introduction

It is essential that Royal Navy (RN) recruits possess the physical capabilities required to meet the substantial demands of training and working in a variety of military environments. Aerobic standards for undertaking safety critical tasks were established by Bilzon et al. [1]. The RN has a responsibility to ensure that personnel are capable of performing these duties in a safe manner. It is through RN Phase I training that recruits learn the techniques and gain the aerobic fitness required to meet the demands of these duties.

In the main, basic military training involves weight-bearing exercise, this type of exercise requires a moderate to high level of aerobic fitness [2]. Low levels of physical fitness are strongly associated with a proneness to injury development [2] and high military training wastage rates [3,4]. Evidence from Allsopp et al. [3] suggests the least aerobically fit RN recruits experienced more injuries than fitter recruits during training. The pre-joining fitness test (PJFT) should ensure that those with low levels of aerobic fitness are identified prior to entering training. Only candidates achieving the required 2.4-km run time would be accepted for training as evidence suggests that greater physical fitness is associated with fewer overuse injuries [2,5] and reduced military training attrition rates [3].

Recruits take Phase I training on entry to the RN, which is a physically demanding 8-week course. Extensions to training can be made if personnel are injured or require further tuition on important elements of the programme. Poor physical progression is one element that may be considered. The reported changes in predicted maximal oxygen uptake (VO2 max) following basic military training in other countries are of the order of 7–10% [6]. The PJFT standard was established in relation to the observed improvement in VO2 max with basic military training and stratified by age and gender. The introduction of a pre-entry aerobic fitness assessment was recommended by previous research [7,4] to reduce the injury rates for groups with slower best effort 2.4 km run times. The primary aim of this study was to assess the PJFTs impact on recruit training outcome and length of Phase I training.

Background

Military training represents a significant physical challenge. Low fitness levels are strongly associated with an increased risk of injury and training attrition. To increase pass rates for Royal Navy (RN) Phase I training, a pre-joining fitness test (PJFT) was introduced (2.4 km treadmill best effort run). The PJFT was designed to identify candidates with poor levels of aerobic fitness who may be prone to leave training prematurely.

Aim

To examine the impact of the PJFT on training length and outcomes.

Methods

Time taken to run 2.4 km and training outcomes were measured before and after the introduction of the PJFT. Information was collected from RN Phase I training establishments and the network of careers offices between 2002 and 2005. Recruits were placed into quartile groups based on 2.4 km overground running performance. The no PJFT and PJFT groups and the 2.4-km run performance quartiles were compared for training outcomes and time spent in training.

Results

Training measures were available for 4818 recruits who entered training before the PJFT’s introduction (no PJFT) and 3305 after its introduction (PJFT). The pass rate increased from 78 to 88% following the introduction of the PJFT ($P < 0.01$). The number of recruits applying for voluntary release decreased from 15% (no PJFT group) to 6% (PJFT group) ($P < 0.05$).

Conclusion

The PJFT positively impacted on RN Phase 1 training pass rates. A greater number of recruits successfully completed training, fewer applied for voluntary release and the number and length of training extensions were reduced.

Key words

Aerobic fitness; military training; selection.
Methods

The PJFTs were conducted at 53 local gymnasium under the direction of qualified staff, using maintained equipment and following standardized instructions. (All recruits followed the same Phase I training syllabus.) The time taken (minutes and seconds) to complete the 2.4-km distance on a treadmill was recorded. This process was regularly quality assured. For candidates in the PJFT group, the PJFT was successfully completed prior to entering Phase I training. Only candidates in the PJFT group performed the PJFT. The length of Phase I training extensions was also recorded. However, training could be prolonged for a number of reasons (e.g. illness, injury and poor military skills), not just poor physical performance.

Associations with the PJFT and training outcomes (i.e. pass, voluntarily release or discharge) were examined by chi-squared tests. All recruits during training performed a 2.4-km overground running test and were placed in quartiles according to performance. Associations between the quartiles of the two groups (PJFT versus no PJFT) were assessed using chi-squared tests. The Ministry of Defence (Navy) Personnel Research Ethics Committee granted ethical approval for this study.

Results

A total of 8123 (6592 males and 1531 females) RN recruits who attended Phase I training were included in the study. 4818 recruits entered training prior to the introduction of the PJFT (no PJFT group) and 3305 completed the PJFT (PJFT group).

The pass rate from RN Phase I training increased from 78% (no PJFT group) to 88% (PJFT group) ($P < 0.01$). Recruits in the PJFT group had lower ($P < 0.01$) voluntary release rates (6%) than the no PJFT group (15%). The discharge rates were similar in both groups (no PJFT 4% and PJFT 3%).

The total percentage pass rates (Table 1) from recruits in Quartile 4 (the slowest 2.4 km run time quartile) were lower than Quartiles 1–3. Comparable data on injuries and severity were not available to establish if the quartiles had similar injury profiles. However, the PJFT fourth quartile group did have a slightly improved 8-week pass rate ($P = 0.07$) compared to the no PJFT group. The largest increases in fourth quartile pass rates in the PJFT group were from female recruits. Following 8 weeks of Phase I training, 37% of female recruits in the no PJFT fourth quartile passed, whereas 58% of the fourth quartile PJFT females passed. The no PJFT group was associated with a longer average training extension ($P < 0.01$): the no PJFT group average extension was 5.7 ± 6.1 (mean ± SD) weeks; whereas the PJFT groups’ training was extended by 2.8 ± 3.3 weeks.

Discussion

The improved pass rates and reduced numbers applying for release in the PJFT group were associated with (i) a greater number of recruits in Quartile 4 successfully completing training and (ii) fewer recruits requiring extended instruction. Training extensions to RN Phase I training occur for many reasons including injury, illness as well as poor performances on physical fitness tests. This reduction in the number and length of extensions to training could not be isolated to one cause. Many previous studies have found that higher rates of injury were associated with poorer aerobic fitness [2–5,7,8]. The present study could not evaluate training injuries, but has found the number and length of training extensions were reduced following the introduction of the PJFT. Whether the improved pass rates were primarily due to the greater aerobic fitness, a reduction in injury or a combination could not be determined.

The PJFT was introduced to identify candidates with low aerobic fitness before entry into Phase I training, as this group had been shown to be less likely to successfully complete training [3]. Physical fitness and completion of training were positively associated; higher pass rates have been achieved by selecting out those less fit (slow 2.4 km run time) recruits during the pre-employment process. This study provides evidence that the PJFT is an effective intervention, improving military training pass rates particularly in the least fit female recruits.

The introduction of the PJFT has had a positive impact on RN Phase I training pass rates. This is as a consequence of an increased number of recruits successfully completing training in the required 8 weeks, a reduction in the number and length of training extensions and fewer recruits applying for voluntary release.

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Table 1. Frequencies and percentages of recruits from the no PJFT and PJFT groups that passed Phase I training in 8 weeks

<table>
<thead>
<tr>
<th>Quartiles</th>
<th>No PJFT</th>
<th>PJFT</th>
</tr>
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<tbody>
<tr>
<td>Frequency</td>
<td>%</td>
<td>n</td>
</tr>
<tr>
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<td>800</td>
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</tr>
<tr>
<td>Total</td>
<td>2736</td>
<td>3507</td>
</tr>
</tbody>
</table>

$n = $ the total number passing after extended training.
Conflicts of interest
None declared

References