within subsequent sessions; by saving clips after viewing, this web-based system supported the immediate compilation of participant generated playlists. It also enabled real-time searching of new topics or ideas introduced by group members. This 'search' and 'save as you go' method of playlist compilation benefited future sessions by ultimately reducing time required to plan.

It is clear that the use of modern web-based resource such as YouTube can allow for a more flexible patient-led interactive RT that can be tailored to an individual or group level. It would be interesting to consider if playlists generated by this means of RT may be of benefit in supporting a greater understanding of biographical and cultural narratives of the person with dementia. This is particularly salient in expatirate sub-groups due to the hetrogeneous background of the patients. Further investigation is required to evaluate this hypothesis. It would also be interesting to consider if there is a potential cost benefit to conducting this type of RT in comparison to other forms of RT in terms of materials and time.

In summary, what can be inferred from this preliminary data is that YouTube is a feasible means of conducting computerised based RT in which this small cohort of participants had an increased sense of wellbeing and mood and displayed greater communicative participation and engagement in the group. A larger controlled study, with blinded assessors is now required to further determine potential and associated benefits of this approach to RT.

Key points

- YouTube is a suitable tool for conducting internet based computerised RT.
- An internet based approach was found to have benefits for the delivery of group RT.
- Preliminary findings show personalised computerised RT had a positive impact on wellbeing, mood and communication.

Conflicts of interest

None declared.

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There is in elderly men a group difference between fallers and non-fallers in physical performance tests

SIR—Fall-related injuries are a common cause of morbidity and mortality [1, 2]. The number of falls increases with age [3–5] so that 59% of community-dwelling women and 33% of men over 85 fall at least once annually [6–9]. Falls account for 10% of visits to emergency departments [2], where one of the most common injuries is a fracture [10–12]. Muscle strength, balance and functional capacities are traits that have been suggested as predictive factors for falls [13], predominantly evaluated in women and high-risk cohorts [13]. This study therefore evaluated whether physical performance tests and estimates of physical activity could discriminate male fallers from non-fallers.

Methods

The Osteoporotic Fractures in Men (MrOS) Study is a multi-centre study including community-dwelling men aged above 65 years. The subjects had to walk without aid and be without bilateral hip replacements [14]. Ethnicity was defined by the participants. MrOS Hong Kong includes 2,000 Chinese men aged 65–92 with Asian ethnicity. Stratified sampling was adopted to have 33% of subjects in each age groups: 65–69, 70–74 and ≥75 years. MrOS United States includes 5,995 men aged 65–100 from six sites [15, 16]. A total of 5,441 men were Caucasians, 254 Black, 196 Asians, 127 Hispanic, 57 Native American and 15 Pacific Islanders/Hawaiians. MrOS Sweden includes 3,014 men aged 69–81 from three sites [17]. More than 99% were Caucasians. All participants provided written informed consent, and the study was approved by the ethics committee at each site (Malmo, Gothenburg, Uppsala, Hong Kong, Birmingham, Minneapolis, Palo Alto, Monongahela Valley, Portland and San Diego). Height and weight were measured by balance beam or digital scale and Harpenden stadiometer. Body mass index (kg/m^2) was calculated as weight divided by height squared. Falls during the preceding 12 months and daily activities were evaluated by a questionnaire, physical activity by the Physical Activity Scale for the Elderly (PASE) [18].

A Jamar® hydraulic hand dynamometer (5030J1), Jackson, MI, USA was used in the grip strength measurement. Two trials of each hand were performed. The better of the two results for each hand was used. The measurement was not performed if the subject had current arthritis or pain in the wrist or hand or had undergone fusion, arthroplasty, tendon repair, synovectomy or related surgery of the upper extremity in the 3 months preceding the measurements (n = 222). A straight-backed chair without arms, with a seat height of 45 cm, was used in the timed stands test. The time to complete five chairs stands (s) without using arms to rise was recorded. In the 6-m walk test and the 20-cm narrow walk test, a walking course was laid out on the floor. In the first test, the participants walked 6-m with their usual pace. The duration of the walk was measured as well as the number of steps. Steps were counted by counting both right and left steps and included the initial starting step and the step that first touched the floor across the finish line. Two-scored trials were performed and the better of the results was used. In the 20-cm narrow walk test, the participants walked the 6-m course within a 20-cm narrow path. Two-scored trials were performed and the performance was scored for time if there were no more than two deviations from the path. In US up to three tests were performed and two successful tests were demanded to be included. This design resulted in 1,049 missing narrow walk tests.

Data are presented as mean with 95% confidence interval (95% CI) or proportions (%). In country comparisons ages 69–81 years were included to achieve comparable country-specific data. Analyses of variance were used to test whether there were differences across the 5-year age groups. Adjustment for country was done by analyses of covariance, if there were country-specific differences. Chi-square test was used to test group differences in proportions between countries and between each 5-year groups with logistic regression. Z-scores were calculated in each individual, based on age, country and measuring site. Odds ratio (OR) was calculated by logistic regression to estimate fall risk in association with Z-score hand grip strength. Area under curve (AUC) was calculated from the receiver operating characteristic curve (ROC). $P < 0.01$ was regarded as a statistical significant difference.

Results

A total of 2,070 men in MrOS (18.8%) reported a fall during the year preceding the baseline investigation, whereas 8,928 (81.2%) reported no falls. The 1-year fall prevalence rate was highest in USA (21.2%), lower in Sweden (16.5%) and lowest in Hong Kong (15.4%) ($P < 0.001$).

Fallers in the age group 64–69 were taller and heavier (both $P < 0.01$) than non-fallers. Fallers scored in general an inferior result than non-fallers in the physical performance tests from age 70 and onwards, in ages from 85 and onwards reaching statistical significant inferior result only in hand grip strength ($P < 0.01$), Fallers did more daily sitting than non-fallers, reaching significance from 75 years and above ($P < 0.01$) (Table 1). Level of physical exercise was only different for light exercise in the age group 75–79 years ($P < 0.001$), similar as for habitual physical activity, see the table Appendix 1 in the Supplementary data available in *Age and Ageing* online.

Scoring below –2 SD in left hand grip strength test was associated with an OR of 2.0 (95% CI: 1.5–2.7) for having sustained a fall while scoring between +1 and +2 SD was associated with an OR of 0.9 (95% CI: 0.7–1.0) (Table 2). The ROC curves revealed that even if the physical performance tests discriminated fallers and non-fallers, the discriminative ability for a specific individual was low, with AUC ranging between 0.53 and 0.55 (95% CI ranging from 0.52 to 0.57 in the different tests, respectively).

The fallers versus non-fallers differences in age, height, weight or BMI were no different in the three countries. There were a group differences in most tests between fallers and non-fallers in the USA and Sweden (all $P < 0.001$) but not in Hong Kong, see the table Appendix 2 in the Supplementary data available in *Age and Ageing* online. The daily walking distance in Sweden was greater in non-fallers than in fallers ($P < 0.01$) and the daily duration of sitting in USA and Sweden was longer in fallers than in non-fallers (both $P < 0.01$) (Appendix 3; Supplementary

Table 1. Comparison between men with a fall and those with no falls including demographics, anthropometry, physical functional tests, walking, lying and sitting habits during the previous 12 months

	64–69 years	*P*-value	70–74 years	*P*-value	75–79 years	*P*-value	80–84 years	*P*-value	85+ years	*P*-value	Difference between age groups *P*-value*
Fallers (*n*)	402		628		641		298		101		
Non-fallers (*n*)	2,035		3,142		2,644		902		205		
Age (years)											
Fallers	67.2 (67.1, 67.4)	0.45	72.2 (72.0, 72.3)	0.23	77.1 (77.0, 77.2)	0.49	81.5 (81.4, 81.7)	0.02	87.5 (86.9, 88.0)	0.11	0.18
Non-fallers	67.2 (67.1, 67.2)		72.1 (72.0, 72.1)		77.0 (77.0, 77.1)		81.3 (81.2, 81.4)		87.0 (86.7, 87.3)		
Difference fallers/non-fallers	0.1 (−0.1, 0.2)		0.1 (−0.1, 0.2)		0.0 (−0.1, 0.2)		0.2 (0.0, 0.4)		0.5 (−0.1, −1.0)		
Height (cm)											
Fallers	173.7 (172.9, 174.5)	<0.001	173.1 (172.5, 173.8)	0.33	172.5 (171.9, 173.1)	0.35	170.9 (170.1, 171.7)	0.46	170.5 (168.9, 172.0)	0.08	0.04
Non-fallers	172.2 (171.8, 172.6)		172.8 (172.5, 173.1)		172.2 (171.9, 172.5)		171.3 (170.8, 171.7)		168.8 (167.8, 169.8)		
Difference fallers/non-fallers	1.5 (0.6, 2.4)		0.3 (−0.3, 1.0)		0.3 (−0.3, 1.0)		−0.4 (−1.3, 0.6)		1.7 (−0.2, 3.5)		
Weight (kg)											
Fallers	82.3 (80.7, 83.9)	0.006	81.3 (80.1, 82.5)	0.01	79.1 (78.0, 80.2)	0.01	76.2 (74.8, 77.6)	0.91	71.9 (69.9, 74.0)	0.99	0.34
Non-fallers	79.9 (79.2, 80.6)		79.6 (79.1, 80.1)		77.5 (77.0, 78.0)		76.1 (75.3, 77.0)		72.0 (70.2, 73.7)		
Difference fallers/non-fallers	2.5 (0.7, 4.2)		1.7 (0.5, 3.0)		1.6 (0.4, 2.7)		0.1 (−1.6, 1.7)		0.0 (−2.9, 2.9)		
Body mass index (kg/m^2)											
Fallers	27.1 (26.7, 27.6)	0.12	27.0 (26.7, 27.3)	0.01	26.5 (26.2, 26.8)	0.01	26.1 (25.6, 26.5)	0.46	24.7 (24.1, 25.3)	0.27	0.44
Non-fallers	26.7 (26.6, 27.0)		26.5 (26.4, 26.7)		26.1 (25.9, 26.2)		25.9 (25.6, 26.1)		25.2 (24.7, 25.7)		
Difference fallers/non-fallers	0.4 (−0.1, 0.8)		0.5 (0.1, 0.8)		0.4 (0.1, 0.7)		0.2 (−0.3, 0.7)		−0.4 (−1.3, 0.4)		
Right-handgrip strength (kg)**											
Fallers	41.1 (40.2, 42.0)	0.45	38.1 (37.4, 38.7)	<0.001	35.6 (34.9, 36.2)	<0.001	33.0 (32.0, 34.0)	0.006	28.9 (27.5, 30.3)	0.006	0.002
Non-fallers	40.7 (40.3, 41.1)		39.9 (39.5, 40.2)		37.3 (37.0, 37.6)		34.5 (34.0, 35.1)		31.3 (30.3, 32.3)		
Difference fallers/non-fallers	0.4 (−0.6, 1.4)		−1.8 (−2.5, −1.0)		−1.8 (−2.5, −1.0)		−1.6 (−2.6, −0.5)		−2.4 (−4.2, −0.6)		
Left-handgrip strength (kg)											
Fallers	39.1 (38.2, 40.0)	0.63	36.9 (36.2, 37.6)	<0.001	34.3 (33.6, 34.9)	<0.001	31.6 (30.7, 32.5)	0.01	27.7 (26.5, 28.9)	0.01	0.02
Non-fallers	38.9 (38.5, 39.3)		38.2 (37.9, 38.5)		35.9 (35.6, 36.2)		32.9 (32.4, 33.4)		29.7 (28.8, 30.7)		
Difference fallers/non-fallers	0.2 (−0.7, 1.2)		−1.3 (−2.0, −0.6)		−1.7 (−2.4, −0.9)		−1.3 (−2.3, −0.3)		−2.0 (−3.6, −0.4)		
Timed stands test (s)											
Fallers	11.0 (10.6, 11.4)	0.11	12.4 (12.1, 12.8)	0.007	13.0 (12.7, 13.4)	0.03	13.5 (12.9, 14.2)		13.8 (12.9, 14.8)	0.36	0.50
Non-fallers	10.6 (10.5, 10.8)		11.9 (11.8, 12.1)		12.6 (12.4, 12.8)		12.6 (12.3, 12.9)		13.3 (12.6, 14.0)		
Difference fallers/non-fallers	0.3 (0.0, 0.7)		0.5 (0.2, 0.8)		0.4 (0.1, 0.8)		0.9 (0.3, 1.5)	0.01	0.5 (−0.7, 1.7)		
Six meter walking test (s)											
Fallers	5.3 (5.1, 5.4)	0.23	5.6 (5.4, 5.7)	<0.001	5.8 (5.7, 6.0)	0.003	6.3 (6.0, 6.5)	<0.001	7.1 (6.7, 7.5)	0.05	0.12
Non-fallers	5.2 (5.1, 5.2)		5.3 (5.2, 5.3)		5.6 (5.5, 5.7)		5.8 (5.7, 5.9)		6.6 (6.3, 6.9)		
Difference fallers/non-fallers	0.1 (0.0, 0.2)		0.3 (0.2, 0.4)		0.3 (0.1, 0.4)		0.4 (0.2, 0.6)		0.5 (0.0, 1.0)		
Steps needed for 6-m walk (*n*)											
Fallers	9.5 (9.3, 9.6)	0.33	9.9 (9.7, 10.1)	<0.001	10.3 (10.1, 10.5)	<0.001	10.8 (10.6, 11.1)	0.001	12.2 (11.5, 12.8)	0.08	0.008
Non-fallers	9.4 (9.3, 9.4)		9.5 (9.4, 9.5)		9.8 (9.8, 9.9)		10.3 (10.2, 10.5)		11.5 (11.2, 11.9)		
Difference fallers/non-fallers	0.1 (−0.1, 0.2)		0.4 (0.3, 0.6)		0.4 (0.3, 0.6)		0.5 (0.2, 0.8)		0.7 (0.0, 1.3)		
Twenty centimetre narrow walk test (s)											
Fallers	5.8 (5.7, 6.0)	0.48	6.4 (6.1, 6.6)	<0.001	6.5 (6.3, 6.7)	0.006	7.2 (6.8, 7.5)	0.008	9.4 (6.9, 11.9)	0.32	<0.001
Non-fallers	5.9 (5.8, 6.0)		5.9 (5.8, 6.0)		6.2 (6.1, 6.3)		6.7 (6.5, 6.8)		8.2 (7.6, 8.7)		
Difference fallers/non-fallers	−0.1 (−0.3, 0.1)		0.5 (0.3, 0.7)		0.3 (0.1, 0.5)		0.5 (0.1, 0.9)		1.3 (−0.5, 3.0)		

Walk for exercise (km)											
Fallers	2.4 (2.1, 2.6)	0.93	2.9 (2.7, 3.1)	0.04	2.6 (2.4, 2.8)	0.02	2.4 (2.1, 2.7)	0.69	1.6 (1.2, 2.0)	0.22	0.63
Non-fallers	2.4 (2.3, 2.5)		3.1 (3.0, 3.3)		2.9 (2.8, 3.0)		2.4 (2.3, 2.6)		1.9 (1.6, 2.2)		
Difference fallers/non-fallers	0.0 (−0.3, 0.3)		−0.3 (−0.5, 0.0)		−0.3 (−0.5, 0.0)		−0.1 (−0.4, 0.3)		−0.3 (−0.8, 0.2)		
Walk as daily routine (km)											
Fallers	2.4 (2.1, 2.6)	0.93	2.9 (2.7, 3.1)	0.04	2.6 (2.4, 2.8)	0.02	2.4 (2.1, 2.7)	0.69	1.6 (1.2, 2.0)	0.21	0.80
Non-fallers	2.4 (2.3, 2.5)		3.1 (3.0, 3.3)		2.9 (2.8, 3.0)		2.4 (2.3, 2.6)		1.9 (1.6, 2.2)		
Difference fallers/non-fallers	0.1 (−0.3, 0.3)		−0.3 (−0.5, 0.0)		−0.3 (−0.5, 0.0)		−0.1 (−0.4, 0.3)		−0.3 (−0.8, 0.2)		
Daily lying (h)											
Fallers	8.1 (8.0, 8.3)	0.42	8.2 (8.1, 8.4)	0.07	8.2 (8.1, 8.4)	0.73	8.5 (8.3, 8.7)	0.20	8.9 (8.5, 9.2)	0.31	0.41
Non-fallers	8.1 (8.0, 8.1)		8.1 (8.1, 8.2)		8.3 (8.2, 8.3)		8.3 (8.2, 8.5)		8.6 (8.4, 8.9)		
Difference fallers/non-fallers	0.0 (−0.1, 0.2)		0.1 (0.0, 0.3)		0.0 (−0.2, 0.1)		0.2 (−0.1, 0.4)		0.2 (−0.2, 0.6)		
Daily sitting (h)											
Fallers	6.5 (6.2, 6.8)	0.26	6.3 (6.0, 6.5)	0.02	6.5 (6.2, 6.7)	0.006	6.8 (6.4, 7.1)	0.009	7.0 (6.4, 7.5)	0.01	0.29
Non-fallers	6.3 (6.1, 6.4)		6.0 (5.9, 6.1)		6.1 (6.0, 6.2)		6.2 (6.1, 6.4)		6.1 (5.7, 6.4)		
Difference fallers/non-fallers	0.2 (−0.1, 0.5)		0.3 (0.1, 0.5)		0.3 (0.1, 0.6)		0.5 (0.2, 0.9)		0.9 (0.2, 1.6)		

Data are presented as mean (95% CI) and mean difference (95% CI) with *P*-values for the difference for each age group, except where otherwise stated.
*ANOVA test for differences between fallers and no fallers across the age groups.
**Significant difference was found between countries for grip strength, so data are adjusted for country.

data are available in *Age and Ageing* online) while there were no differences in physical training or habitual physical activity, see the table Appendix 3 in the Supplementary data available in *Age and Ageing* online.

Discussion

This study supports that there is a group difference when comparing tests of physical ability in fallers and non-fallers in ages from 70 years and above (Table 1). Given the known problems with accuracy of recall of falls in the past, it is likely that the numbers of falls recorded is if anything was underestimated. It is also possible that the lower performance rate may be the result of a previous fall. But the outcome of this study could probably be generalised based on the sampling procedure, the sample size, even if the racial mix in the USA does not match the apparent nominal mix as described by the US Census Bureau, reporting an overall proportion for 2009 for black persons of 12.9%, and the fact that the trial supports publications of a annual fall incidence of 22–29% in elderly men [18–22], The slightly lower fall prevalence reported in MrOs could depend on differences in ethnic proportions and ages compared with cited studies. MrOs also included men who voluntarily agreed to participate in extensive measurements maybe excluding the frailest. The high attendance rate in MrOs [17] may also better reflect the proportion of fallers than studies with lower attendance rate [18–22] and a 12-month recall period may better reflect the fall prevalence than longer recall periods. Also, a retrospective design as in this and other studies [20] may lead to different inferences compared with prospective studies [18, 19, 21, 22].

The fallers aged 70 or above performed inferior in the performance tests than non-fallers, in ages above 85 only in grip strength tests. The same pattern is seen separately in the USA and Sweden but not in Hong Kong (Appendices 2 and 3 are available as Supplementary data in *Age and Ageing* online). The association of gradually higher fall prevalence with a lower grip strength test (Table 2) strengthens the view that there is an association between the test and fall risk. However, the ROC analyses indicate that we could not discriminate the different tests from each other. The calculations and the form of the curves also indicate that there is no clear cut-off point so that the test could in a large extent result in both false positive results, leading to a significant degree waste of fall prevention resources, but also false negative results, leading to significant morbidity following falls in subjects who were not believed to be at risk. That is, the tests should predominantly be used in epidemiological studies to identify groups with high fall prevalence but decisions about fall prevention for an individual based on the tests must be questioned.

In conclusion, this study indicates that there in the USA and Sweden are group differences in physical performance

Table 2. Odds ratios (OR) by a change in hand grip strength by one *Z*-score, calculated within each country based on age and measuring site

Z-scores	>+2	+2 to +1	+1 to −1 (reference group)	−1 to −2	−<2
MrOs International					
Right-hand grip strength	0.72 (0.50, 1.05)	0.84 (0.72, 0.98)	1.0	1.27 (1.10, 1.46)	1.65 (1.25, 2.18)
Left-hand grip strength	1.04 (0.76, 1.43)	0.86 (0.73, 1.00)	1.0	1.36 (1.19, 1.57)	2.02 (1.54, 2.66)
MrOs Hong Kong					
Right-hand grip strength	1.11 (0.38, 3.28)	1.00 (0.67, 1.50)	1.0	1.09 (0.73, 1.63)	0.89 (0.31, 2.58)
Left-hand grip strength	1.62 (0.69, 3.81)	0.91 (0.58, 1.42)	1.0	0.92 (0.61, 1.40)	2.09 (0.80, 5.38)
MrOs United States					
Right-hand grip strength	0.75 (0.48, 1.16)	0.84 (0.69, 1.02)	1.0	1.15 (0.96, 1.38)	1.42 (0.99, 2.02)
Left-hand grip strength	1.02 (0.69, 1.52)	0.79 (0.65, 0.97)	1.0	1.34 (1.12, 1.59)	1.79 (1.26, 2.55)
MrOs Sweden					
Right-hand grip strength	0.48 (0.21, 1.11)	0.68 (0.47, 0.94)	1.0	1.58 (1.20, 2.06)	2.50 (1.50, 4.15)
Left-hand grip strength	0.77 (0.38, 1.57)	0.90 (0.65, 1.24)	1.0	1.59 (1.21, 2.09)	2.40 (1.46, 3.92)

For MrOS International ages 64–100 years were included and for the country-specific evaluation ages 69–80 years as to achieve comparable cohorts. Data presented as OR with 95% confidence interval (95% CI) within brackets.

tests when comparing fallers and non-fallers in individuals aged 70 or above, above 85 only in grip strength tests.

Key points

- The prevalence of fallers differed across countries.
- There is a group difference in physical performance tests when comparing fallers and non-fallers in the USA and Sweden but not in Hong Kong.
- Differences in physical function across countries did not explain the international variation in fall prevalence.

Conflicts of interest

None declared.

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Supplementary data

Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.

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Socio-economic position predicts grip strength and its decline between 79 and 87 years: the Lothian Birth Cohort 1921

SIR—Grip strength is a useful measure of health in older adults, predicting both disability [1, 2] and mortality [1, 3]. In adulthood grip strength declines with age, though reaches a plateau in women in their tenth decade [4]. In a recent systematic review and meta-analysis, we reported that childhood socio-economic position (SEP) predicted physical capability in adulthood; comparing the lowest with the highest childhood SEP there was a reduction in grip strength of 0.13 standard deviations (95% CI: 0.06–0.21) [5]. Adjustment for the potential mediating factors, adult SEP and body size, attenuated this association so that it was no longer statistically significant. However, to facilitate the meta-analysis only paternal occupation was used as the index of childhood SEP for studies where more than one indicator was available. The Lothian Birth Cohort 1921 (LBC1921) was one study included in the meta-analysis, and there are several measures of childhood SEP available which were not used in the meta-analysis [5]. In addition, LBC1921 participants provided longitudinal data on grip strength measured on three occasions, at mean ages 79, 83 and 87 years. These assessments cover a period of life when the relationship of muscle strength to disability and mortality is particularly important. Drawing on these data, we sought to test whether paternal and maternal indices of childhood SEP improve the prediction grip strength and change in grip strength in old age beyond well-recognised adult predictors.