CONSORT-EHEALTH Checklist V1.6.2 Report	Manuscript Number	28355
(based on CONSORT-EHEALTH V1.6), available at [http://tinyurl.com/consort-ehealth-v1-6].		
Date completed		
3/9/2021 2:37:30		
by		
Yukio Suzuki		
Effect of a Brief Web-Based Educational Intervention on Willingness to Receive the Human Papillomavirus Vaccine in Japan: A Randomized, Controlled Trial		
TITLE		
1a-i) Identify the mode of delivery in the title		
Effect of a Brief "Web-Based" Educational Intervention on Willingness to Receive the Human Papillomavirus Vaccine in Japan: A Randomized, Controlled Trial		
1a-ii) Non-web-based components or important co-interventions in title		
1a-iii) Primary condition or target group in the title		
The target was not specific disease.		
ABSTRACT		
1b-i) Key features/functionalities/components of the intervention and comparator in the METHODS section of the ABSTRACT		
a brief educational intervention using scientific information presented in an easy-to-read format		
1b-ii) Level of human involvement in the METHODS section of the ABSTRACT		
We recruited 1,660 participants aged 20 years and older in March 2018 via a webpage and provided them "fully automated" with a 10-item questionnaire related to the following aspects: awareness regarding HPV infection and vaccine, willingness for immunization, and actions for prevention.		
1b-iii) Open vs. closed, web-based (self-assessment) vs. face-to-face assessments in the METHODS section of the ABSTRACT		
We recruited 1,660 participants aged 20 years and older in March 2018 via a webpage and provided them fully automated		
1b-iv) RESULTS section in abstract must contain use data		
We recruited 1,660 participants. Although only 21.2% of the respondents displayed a willingness toward immunization for their daughters, an additional 4.8% of the respondents in the intervention group reported affirmatively (adjusted odds ratio [aOR]=1.32, 95% CI 1.04-1.69).		
1b-v) CONCLUSIONS/DISCUSSION in abstract for negative trials		
INTRODUCTION		
2a-i) Problem and the type of system/solution		
This study aimed to assess the effects of these behavioral insights utilizing fundamental scientific information on vaccine benefits, along with statistics on cervical cancer.		
2a-ii) Scientific background, rationale: What is known about the (type of) system		
Intervention used in this study is not a system but just a easy-to-read format.		
Does your paper address CONSORT subitem 2b?		
`Vaccine awareness programs are necessary and campaigns through the media and social network services can play significant roles. In an information-overloaded society, people frequently take decisions related to health issues based on limited information. Therefore, it is critical to consider the influence of behavioral insights to promote change [12]. This broadly refers to concrete approaches based on the knowledge of behavioral science and economics. The Easy, Attractive, Social and Timely (EAST) principles are a simple way of applying behavioral insights to interventions and have been used to change human awareness and behavior [12]. This study aimed to assess the effects of these behavioral insights utilizing fundamental scientific information on vaccine benefits, along with statistics on cervical cancer.`		
METHODS		
3a) CONSORT: Description of trial design (such as parallel, factorial) including allocation ratio		
We randomly assigned each participant to respond to an identical questionnaire after (Intervention group) or prior to (Control group) providing behavioral insights material (BI-material) using fundamental scientific information presented in an easy-to-read format (as displayed in Figures 1 and 2). Participants were randomly allocated (1:1) to each group. Intervention was performed using an automatic web-based allocation system stratified with sex (female/women, male/men) and age (20s, 30s, 40s, 50s, and 60s) of the participants. Randomization was performed by Macromill, Inc web-research system.		
3b) CONSORT: Important changes to methods after trial commencement (such as eligibility criteria), with reasons		
No change.		
3b-i) Bug fixes, Downtimes, Content Changes		
4a) CONSORT: Eligibility criteria for participants		
These were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan). The participants were 20 years old or above as on March 12th-13th, 2018.		
4a-i) Computer / Internet literacy		
4a-ii) Open vs. closed, web-based vs. face-to-face assessments:		
We recruited a total of 1,660 participants in March 2018 via a specially designed webpage for this study. These were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan). Our study was obviously closed.		
4a-iii) Information giving during recruitment		
Participants were randomly allocated (1:1) to each group after providing their consent.		
4b) CONSORT: Settings and locations where the data were collected		
We recruited a total of 1,660 participants in March 2018 via a specially designed webpage for this study. These were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan).		
4b-i) Report if outcomes were (self-)assessed through online questionnaires		
Our study is performed as web-based trial.		
4b-ii) Report how institutional affiliations are displayed		
5) CONSORT: Describe the interventions for each group with sufficient details to allow replication, including how and when they were actually administered		
5-i) Mention names, credential, affiliations of the developers, sponsors, and owners		
These were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan).		
5-ii) Describe the history/development process		
I described the process in the discussion session about behavioral insights. "Informational materials are designed primarily to increase effectiveness; they are based on a specific purpose rather than a template."		
5-iii) Revisions and updating		
This intervention material is the first edition.		
5-iv) Quality assurance methods		
Our intervention material is designed primarily to increase effectiveness; they are based on a specific purpose rather than a template. The intervention method (BI-material) was designed by us, resulting in a moderate cost; therefore, this intervention is more reliable and cost-effective than those used in previous studies. The first author of this article (YS) is a core member of the behavioral design team in Yokohama, which was established as the first non-governmental nudge unit in Japan. Thus, this BI-material is reliable in view of the BI methodology.		
5-v) Ensure replicability by publishing the source code, and/or providing screenshots/screen-capture video, and/or providing flowcharts of the algorithms used		
We displayed the source and flowchart in the manuscript.		
5-vi) Digital preservation		
This material is freely used as a material for the education in our department. However we have not provided yet in free access website.		
5-vii) Access		
Participants were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan).		
5-viii) Mode of delivery, features/functionalities/components of the intervention and comparator, and the theoretical framework		

Participants were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan). If this manuscript would be published, we will provide this material through our department website and through SNS.		
5-ix) Describe use parameters		
Not applicable for our study.		
5-x) Clarify the level of human involvement		
This material was provided through web-site. There were no human involvement.		
5-xi) Report any prompts/reminders used		
Not applicable for our study.		
5-xii) Describe any co-interventions (incl. training/support)		
Not applicable for our study. In the intervention group, we provided the BI-material prior to answering questions related to preventive awareness, following consent for the online study. The control group was provided with the same material as that provided to the intervention group after all responses were completed. There are little possibility existing any co-interventions.		
6a) CONSORT: Completely defined pre-specified primary and secondary outcome measures, including how and when they were assessed		
The primary outcome is the rate of willingness on the HPV vaccine for their daughters. The secondary outcome is the sub-analysis of sexes.		
6a-i) Online questionnaires: describe if they were validated for online use and apply CHERRIES items to describe how the questionnaires were designed/deployed		
Not applicable for our study.		
6a-ii) Describe whether and how "use" (including intensity of use/dosage) was defined/measured/monitored		
Not applicable for our study.		
6a-iii) Describe whether, how, and when qualitative feedback from participants was obtained		
Not applicable for our study.		
6b) CONSORT: Any changes to trial outcomes after the trial commenced, with reasons		
We recruited a total of 1,660 participants in March 2018 via a specially designed webpage for this study. These were registered members of the research panel owned by Macromill, Inc. (Tokyo, Japan).		
7a) CONSORT: How sample size was determined		
7a-i) Describe whether and how expected attrition was taken into account when calculating the sample size		
The sample size was calculated as powered 80% to detect a 10% effect in the intervention group (increased from 40% in the control to 50% in the intervention group) with a two-sided p value of 0.05. P values less than 0.05 were regarded as significant. The hypothetical baseline willingness rate in the control group was determined based on our previous study. The sample size was calculated as 776 when the effect of intervention estimated a 10% increase. The number of participants recruited was double of the calculated sample size because of the difficulty of estimating the baseline willingness and the intervention effect.		
7b) CONSORT: When applicable, explanation of any interim analyses and stopping guidelines		
The primary outcome is the rate of willingness on the HPV vaccine for their daughters. The secondary outcome is the sub-analysis of sexes.		
8a) CONSORT: Method used to generate the random allocation sequence		
Participants were randomly allocated (1:1) to each group after providing their consent. Intervention was performed using an automatic web-based allocation system stratified with sex (female/women, male/men) and age (20s, 30s, 40s, 50s, and 60s) of the participants. Randomization was performed by Macromill, Inc web-research system. Participants and investigators were blinded to the distribution (double-blinded). Once the upper limit of each stratum was reached, new participants could not be added to the web system. This ensured uniform distribution of the stratification factors. In the intervention group, we provided the BI-material prior to answering questions related to preventive awareness, following consent for the online study. The control group was provided with the same material as that provided to the intervention group after all responses were completed.		
8b) CONSORT: Type of randomisation; details of any restriction (such as blocking and block size)		
Participants were randomly allocated (1:1) to each group after providing their consent. Intervention was performed using an automatic web-based allocation system stratified with sex (female/women, male/men) and age (20s, 30s, 40s, 50s, and 60s) of the participants. Randomization was performed by Macromill, Inc web-research system. Participants and investigators were blinded to the distribution (double-blinded). Once the upper limit of each stratum was reached, new participants could not be added to the web system. This ensured uniform distribution of the stratification factors. In the intervention group, we provided the BI-material prior to answering questions related to preventive awareness, following consent for the online study. The control group was provided with the same material as that provided to the intervention group after all responses were completed.		
9) CONSORT: Mechanism used to implement the random allocation sequence (such as sequentially numbered containers), describing any steps taken to conceal the sequence until interventions were assigned		
Not applicable for our study.		
10) CONSORT: Who generated the random allocation sequence, who enrolled participants, and who assigned participants to interventions		
Randomization was performed by Macromill, Inc web-research system.		
11a) CONSORT: Blinding - If done, who was blinded after assignment to interventions (for example, participants, care providers, those assessing outcomes) and how		
11a-i) Specify who was blinded, and who wasn't		
Participants and investigators were blinded to the distribution (double-blinded).		
11a-ii) Discuss e.g., whether participants knew which intervention was the "intervention of interest" and which one was the "comparator"		
Not applicable for our study.		
11b) CONSORT: If relevant, description of the similarity of interventions		
Not applicable for our study.		
12a) CONSORT: Statistical methods used to compare groups for primary and secondary outcomes		
Statistical evaluation comprised the student's t-test, the chi-square ($\chi 2$) test, and multiple regression analyses.		
12a-i) Imputation techniques to deal with attrition / missing values		
Not applicable for our study. There were no missing values.		
12b) CONSORT: Methods for additional analyses, such as subgroup analyses and adjusted analyses		
Same as the primary outcome analysis.		
RESULTS		
13a) CONSORT: For each group, the numbers of participants who were randomly assigned, received intended treatment, and were analysed for the primary outcome		
Not applicable for our study. All participants receive intended treatment.		
13b) CONSORT: For each group, losses and exclusions after randomisation, together with reasons		
Not applicable for our study.		
13b-i) Attrition diagram		
Not applicable for our study.		
14a) CONSORT: Dates defining the periods of recruitment and follow-up		
From March 12th to 13th 2018, 1,660 participants were recruited. We have no follow-up period.		
14a-i) Indicate if critical "secular events" fell into the study period		
Not applicable for our study.		
14b) CONSORT: Why the trial ended or was stopped (early)		
Not applicable for our study.		
15) CONSORT: A table showing baseline demographic and clinical characteristics for each group		
The following variables displayed no significant differences between the two groups: marital status (P=.96), children (P=.84), household income (P=.58), sexual experience (P=.26), education (P=.44), medical background (P=.50), and tobacco use (P=.64) (Table 1).		
15-i) Report demographics associated with digital divide issues		
Not applicable for our study.		
16a) CONSORT: For each group, number of participants (denominator) included in each analysis and whether the analysis was by original assigned groups		
16-i) Report multiple "denominators" and provide definitions		
Not applicable for our study. All participants answered questionnaire and received intervention as allocated.		
16-ii) Primary analysis should be intent-to-treat		
Not applicable for our study. All participants answered questionnaire and received intervention as allocated.		
17a) CONSORT: For each primary and secondary outcome, results for each group, and the estimated effect size and its precision (such as 95% confidence interval)		

Only 21.2% of the respondents displayed a favorable attitude toward HPV immunization for their daughters (Q6). However, an additional 40 (4.8%) participants responded affirmatively in the intervention group (aOR=1.32, 95% CI=1.04-1.69) compared to those in the control group (Table 2). For Q7, there were additional 33 (3.9%) satisfied respondents willing for their sons' vaccination in the intervention group (aOR=1.38, 95% CI=1.05-1.80) compared to those in the control group (Table 2).		
17a-i) Presentation of process outcomes such as metrics of use and intensity of use		
Not applicable for our study.		
17b) CONSORT: For binary outcomes, presentation of both absolute and relative effect sizes is recommended		
Only 21.2% of the respondents displayed a favorable attitude toward HPV immunization for their daughters (Q6). However, an additional 40 (4.8%) participants responded affirmatively in the intervention group (aOR=1.32, 95% CI=1.04-1.69) compared to those in the control group (Table 2). For Q7, there were additional 33 (3.9%) satisfied respondents willing for their sons' vaccination in the intervention group (aOR=1.38, 95% CI=1.05-1.80) compared to those in the control group (Table 2).		
18) CONSORT: Results of any other analyses performed, including subgroup analyses and adjusted analyses, distinguishing pre-specified from exploratory		
Differences were identified in Q6 (Men; aOR=1.46, 95% CI=1.05-2.02 vs Women; aOR=1.20, 95% CI=0.83-1.73) and Q7 (Men; aOR=1.53, 95% CI=1.08-2.18 vs Women; aOR=1.21, 95% CI=0.80-1.83). The awareness in men showed a significant positive change (by 8.2%, P=0.02, Supplement 1) upon intervention by fundamental scientific information; however, this was not observed in women (P=0.22, Table 3, Supplement 2). There were no additional analysis other than planned analysis.		
18-i) Subgroup analysis of comparing only users		
Not applicable for our study.		
19) CONSORT: All important harms or unintended effects in each group		
Not applicable for our study.		
19-i) Include privacy breaches, technical problems		
Not applicable for our study.		
19-ii) Include qualitative feedback from participants or observations from staff/researchers		
Not applicable for our study.		
DISCUSSION		
20) CONSORT: Trial limitations, addressing sources of potential bias, imprecision, multiplicity of analyses		
20-i) Typical limitations in ehealth trials		
Third, selection bias existed as the respondents were Japanese enrolled by an internet survey company.		
21) CONSORT: Generalisability (external validity, applicability) of the trial findings		
21-i) Generalizability to other populations		
Our study reveals a positive outlook towards the HPV vaccination following brief, web-based educational intervention, especially among male participants. Such an approach is extremely effective to overcome challenges related to communication and information overload.		
21-ii) Discuss if there were elements in the RCT that would be different in a routine application setting		
Not applicable for our study.		
22) CONSORT: Interpretation consistent with results, balancing benefits and harms, and considering other relevant evidence		
22-i) Restate study questions and summarize the answers suggested by the data, starting with primary outcomes and process outcomes (use)		
We conducted a web-based randomized controlled trial (RCT) to assess the benefits of BI-material employing fundamental scientific information and motivate individuals to take the HPV vaccine. Our results showed that providing brief scientific information could increase the positive awareness of HPV vaccination. This effect was observed typically among male participants. Similar minor interventions may potentially modify mindsets favorably. However, such brief digital information failed to affect the mindset in women. In terms of the coronavirus disease (COVID-19) pandemic, a difference in awareness of prevention strategies was observed between the sexes; therefore, it is essential to build a method appropriate for sex subgroups to transform general behavior via the internet and social networking service (SNS).		
22-ii) Highlight unanswered new questions, suggest future research		
We recognize several limitations in this study. First, the sustainability of effective change was not evaluated. Typically, with respect to health issues, taking action requires time. Therefore, a study should assess not only a change in mindset but also the appropriate course of action. We have already performed a RCT (UMIN000039273) assessing the sustainability of general acceptance and concrete behavior for HPV vaccination.		
Other information		
23) CONSORT: Registration number and name of trial registry		
UMIN000049745 URL; https://www.umin.ac.jp/english/		
24) CONSORT: Where the full trial protocol can be accessed, if available		
Not applicable for our study.		
25) CONSORT: Sources of funding and other support (such as supply of drugs), role of funders		
We received research funding from the Japan Agency for Medical Research and Development (grant no. 15ck0106103h0102).		
X26-i) Comment on ethics committee approval		
The study protocol was approved by the Institutional Research Ethics Committee of Yokohama City University School of Medicine (A180200004). The trial registration number is UMIN000049745.		
x26-ii) Outline informed consent procedures		
In the intervention group, we provided the BI-material prior to answering questions related to preventive awareness, following consent for the online study. The control group was provided with the same material as that provided to the intervention group after all responses were completed.		
X26-iii) Safety and security procedures		
Not applicable for our study.		
X27-i) State the relation of the study team towards the system being evaluated		
We have no COI between study team and the survey company.		