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Development of Knowledge, Attitude, and Practices Questionnaire for Computer Workstation Ergonomic Behaviors among Senior High School and College Teachers in a Private University in the Philippines

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Abstract *– The shift to a work-from-home set-up placed professionals, particularly those in the education sector, at risk for developing musculoskeletal disorders (MSKD). Targeting teachers' knowledge, attitude, and practices (KAP) concerning computer workstation ergonomic behaviors (CWEB) is a way to reduce the risk. Still, there is currently a shortage of information about this strategy. The researchers conducted a pilot study to develop a KAP questionnaire to provide information about the risk factors for developing MSKD and KAP related to CWEB. The first draft was generated via literature review and was revised by six (6) experts through content validation. Thirty (30) teachers from the senior high school department and colleges of Lyceum of the Philippines University – Batangas answered the revised questionnaire. Five teachers and five experts performed face validation. Discriminant validity was analyzed using Pearson correlation. Internal consistency was analyzed using Cronbach's alpha for attitude and Kuder-Richardson 20 formula (KR20) for knowledge and practices. Test-retest reliability was assessed using the intraclass correlation coefficient. Results from the validation process demonstrated adequate content, face, and construct validity. KR-20 values of knowledge (0.70) and practices (0.72), as well as Cronbach's alpha coefficient of attitude (0.94) section, indicated acceptable tool reliability. The second draft of the questionnaire showed adequate psychometric properties in assessing KAP related to CWEB when used as a self-report tool. The questionnaire was further revised based on the appreciation of the results for improvement. Overall, this pilot study produced a valid and reliable tool with the potential for large-scale testing and implementation. This tool can facilitate future research exploring the risk factors and ergonomic behaviors of teachers, which can then be used as a guide in planning and designing interventions to lessen the risk of developing MSKD.*

Keywords – education sector, musculoskeletal pain, occupational risks, teleworking, work-from-home

INTRODUCTION

The traditional workspaces in the Philippines have improved in meeting the ergonomic needs of all employees since the 1990 report in the Global Burden of Diseases report of the Institute for Health Metrics and Evaluation. A year before the pandemic, 3% of the total Disability-adjusted life years (DALYs) due to low back pain (LBP) was reported in the Philippines, higher than 1.95% reported in 1990. Despite this increase, occupational ergonomic factors' contribution to developing LBP has decreased from 30.65% in 1990 to 25.18% in 2019 [1]. While there is a decrease in the contribution of ergonomic factors in the development of musculoskeletal diseases like LBP across all ages, this minimal change can be attributed to the lack of more specific studies that investigate the ergonomic factors and behaviors of professionals in addressing ergonomic factors related to their work. Working adults are known to be susceptible to work-related musculoskeletal disorders (WRMSD) related to ergonomic factors [2], [3], which necessitates the identification of issues related to professionals' and employers' adherence on ergonomic standards. Addressing the ergonomic issues among workers reduces risk to their health and promotes their

productivity, consistent with the sustainable development goals promoted by the Philippine's National Economic and Development Authority and the United Nations Development Programme [4], [5], [6], [7].

Ergonomic behavior is defined in this study as the knowledge, attitude, and practices (KAP) of individuals when it comes to ergonomic considerations in modifying the working environment and job demands, following the definition of behavior in the KAP model and ergonomics [3], [8]-[11]. Figure 1 demonstrates the relationship between the KAP components and ergonomic behavior. Aside from modifying environmental factors, employees' knowledge and ability to practice evidence-based ergonomic strategies are essential in driving ergonomic behaviors. Moreover, we can infer that workers may be driven to change toward ergonomic behaviors considering cognitive processes that assess the potential benefits of adherence to evidence-based ergonomic strategies in reducing the threat of having WRMSDs, using the Protection Motivation Theory [12], [13].

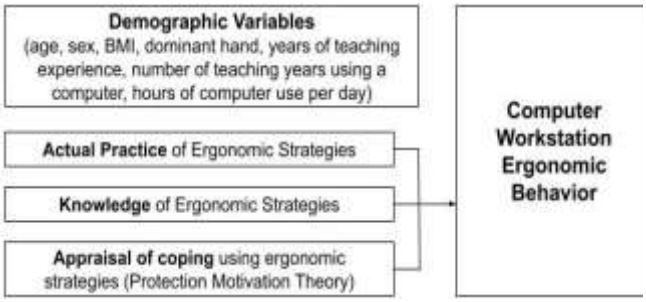

Fig. 1. Framework for Ergonomic Behavior used in this study

Focusing on the workers' ergonomic behaviors is one of the key solutions in reducing the number and severity of WRMSDs [3], [10], [11], such as pain. KAP surveys provide pragmatic means to understand a target population's ergonomic behavior, mainly when no rigorous studies have been performed before it [9]. Combining the frameworks of KAP and Protection Motivation Theory (PMT) allows for a cost-effective solution for the surveillance of workers' musculoskeletal health; however, studies have yet to be undertaken regarding this opportunity.

The education sector is one of the primary industry groups in the Philippines, having employed 986 thousand of teachers in the year 2017 [14]. Teachers have been using computers to accomplish their day-to-day academic tasks, regardless of their student's level of education.

Computers have enabled teachers to develop and perform their instruction, and even perform administrative tasks, within the school premises and at home. The COVID-19 pandemic in 2020 further increased the interaction of teachers with computers aside from complicating their work arrangement, as the education sector migrated to online learning in compliance with the existing government policies [15]-[17]. Many public-school teachers implemented online activities next to printed modules [18]. All teachers have to convert their home rooms into makeshift, placing them at risk for developing MSKD.

Targeting the KAP of teachers concerning computer workstation ergonomic behaviors (CWEB) is a way to reduce the risk, but there currently needs to be more information about this strategy. In response to this need, developing a tool that will assess the risk factors and KAP related to CWEB would be significant to facilitate future researchers in exploring variables that could contribute to the development of MSKD in teachers. In addition, the tool may also be used as a risk assessment and evaluation tool that would guide policymakers and universities in planning and designing interventions related to CWEB of teachers. Lastly, addressing the ergonomic issues that would be identified from using the tool would be beneficial to the teachers, as they will be allowed to lessen their risk of developing MSKD in their workplace.

OBJECTIVE OF THE STUDY

This study was designed to develop a valid and reliable self-report tool that will assess the KAP on computer workstation ergonomic behaviors of senior high school and college teachers in a private university in the Philippines. Specifically, it aims to develop a KAP questionnaire on CWEB; validate the items in the questionnaire, and evaluate the reliability of the developed tool.

MATERIALS AND METHODS

Research design

The development of the KAP questionnaire for ergonomic behaviors in the computer workstation (KAPQ-CWEB) used a literature review. A cross-

sectional design was used to test its psychometric properties.

Respondents of the Study

After developing the draft of the KAP questionnaire through a literature review, the researchers recruited experts who are teaching or serving in fields requiring ergonomics such as occupational health, workplace safety, and industrial rehabilitation, or published articles related to ergonomics via e-mail to conduct content and face validation [19].

The researchers recruited senior high school and college teachers currently employed at Lyceum of the Philippines University-Batangas (LPU-B) using purposive sampling for test-retest reliability, internal consistency, and construct validity. The researchers set the minimum number of pilot testing respondents to thirty (30), based on the minimum recommendation of Browne [20]. Online respondents were screened using Google® Forms, which were disseminated with the help of their principal, deans, and secretaries. Respondents using the paper forms were screened using a separate sheet of paper. Respondents were allowed to proceed through the questionnaire if they worked from home or at least experienced working from home during the pandemic, had online access, and used laptops or desktop computers. However, teachers with other responsibilities not in line with their current job, those with administrative duties in their institution, and those with existing musculoskeletal (MSK) disorders before being in a WFH set-up were not allowed to answer the questionnaire. Among these respondents, one (1) rater from the senior high school department, and one (1) rater from each of the participating colleges of LPU-B were selected to join the experts in face validation [21]. The selection is either by random selection if there is more than one respondent in that department or by automatic assignment if there is one respondent.

Development of KAPQ-CWEB

The method for developing KAPQ-CWEB is similar to previous studies [22]-[24]. The entire process is divided into three (3) stages: Literature review and item generation, Content validation, and Pilot testing.

Literature review and item generation

PubMed and ScienceDirect databases were used to search for studies about the knowledge, attitudes, and practice of teachers and similar occupations using computers at work related to ergonomic guidelines for computer workstations and demographic variables contributing to musculoskeletal conditions (i.e., age and body mass index). The researchers used several search strategies using the keywords "guidelines"; "computer" OR "laptop"; "ergonomics"; "teacher" OR "professor" OR "faculty" OR "academe" OR "school" OR "university" OR "office"; "work-related musculoskeletal" OR "musculoskeletal"; "knowledge" OR "perception" OR "education" OR "awareness"; "attitude" OR "perspective" OR "view" OR "belief"; and "practices" OR "application" to search for research articles. Articles were limited to exploratory studies and systematic reviews that included studies published within the last ten (10) years and in English. Duplicate articles, those that do not have an abstract, and those that are not related to the topics of the search were removed from the list.

Cohort studies and systematic reviews were then evaluated using the specific Critical Appraisal Skills Programme (CASP) checklist. At the same time, cross-sectional studies were appraised using Joanna Briggs Institute (JBI) Critical Appraisal tool. Information about risk factors for the development of musculoskeletal conditions and ergonomic guidelines for computer workstations for the prevention of musculoskeletal disorders were only collected from studies that were evaluated as "low risk."

Risk factors for developing work-related musculoskeletal disorders were all placed in the first section of the questionnaire, labeled "Demographic Variables ."All ergonomic recommendations supported by at least one of the studies selected in the review were included in the first draft of the questionnaire. Body mass index value groups were adjusted based on World Health Organization recommendations [25], [26]. KAP questions were constructed from each of these ergonomic recommendations. Multiple-choice questions were constructed to test recall and understanding. These questions were then assigned to the second section of the questionnaire labeled "Knowledge"; Likert scale-type questions to verify their appraisal of the benefits of ergonomic guidelines in reducing the risk of developing WRMSD consistently, otherwise known as "coping appraisal" in PMT. These were placed into the third section of the questionnaire labeled "Attitudes"; Multiple-choice and Yes-or-No questions to know if the respondents' activities in

their computer workstation were consistent with the ergonomic guidelines. These were set in the last questionnaire section labeled "Practice". An online version of the first draft was made via Google® Forms.

Content validation

The online version of the first draft of the questionnaire was sent to the panel of experts for content validation. The researchers followed the protocol for content validation as described by Lynn [27]. The researchers distributed the first draft of the questionnaire together with the tool for content validation. This tool is a 4-point Likert scale, with scores ranging from 1 = Irrelevant to 4 = Extremely relevant. A space was provided per item so that the experts could state the reason for their judgment and offer suggestions for improvement. The researchers calculated the content validity index (CVI) when at least six experts returned the content validation tool. The calculation of CVI is discussed in the Statistical Analysis section. CVI per item and for the total scale was calculated. Those items that scored 0.83 and above were retained in the second draft of the questionnaire or revised based on experts' comments. Those that scored lower than the threshold were removed or changed if the experts favored it in their comments. The second draft was disseminated using paper and online forms. An online version of this questionnaire was made using Google® Forms.

Pilot Testing

The link to the online version of the second draft of the questionnaire was sent via e-mail to the secretaries of the senior high school department and all colleges of LPU-B for dissemination. This form is included and follows the screening tool. Teachers who satisfied the eligibility criteria were able to answer the questionnaire. On the other hand, paper forms were also distributed in all the departments of LPU-B via their respective secretaries, so that respondents who prefer this method may be accommodated. Accomplished forms were collected from the secretaries of each department.

After submitting the accomplished questionnaires, the same respondents received the same questionnaire from the researchers after two (2) weeks via the same medium, still through the help of the secretaries of each department. At the same time, the selected respondents from each department received an additional instrument for face validation together with all the experts from the content validation process. The face validation instrument consists of five questions per item, answerable by Yes or No. The questions verified if each item in the second draft has correct grammar and syntax is appropriately organized and suitable for assessing the demographic variables associated with MSK disorders and KAP of computer workstation ergonomics, and appears to flow logically [28]. Forms from teachers were included in the data analysis. Likewise, face validation forms coming experts answer who were able to return the accomplished forms were included in the analysis of face validity.

Data analysis

The content validity index (CVI) of each item was determined following the procedure of Lynn [27] by assigning a score of zero (0) to items that were rated as 1 or 2, while setting a score of one (1) to items that were rated as 3 or 4. The resulting assigned scores were then added, and the sum was divided from the total number of experts ranking the questionnaire. The CVI for the entire scale was determined by dividing the total number of content-valid items by the total number of items.

Face validity was analyzed quantitatively by calculating the total "Yes" rating for each question per item and dividing each by the total number of respondents. Items were removed from the questionnaire if the score for any item was less than 70%, revised upon reviewing the respondents' comments, or retained if the score was 70% or more and there were no suggestions for revision from the respondents.

The discrimination index (DI) was used to determine if the items in the Knowledge and Practice sections of the questionnaire could differentiate between the respondents who have the highest and lowest scores [29]-[34]. The researchers computed DI by comparing the scores per item of the respondents who got the highest 27% score to those who got the lowest 27% score for each section [31], [33], [34]. The researchers inferred that those who scored better have more knowledge and better practice in computer workstation ergonomics than those who scored less. DI of 0.40 and above is classified as “very good,” 0.30 – 0.39 is “reasonably good”, 0.20-0.29 is “marginal”, and less than 0.20 is “poor” [32] to review each item for revision or rejection.

All the statistical procedures were performed by a statistician using SPSS for Windows (Version 26)

and Microsoft Excel 365®, with the alpha level for all statistical measures set at 0.05. Demographic details of pilot testers were summarized using descriptive statistics appropriate for the level of measurement of each of the variables.

The discriminant validity of the Attitude section was analyzed by comparing each item using Pearson correlation [35]. The Cut-off was set at below 0.80 to consider that the Attitude section has discriminant validity [36]. Internal Consistency of the Attitude section of the questionnaire was analyzed using Cronbach's alpha, while the Knowledge and Practice section was analyzed using the Kuder-Richardson formula 20 (KR-20). The acceptable Cronbach alpha values range from 0.70 – 0.90 [37]-[40]. On the other hand, a KR-20 value of >0.5 is considered "good" [41]. In addition, the item-total correlation Pearson correlation was used to verify the internal consistency of the Attitude section [35]. Test-retest reliability of the Knowledge section of the questionnaire was assessed using the intraclass correlation coefficient (ICC). It is interpreted as follows: values less than 0.5 is "poor," between 0.50 - 0.75 is "moderate," between 0.75 and 0.90 is "good," and greater than 0.90 is "excellent" reliability [42].

Ethical Review

All respondents accomplished informed consent procedures online or on paper before undergoing the screening and pilot testing procedures. This research was approved by the Research Ethics Review Committee of the Lyceum of the Philippines University – Batangas (A1-2021-074) and complied with the Data Privacy Act of 2012.

RESULTS AND DISCUSSION

Literature review and item generation

Seventeen (17) out of 30,029 articles were included in the literature review (Figure 2). Most of the ergonomic guidelines used in the questionnaire came from the Computer Workstation e-Tool, accessible on the Occupational Safety and Health Administration (OSHA) website, mentioned by Woo et al. [43]. The other sixteen (16) articles provided the basis for the demographic variables. They supported the ergonomic guidelines by OSHA (Appendix D) included in the initial draft of the questionnaire [44]-[59] while two (2) out of these sixteen (16) articles even used the Computer Workstation e-Tool [49], [58].

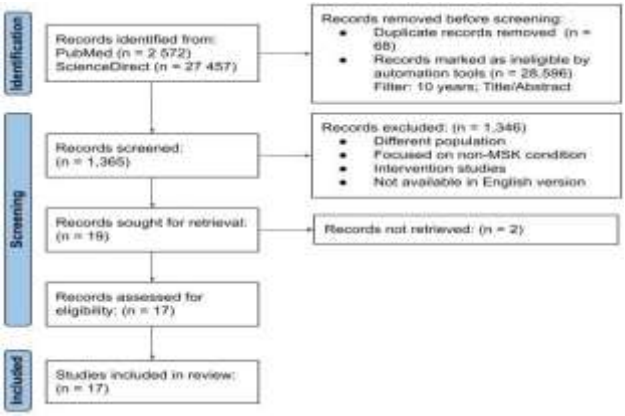

Fig. 2. PRISMA flow diagrams of articles from PubMed and ScienceDirect

Content validation

Table 1. Credentials of Experts

Expert	Profession	Area of Practice	Competencies
1	Licensed Physical Therapist	Quezon City, NCR	• Master in Occupational Health • Conducted trainings on occupational health and safety
2	Licensed Physical Therapist	Lipa City, Batangas	• Attended training on industrial rehabilitation • Head of Industrial Rehabilitation in the workplace • Assessed workplace and employees with or without work related injuries
3	Licensed Physical Therapist	England, United Kingdom	• Performs comprehensive assessments and treats patients with WRMSD • Educates patients with WRMSD on proper work ergonomics
4	Industrial Engineer	Taguig, NCR	• Organized and facilitated conference on ergonomics • Published a study on ergonomics
5	Professor	Batangas City, Batangas	• Master in Industrial Engineering • Teaches Ergonomics for 10 years • Conducted seminar on ergonomics • Published researches on ergonomics
6	Professor	Los Baños, Laguna	• Doctor in Engineering • Teaches Ergonomics and Industrial Safety and Health • Published researches on ergonomics

Table 2. Content Validity Index (CVI) of Subscales in Version I KAP Questionnaire

Item	Demographics	Knowledge	Attitude	Practice
1	1 †	0.5 ‡	1 †	1 †
2	1 †	0.67 ‡	0.83 †	0.83 †
3	0.5 ‡	0.67 ‡	1	1
4	0.83 †	0.83 †	1	1
5	0.17 ‡	0.5 ‡	1	1
6	0.83 †	1 †	0.83	0.83
7	1 †	0.5 ‡	0.83	0.83
8	0.67 ‡	1 †	1	1
9	0.5 ‡	1 †	0.83 †	0.83 †
10	0.83 †	1 †	0.83	0.83
11		1	1 †	1 †
12		0.83 †	1	1
13		1	1	1
14		1 †	0.83	0.83
15		0.83 †	0.67 ‡	0.67 ‡
16		1 †	1	1
17		0.67 ††	1	1
18		1 †	1 †	1 †
19		1	1	1
20		1 †	1	1
21		1	1 †	1 †
22		1 †	1	1
23		1	0.83	0.83
24		1 †	1 †	1 †
25		0.83 †	1 †	1 †
26		1	0.67 ‡	0.67 ‡
27		1	1	1
28		1 †	0.83	0.83
29		1	0.83	0.83
30		0.83 †	0.83	0.83
Total CVI	0.60	0.93	0.80	0.90

‡ removed item; † revised item based on the experts' comments/suggestions that passed the CVI level; †† revised and retained item that did not pass the CVI level

Table 3. Demographic Profile of the Respondents from LPU-Batangas

Demographic Profile	*F*	%
Age		
20-29	14	46.67
30-39	7	23.33
40-49	1	3.33
≥ 50	8	26.67
Sex		
Male	12	40.00
Female	18	60.00
Dominant Hand		
Right	26	86.67
Left	2	6.67
Ambidextrous	2	6.67
BMI		
Underweight	0	0.00
Normal	9	30.00
Overweight	14	46.67
Obese	7	23.33
Years of Teaching Experience		
≤ 5	8	26.67
6-10	10	33.33
11-15	5	16.67
16-20	4	13.33
≥ 21	3	10.00
Years of laptop/desktop computer use		
≤ 5	1	3.33
6-10	11	36.67
11-15	10	33.33
16-20	7	23.33
≥ 21	1	3.33
Hours of laptop/desktop computer use per day		
≤ 4	4	13.33
5-6	11	36.67
7-8	7	23.33
≥8	8	26.67

Demographic Characteristics

The demographic characteristics of the 30 respondents are summarized in Table 3. Seventy percent (70%) of the respondents are 20-39, 70% have higher-than-normal body mass, and 60% are working as a teacher for less than or equal to ten years. 86% were right-handed, and 97% had used their laptops for over five years. At the point of pilot testing, 86% of the respondents said they had been using their laptops for 5 hours or more. Females are more represented in this pilot testing than males, compromising 60% of the sample size.

Face validity

Five experts from the content validation and five randomly chosen teachers from the test-retest participated in the face validation of the Version II KAP Questionnaire. All items were retained as the scores of each question per item were 80% and above. However, a total of thirty-seven (37) items were revised based on the comments and suggestions of the respondents (Appendix C). For instance, in Demographics Section, item 5 was modified from "Number of years you have been using laptop/desktop computer" to "Number of teaching years you have been using a laptop/desktop computer" for correct use of grammar and for it to determine the related demographic information of the teachers appropriately. A few items were also improved for clarity, such as the phrase in item 18 of

Attitude Section, which was revised from "by placing my keyboard with the elbows near the trunk at an angle of 90 to 100 degrees" to "by placing my keyboard in an angle that promotes neutral wrist posture" to make it more understandable to lay persons. Experts also gave suggestions to improve the uniformity of choices, such as in item 2 in the Knowledge Section by changing choice B from "Hands, wrists, and forearms are straight, in-line and roughly parallel to the floor." to "Head is in-line with the trunk," as the other three choices were all about head position. Lastly, for the ideas to flow logically, item 7 (Height and Weight) was reallocated to item 3 in the Demographics Section, as it inquires about physical characteristics like item 2 (Sex). These revisions formed the Version III of the KAP Questionnaire on Computer Ergonomics.

Construct validity

Table 4. Discrimination Index of Knowledge Subscale

Items	Correct Responses	Discrimination Index	Action
1	26	0.38	Retained
2	22	0.50	Retained
3	24	0.38	Retained
4	5	-0.13	Revised
5	17	0.38	Retained
6	10	0.50	Retained
7	21	0.13	Revised
8	23	0.50	Retained
9	9	0.50	Retained
10	22	0.38	Retained
11	15	0.75	Retained
12	12	0.25	Revised
13	13	0.75	Retained
14	15	0.25	Revised
15	8	0.25	Revised
16	14	0.38	Retained
17	14	0.50	Retained
18	13	0.50	Retained
19	18	0.63	Retained
20	17	0.88	Retained
21	10	0.50	Retained
22	5	0.50	Retained
23	15	0.38	Retained
24	13	0.25	Revised
25	16	0.25	Revised

Tables 4 and 5 show the result of discrimination index analyses for the Knowledge and Practice sections. For the knowledge section, items that were considered marginal (items 12, 14, 15, 24, and 25), and poor (items 4 and 7) were revised and retained in the questionnaire. Items considered marginal (16) and poor (5, 9, 11, 12, 15, 19, 20, 21, 22, 25, and 26) in the Practice section were also revised and retained.

In the attitude section, the correlation result of each item's correlation (Appendix E) shows that all items have established discriminant validity except for item 27, with a value of 0.827 which went above the cut-off when correlated to item 1. Thus, it was removed from the questionnaire.

Table 5. Discrimination Index of Practice Subscale

Items	Correct Responses	Discrimination Index	Action
1	11	1.00	Retained
2	13	0.88	Retained
3	14	1.00	Retained
4	24	0.38	Retained
5	8	0.13	Revised
6	17	0.88	Retained
7	15	0.38	Retained
8	20	0.75	Retained
9	26	0.13	Revised
10	24	0.38	Retained
11	29	0.13	Revised
12	26	0.13	Revised
13	16	0.38	Retained
14	27	0.38	Retained
15	29	0.13	Revised
16	28	0.25	Revised
17	23	0.50	Retained
18	22	0.50	Retained
19	28	0.13	Revised
20	13	-0.13	Revised
21	28	0.13	Revised
22	26	0.00	Revised
23	14	0.50	Retained
24	22	0.38	Retained
25	26	0.13	Revised
26	27	0.00	Revised
27	24	0.38	Retained

Reliability

Table 6. Reliability Coefficient of KAP Subscales

Variable	Reliability Coefficient	Sig	Interpretation
Knowledge	0.702	0.05	Good
Attitude	0.940	0.05	Excellent
Practice	0.721	0.05	Good

The result of internal consistency analyses for the Knowledge, Attitude, and Practice sections are shown in Tables 6 and 7. The KR-20 values for Knowledge and Practice sections are 0.70 and 0.72, respectively, while the Cronbach alpha for Attitude section is 0.94 (Table 6). This means that all sections have acceptable levels of internal consistency [37]-[41],

with the Attitude section more suitable for clinical use [39], [40].

However, Item-total Pearson correlation result for item 3 (r = 0.281) and item 9 of the Attitude section (r = 0.283) did not reach the level of statistical significance (Table 7), which means that these items did not correlate well with the overall result of the section and were removed from the questionnaire. Also, in the Practice section, item 27 was discarded as it showed no variance during the computation of KR-20.

Table 7. Item-total Pearson Correlation

Item	Total Correlation	Item	Total Correlation
1	.561**	14	.613**
2	.417*	15	.667**
3	.281	16	.715**
4	.714**	17	.719**
5	.586**	18	.429*
6	.684**	19	.707**
7	.578**	20	.653**
8	.560**	21	.512**
9	.283	22	.601**
10	.514**	23	.689**
11	.668**	24	.563**
12	.589**	25	.625**
13	.570**	26	.550**

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed).

Table 8. Intraclass Correlation Coefficient of Knowledge Items

Intraclass Correlation Coefficient	Intraclass Correlation[b]	Sig	Interpretation
Single Measures	.698[a]	0.00	Moderate
Average Measures	.822[c]	0.00	Good

Two-way mixed effects model where people effects are random and measures effects are fixed.

a. The estimator is the same whether the interaction effect is present or not.

b. Type A intraclass correlation coefficients using an absolute agreement definition.

c. This estimate is computed assuming the interaction effect is absent, because it is not estimable otherwise.

Results of the test-retest reliability assessment of the Knowledge section (Table 8) returned an ICC value of 0.822 for average measures (p-value = 0.00), which means that it has good reliability.

The results overall demonstrate that the second draft of the KAPQ-CWEB has acceptable validity and reliability for use in assessing KAP related to ergonomic behaviors in the computer workstation when used as a self-report tool. The questionnaire was further revised based on appreciating the limitations and strengths regarding its psychometric properties.

The discrimination index does not guarantee that the respondents that scored high for the knowledge and practice sections have a high level of knowledge and consistency of behavior. Due to the nature of multiple choice-type items where respondents are provided with a list of possible answers, there is a potential that the baseline values obtained by the respondents are due to guessing only [66]. Nevertheless, none of the highest scorers (highest 27%) in the Knowledge section have been included in the lowest scorers (lowest 27%) in the Practice section during the pilot test and retest. The results support the notion that those not acting towards ergonomic behaviors tend to be less informed about the proper behaviors [67], [68]. To help verify if those who have high scores in the KAP questionnaire benefitted from having previous ergonomic training, questions such as that of the exposure of respondents to training or seminar related to computer workstation ergonomics, and how consistent they have implemented the guidelines if they did participate in such activities, were added [51], [54].

Items in the Practice section utilize dichotomous responses, which provided information on the CWEB of respondents but eliminated the possibility of determining the frequency of these behaviors. To gauge how often the respondents practice CWEB, items in the Practice section were changed into Likert scale-type questions [23], [55].

Strengths

To the best of the researchers' knowledge, this pilot study is the first attempt to design a self-report KAP questionnaire for computer workstation behavior. Despite being limited to questionnaire development due to the small sample size, results reveal that the questionnaire has the potential for large-scale testing and implementation. This is because the methodology employed is similar to Phases 1 to 3 of Hatfield et al. [24], Stages 1 to 3 of Saefi et al. [23], and Phases 1 to 4 of Park [22].

Administering the KAP questionnaire in both paper and online allowed the researchers to achieve

the required number of respondents despite the limitations brought about by the COVID-19 pandemic. Studies also show that presenting self-report questionnaires online or on paper produces comparable results [60], [61]. This approach helped the researchers address the specific needs of patients who are either aversive to computers or even reduce researcher error when attempting to convert the responses into numeric data [61]. Lastly, the use of new body mass index (BMI) standards for Asians [25], [26] made it more locally adaptable.

Limitations

The researchers acknowledge that there are several limitations to this paper.

Due to the small sample size, the researchers could not conduct more sophisticated data analyses. Nevertheless, results show that KAPQ-CWEB has the potential for large-scale testing and implementation.

Limited responses on demographic variables of the questionnaire that utilize range values made the answers more uniform but eliminated the possibility of attaining new values.

Self-reported outcome measures or surveys generate social desirability bias, resulting in overreporting normative behavior and underreporting counter-normative behavior. [62]. This occurs most especially when reported to an interviewer [63]. This effect was less likely in this study since it utilized paper-based and online questionnaires.

Higher-than-normal BMI is positively correlated to sedentary behaviors [64] from an ergonomic perspective, so the number of respondents who are overweight and obese could have affected the responses to questions that require position changes. Those with higher-than-normal BMI were apparently overrepresented in this study, given that the current prevalence rate of high BMI for adults in the Philippines is 31.1% [65].

Nevertheless, the responses of these respondents for both Attitudes and Practice sections did not demonstrate this expectation regarding BMI. For example, 16 out of 19 of those who are classified as Overweight and Obese provided a favorable response to item 4 of the Attitudes section when the questionnaire was administered for the first time. Fifteen (15) out of 21 still provided favorable responses to the same item when the questionnaire was administered for the second time. For the Practice section, similar findings were noted: 16 out of 21 responded that they changed their posture whenever they feel uncomfortable when they answered the section for the first time, decreasing to 15 out of 21 when it was administered again. These findings can be either attributed to the respondents' openness to increased physical activity while working inside the computer workstation or the inherent limitation of self-report questionnaires.

CONCLUSION AND RECOMMENDATION

KAPQ-CWEB was developed through an extensive literature review which steered to achieve adequate psychometric properties regarding content, face, construct validity, and reliability. Given this, the KAPQ-CWEB is a potentially valid and reliable tool in gauging the KAP on computer workstation ergonomic behaviors of teachers in a private university, implementable online or on paper.

The questionnaire was revised based on appreciating the limitations and strengths regarding its psychometric properties. Changes in the final version of the questionnaire include adding questions in the Demographics section regarding respondents' exposure to training or seminar related to CWEB, and how consistently they have implemented the guidelines if they did participate in such activities. Items in the Practice section were also changed into Likert scale-type questions to gauge how often the respondents practice CWEB.

The researchers recommend future studies to test the Version 5 of KAPQ-CWEB on a larger sample further to improve the evidence regarding its validity and reliability. This was also suggested due to the changes in the abovementioned Demographics and Practice sections. The employment of statistical tests to measure the levels of KAP and the relationship between the variables in the framework (Figure 1) for a thorough analysis of the resulting ergonomic behaviors of the population is also recommended. Once tested, the researchers recommend using the tool for implementation to achieve its goal of providing information about the risk factors and KAP related to CWEB of teachers in the Philippines, which can then be used as a guide in planning and designing interventions for teachers to lessen their risk of developing MSKD.

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