**Developing the KAP Metrics**

We used knowledge-based questions to develop a metric that ranked a respondent’s knowledge. We chose 6 questions to which the respondent had to answer YES or NO. Yes indicating their acknowledgment of knowing an aspect about blood donation and NO indicating the opposite. This metric was converted into a binary outcome, i.e., adequate knowledge (knowledge metric >50%) and inadequate knowledge (knowledge metric <50%) for use in logistic regression modeling. To evaluate the contribution of each question to this metrics, all the questions were used in a PCA. The weight of each question was taken to be the correlation coefficient with the component that explained the most variation.

**Analysis of KAP Using PCA**

Similar to the Knowledge metric, an attitude and practices ranking metrics was developed from 5 and 3 attitude and practices questions, respectively. Here, YES and NO responses reflected positive/negative attitudes and good/bad practices. These three metrics were then used to examine the linear relationship between KAP by (a) visualizing the variability of the 512 data points along three orthogonal lines corresponding to three components; (b) computing and comparing the correlation coefficients between KAP as well as other background variables. A positive correlation coefficient indicates a direct relationship between KAP, while a negative correlation coefficient indicates an antagonistic relationship. Internal consistency and reliability of the factors included in the PCA for linear relationship were tested using Cronbach’s alpha.

**Table 1. Reliability and internal consistency testing of factors used in PCA.**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Factors** | **Raw alpha** | **Std. alpha** | **95% CI** | **Cronbach’s alpha** | **Raw alpha** | **Std. alpha** | **95% CI** | **Cronbach’s alpha** |
| **Knowledge** | 0.53 | 0.50 | 0.49-0.57 | 0.49 | 0.79 | 0.80 | 0.76-0.82 | 0.66 |
| **Attitude** | 0.43 | 0.33 | 0.40-0.46 |  | 0.44 | 0.50 | 0.37-0.51 |  |
| **Practice** | 0.51 | 0.52 | 0.46-0.56 |  | 0.34 | 0.48 | 0.26-0.42 |  |
| **Age** | 0.23 | 0.32 | 0.20-0.26 |  | - | - | - |  |
| **Education** | 0.26 | 0.36 | 0.23-0.29 |  | - | - | - |  |

A high level for alpha may mean that the items in the test are highly correlated. However, α is also sensitive to the number of items in a test. A larger number of items can result in a larger α, and a smaller number of items in a smaller α. If alpha is high, this may mean redundant questions (i.e. they’re asking the same thing). A low value for alpha may mean that there aren’t enough questions on the test. Adding more relevant items to the test can increase alpha.

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| **Figure 1. Scree plot with % of explained variance** |

**Table 2. Eigenvalues and proportion of variance**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | **PC1** | **PC2** | **PC3** | **PC4** | **PC5** |
| **Proportion of variance** | 34.67% | 24.06% | 19.58% | 12.06% | 9.63% |
| **Cumulative proportion** | 34.67% | 58.73% | 78.31% | 90.36% | 100% |
| **Eigen Value** | 1.73 | 1.20 | 0.98 | 0.60 | 0.48 |

PCA extracted two significant PCs with eigenvalues > 1, explaining about 58.73% of the total variance. The examination of the Scree plot provides a visualization of the variance associated with each factor, the steep slope shows the biggest factors. It is clear from the figure that there are three dominant factors.

**Table 3. Rotated factor loadings for (Extraction method\*\*)**

|  |  |  |
| --- | --- | --- |
|  | **PC1** | **PC2** |
| **Knowledge** | -0.194 | **0.765** |
| **Attitude** | **-0.504** | **0.452** |
| **Practice** | -0.161 | -0.159 |
| **Age** | **-0.604** | -0.262 |
| **Education (years)** | **-0.563** | **-0.341** |

\*\* TWO components extracted from matrix; Extraction method = Principal component analysis; Loadings greater than 0.3 are in bold.

The rules of classifying the factor loadings as "strong," "medium," and "weak," corresponding to absolute loading values of >0.75, 0.75– 0.50, and 0.50–0.30, respectively (Liu, Lin, & Kuo, 2003). Factors variance exceeded 70% and they are sufficient to explain the mechanisms that controlling the KAP of blood donation.

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| **Figure 2. PCA of knowledge, attitudes, and practices toward blood donation.** |

**Table 4. Relationship between respondents’ knowledge, attitudes and practices toward donating blood.**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  |  | Knowledge | | Attitude | | Practice | |
| Variables | Response | OR (95% CI) | P-value | OR (95% CI) | P-value | OR (95% CI) | P-value |
| Age group | | | | | | | |
|  | 25 or 25+ | 3.10 (1.41-7.83) | 0.009 | - | - | - | - |
|  | 16-24 | 1 |  | - |  | - |  |
| Highest educational level (Academic years) | | | | | | | |
|  | 1-10 | 1.73 (1.03-2.90) | 0.037 | - | - | - | - |
|  | 11-12 | 0.89 (0.52-1.52) | 0.669 | - | - | - | - |
|  | 13 or 13+ | 1 |  | - |  | - |  |
| Participant type | | | | | | | |
|  | Teacher | - | - | 1.94 (1.03-3.81) | 0.046 | 4.79 (2.23-11.92) | <0.001 |
|  | Students | - |  | 1 |  | 1 |  |
| Smoker | | | | | | | |
|  | Yes | - | - | 0.41 (0.11-1.34) | 0.156 | - | - |
|  | No | - |  | - |  | - |  |