The Development and Piloting of the Perceived Knowledge of Stroke Survey (PKSS)

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Stroke is the fifth leading cause of death in the United States (Center for Disease Control and Prevention, 2017), and is still very widely misunderstood by the general public. It's important to assess the perceived knowledge that adults have about strokes, because it can help professionals understand what the general public does and does not know about strokes, including preventative steps, treatment options, long term symptoms, and risk factors. In turn, professionals can determine what aspects they should be focusing on in terms of informing the public, with hope of reducing the prevalence, and increasing awareness.

This study was done through a 27 item survey with a 6 point likert scale, and the design was aimed at the general public. The construct that this survey is trying to tap, is an individual's perceived knowledge of stroke, in regard to aspects of prevention, treatment, symptoms, and risks.

Assessment of stroke knowledge or awareness is not a new idea. It is something that has been tested all over the world for many years. In researching this topic, studies were found from several different countries, including the United States, Ireland and the UK, Ghana, Australia, Malaysia, China, Uganda, and Brazil. For the purpose of this survey, studies that best reflect the representation seen in the PKSS were chosen to be reviewed.

A 2009 study in Ireland done by Donnellan, Hickey, Horgan, McGee, O'Hanlon, O'Neill, and Shelley, assessed 2,033 adults over 65 on their knowledge of strokes. Participants surveyed on their knowledge of stroke warning signs and risk factors. Participants were given lists of factors and were asked to identify which could be considered possible risk factors or warning

signs (Donnellan, et al., 2009). Of the sample, 6% of participants have had a previous stroke (Donnellan et al., 2009). It was found that less than half of the adults surveyed were able to correctly identify warning signs or risk factors. Participants had the most success with identifying slurred speech as a warning sign, with 54% of the participants correctly identifying it (Donnellan, et al., 2009). Hypertension was the most successful risk factor identified, with 75% of participants correctly identifying it, however all other risk factors had below 50% of participants correctly identifying them (Donnellan, et al., 2009). Overall, Donnellan, et al. (2009) conclude that general knowledge of stroke warning signs and risk factors is very poor in Ireland.

A study in 2013 done by Zachary Jarou, Nathaniel Harris, Liza Gill, Meena Azizi, Shayef Gabasha, Robert LaBril of Michigan State University, College of Human Medicine, surveyed 245 individuals about their self reported risk factors, and knowledge of stroke symptoms. The survey consisted of 6 items relating to stroke symptoms, and 7 items about the participants past medical history, as well as a demographic questionnaire. The study concluded that respondents who showed the most stroke risk factors were the least able to identify stroke symptoms (Azizi et al., 2013).

In 2001 a study was conducted in Georgia via phone interviews. Participants were interviewed based on a questionnaire addressing symptoms of stroke, stroke risk factors, stroke treatment, protocol if someone is having a stroke, and stroke prevention (Frankel, Rowe, and Sanders, 2001). They were also asked their family history of stroke, and other demographic questions. Questions were both closed and open ended. Of the sample of 602 participants, 55.5% claimed they would be able to recognize the signs or symptoms of someone having stroke, however when asked to name the specific signs or symptoms, only 38.5% were able to name

more than one sign, and not a single participant was able to name all five signs (Frankel et al., 2001). Younger individuals were less successful than older individuals in identifying more than one sign, as were individuals with lower levels of education. When asked to pick out warning signs that were read from a list, 54.9% of individuals were able to identify all five (Frankel et al., 2001). 69.8% of respondents said that they would call 911 if someone was having a stroke (Frankel et al., 2001). Most of the participants were also able to correctly identify risk factors read from a list (Frankel et al., 2001). Overall, this study concludes that there is a low level of stroke knowledge in Georgia, and suggests that younger individuals, and individuals with lower levels of education have the least amount of awareness (Frankel et al., 2001).

A review of evidence was conducted in 2010 in the United Kingdom by Jenkinson, Jones, Leathley, and Watkins. This review looked at 39 studies from the UK, Europe, North America, Asia, and Australia, around knowledge of risk factors, symptoms, action to take if someone is having a stroke, and sources of information (Jenkinson et al., 2010). Results varied between studies, with the ability to name one risk factor for stroke ranging from 42% to 97% of individuals for closed-ended questions and from 18% to 94% of individuals for open-ended questions (Jenkinson et al., 2010). Ability to name symptoms ranged from 95% to 100% for closed-ended questions, and 25% to 72% for open-ended questions (Jenkinson et al., 2010). In regards to action steps when someone is having a stroke, between 53% and 98% claimed they would call EMS (Jenkinson et al., 2010). Despite the varied percentages, the review concluded that stroke knowledge in the general public is poor, and suggests that ethnic minority groups and individuals with lower levels of education typically had lower levels of stroke knowledge

(Jenkinson et al., 2010). Contradictory to the previous study by Frankel et al., this study suggests that older individuals have a lower level of stroke knowledge (Jenkinson et al., 2010).

It is clear that knowledge of stroke is a construct worth tapping. Each of these studies have concluded that there are low levels of stroke knowledge in the general public, and suggest that steps be taken in improving stroke knowledge in individuals, to promote public awareness and education. The PKSS differs slightly in that it is being used to measure individual's perceived stroke knowledge, rather than an actual measure of knowledge, using a convenient sample size at the University of Vermont, as well as friends and family members of test administrators.

Method

Participants

The participants in this survey were a convenient sample of friends and classmates at the University of Vermont, as well as family members. Of the 55 individuals surveyed, 41.8% described themselves as male, 56.4% described themselves as female, and 1.8% described themselves as other. The mean age of participants was 29.53 (16.06). Of the sample, 96.4 were white, 1.8% were hispanic, and 1.8% were Black or African American.

Materials

Demographic questionnaire. Before completing the formal survey, participants were asked to fill out a demographic questionnaire to provide information regarding their age, gender, and race and ethnicity, as well as a number of other characteristics that we thought might be correlated with knowledge of stroke. As seen in the measure, participants were also asked to provide their hometown characteristics, estimated family income, field of study or profession,

and level of education as well as specific questions about stroke, including if they have seen an advertisement for stroke prevention on TV, or learned about it in school, or if they know someone who has had a stroke, and how well they know them (see measure).

Survey instrument. The Perceived Knowledge of Stroke Survey (PKSS) consists of 27 items designed to tap into individuals perceived knowledge of stroke, including prevention, treatment, symptoms, and risk factors. Participants were given a six point Likert Scale, ranging from 1 (*strongly disagree)* to 6 *(strongly agree)*. The written instructions provided asked them to circle the number that corresponds to their thoughts on each statement. For example, one statement reads, " I know how communication can be affected by a stroke" (see measure, item 13). Participants would then be asked to judge their agreement with that statement, based on the 6 point scale given. A 6-point scale was used in order to avoid the presence of a midpoint. This forces the participant to choose wisely from the scale. The entire survey, including the demographic questionnaire, only takes about 5 to 10 minutes to administer, but it may depend on an individual's reading ability, and ability to concentrate.

Items are intended to be exhaustive, reaching a range of factors. Focus was kept on prevention, symptoms, causes and treatment of stroke, however subscales were not developed. Data for items were collected through the knowledge of the test developers, as well as from the journal articles discussed earlier, and websites such as the American Stroke Association website. Items were not directly taken from previous surveys, but were used as resources during the process of developing items for the PKSS.

Scoring of this survey is done by calculating an individual's mean score of all the items. A mean score calculation is preferred over the sum of items, because a mean can be statistically

manipulated, and can be used to further analyze data compared to other information that we have gained through our demographic questionnaire. An individual's mean score can range from 1 to 6. The higher an individual's score is, the more knowledgeable they perceive themselves to be.

Design and Procedure

This survey used a cross-sectional design, and data were collected through a convenient sample of friends, classmates, and family members of survey administrators. Surveys were administered in person, as a paper-and-pencil survey. Participants were asked if they would be willing to take a survey for a class, and upon agreement were distributed a survey. Confidentiality was maintained as no names were collected, and the only personal information that was collected was discussed earlier in the demographic questionnaire section. After completion of the survey, participants were thanked, and the surveys were put away until data analysis to further ensure confidentiality. Surveys were given a number for organizational purposes.

Pilot Results

Descriptive statistics were calculated for the demographic sections, and some were discussed earlier, including age, gender, and race and ethnicity. Other statistics were calculated for the remaining demographic questions. The mean years of education for participants was 15.5 (1.6). The estimated family household income of the individuals was $144,292 (77,380), however this is only for 41 of the individuals, as there was missing data for the other 14 participants. 40% of individuals describe their hometown as rural, 53.7% describe their hometown as suburban, and 7.3% describe their hometown as urban. 67.3% of individuals have seen a TV advertisement about stroke warning signs, and 67.3% have learned about stroke in

school. An individual's field of study or profession were further grouped into whether or not it may be related to stroke knowledge. Related fields of study included health sciences, like nursing, neuroscience, or communication sciences and disorders. If participants were not students, they were asked specifically if their job requires them to know about strokes. Only one individual answered yes, with her profession being a school counselor. Only 21.8% of individuals were considered to be in a related field, and the remaining 78.2% were not. 69.1% of individuals know someone who has had a stroke, and of those relationships, 38.2% said it is a family or friend, 9.1% said it is a distant relation, 14.5% said it is a casual acquaintance, and 7.3% said they know multiple individuals with different relationships.

In regards to the items on the survey, the mean score of all individuals was 4.1 (.780). A Cronbach's alpha indicated a high level of internal consistency among items ($\alpha = .933$). The standard error of measurement (SEM) was calculated in order to determine the estimated amount of error in the test. The SEM for the PKSS was .11, which is acceptable, because it is known that an SEM "should be no more than one third or one half of the SD" (Class notes, 2017). Cronbach's alpha was also calculated for each item if deleted, which ranged from (α=.928) to (α=.933), indicating that each item is internally consistent and is testing something highly reliable. None of the items need to be deleted to improve reliability.

An independent samples t-test was conducted to compare mean scores of individuals in related and unrelated fields. As seen in Figure 1, individuals in related fields received significantly higher scores (M =4.66) than did individuals not in a related field (M = 3.95), $t(53) = 2.99$, $p < .05$. Another independent samples t-test was conducted, indicating that individuals who know someone who have had a stroke received significantly higher scores (M

=4.25) than did individuals who do not know someone who has had a stroke ($M = 3.76$), $t(53) = 2.24$, $p < .05$, as shown in Figure 2.

Due to the extensive research in the correlation between level of education and stroke knowledge in former studies, this correlation was examined in the PKSS as well. A pearson-product moment correlation indicated a slight and almost negligible relationship between an individual's mean score and their level of education ($r = .186$, p=.174). Additionally, a pearson-product moment correlation indicated a slight and almost negligible relationship between an individual's mean score and their age ($r = .155$, p =.258). Contradictory to previous studies, like Frankel et al. and Jenkinson et al., the PKSS provided little evidence in regards to a correlation between level of education and stroke knowledge, or age and stroke knowledge.

Participants in this survey were generally very receptive of the survey. There were some concerns about the length of the survey, and the necessity of the demographic questions, like household income for example. It was explained to the participant that that piece of demographic info was used to show representation of the sample. Some feedback was given in regards to the clarity of some of the questions. For example, on item 7: *I know how exercise can affect the risk of a stroke*, one participant mentioned that she was unsure if she was being asked if she knew *that* exercise can affect the risk of a stroke, or the actual ways in which it can. Items like this may need to be reworded for clarity in future versions. Other participants mentioned that they did not like how many options they were given on the likert scale. They said they felt that it was too large, and that some of the numbers could mean the same thing. This is another thing to consider for future versions.

Suggestions for Evaluating Psychometric Properties of the Survey

If more time, money, and resources could be put into this survey, several more tests of reliability and validity would need to go into developing it's psychometric properties. In terms of reliability, it would be important to assess test-retest reliability to ensure that the survey remains consistent over time. It would also be important to assess reliability using alternate forms, to ensure that the survey remains reliable over different forms. In regards to the PKSS, alternate forms could consist of a telephone survey, or an in-person interview.

Validity of the PKSS should be further examined, in the form of content validity and item analysis. Content validity was achieved through extensive research by the survey administrators, however it could be further developed through communication with professionals. Item analysis should be performed in order to determine item difficulty and item discrimination or predictability. Exploratory factor analysis should also be done to examine how test items behave in groups, and to examine the possibility of subscales within the test. Additionally, predictive validity should be examined by comparing individuals scores on the PKSS to their scores on a seperate, well validated test of the same construct.

Future versions of the PKSS will have to make some adjustments in the demographic questionnaire. There were several demographic questions that were later deemed irrelevant. For example, whether or not an individual has seen an advertisement on TV about stroke warning signs maybe be an indicator of how much TV they watch, rather than how knowledgeable they are about strokes. Additionally, the norming of the PKSS would need to include a much more diverse sample, considering this version only represented 3 different races, with the majority being white (96.4%).

Figure 1. Comparison of mean result on the PKSS between participants in related fields, and participants unrelated fields.

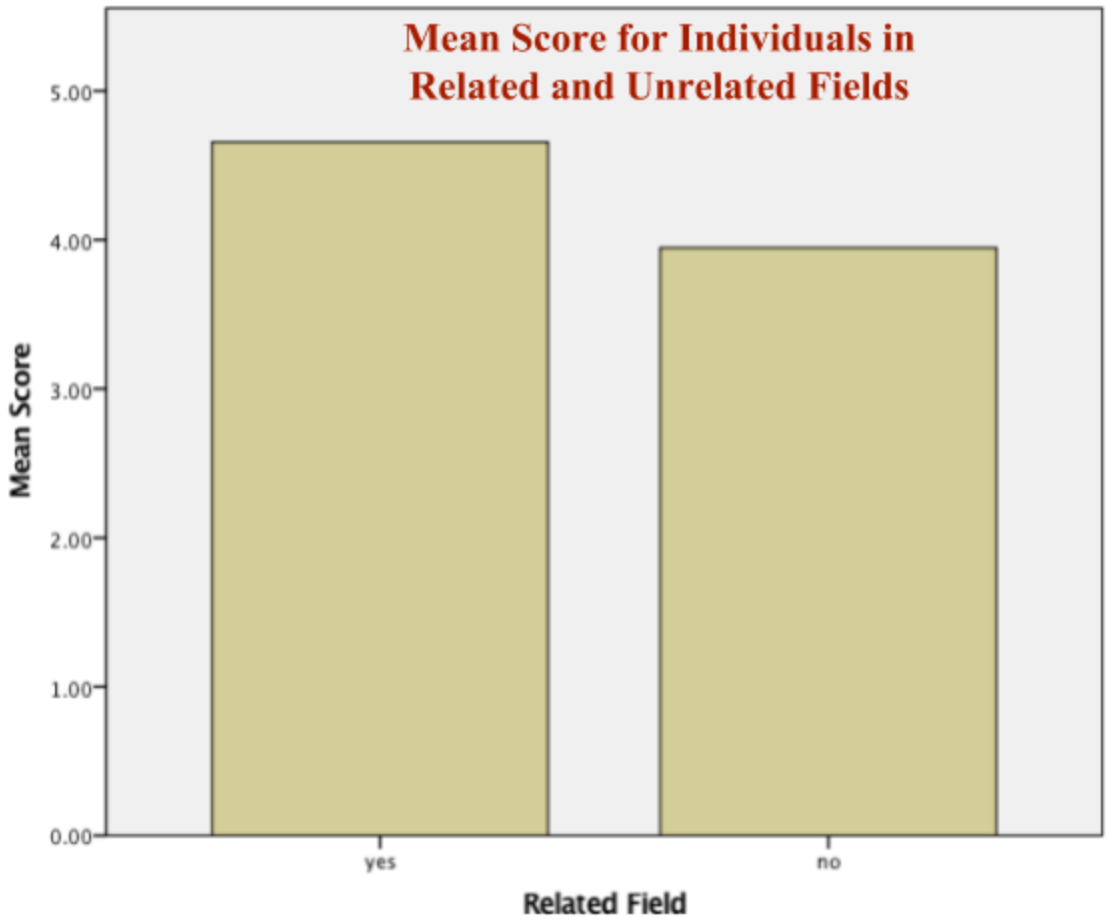
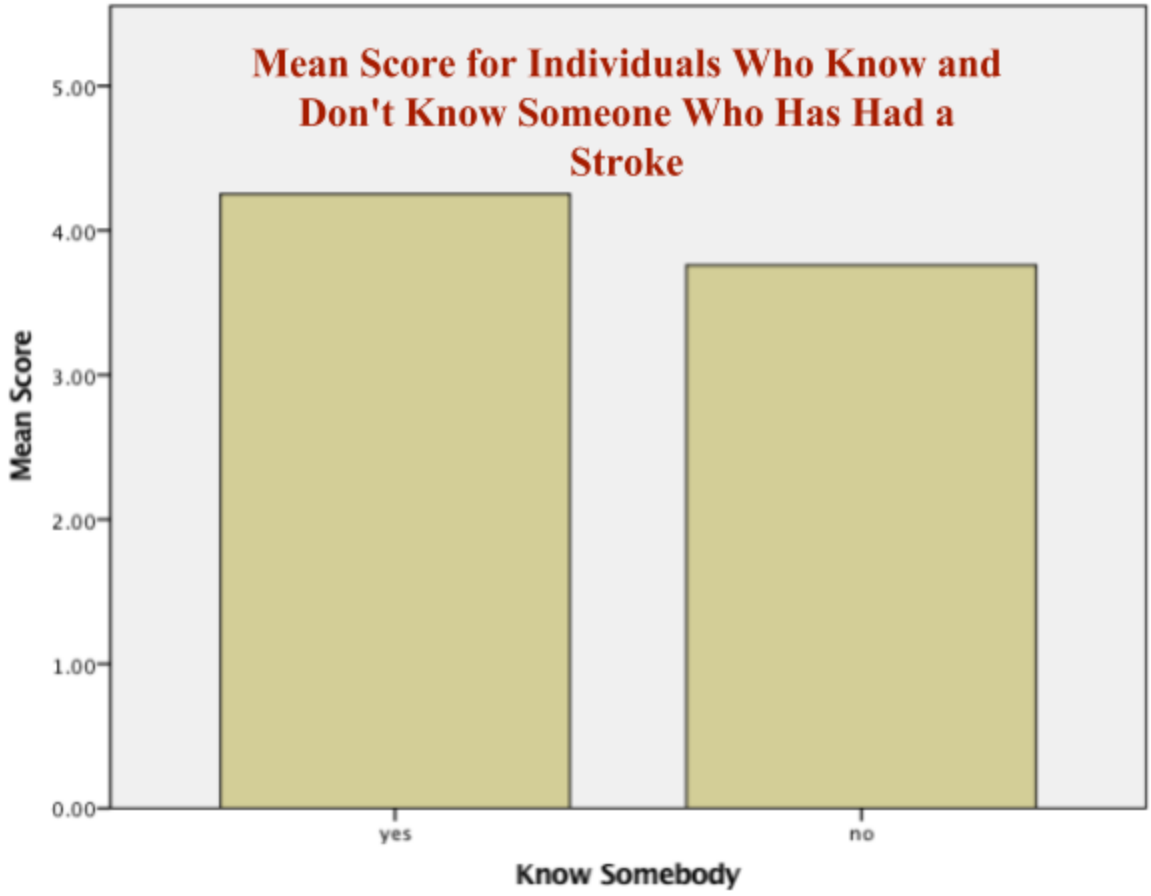


Figure 2. Comparison of mean result on the PKSS between participants who know someone who has had a stroke, and participants who don't know someone who has had a stroke.



References

Azizi M., Gabasha S., Gill L., Harris N., Jarou Z., and LaBril R. (2013). Public stroke knowledge: those most at risk, least able to identify symptoms. *Medical student research journal, 3(fall),* 3-8. doi:10.3402/msrj.v3i0.201312

Center for Disease Control and Prevention. (2017). Stroke facts. *Center for disease control and prevention.* Retrieved from https://www.cdc.gov/stroke/facts.htm

Donnellan C., Hickey A., Horgan F., McGee H., O'Hanlon A., O'Neill D., and Shelley E. (2009). Stroke awareness in the general population: knowledge of stroke risk factors and warning signs in older adults. *BMC geriatrics, 9(35).* doi:10.1186/1471-2318-9-35

Frankel M., Rowe A., and Sanders K. (2001). Stroke awareness among georgia adults: Epidemiology and considerations regarding measurement. *Southern medical journal 94(6)*.

Jenkinson, A., Jones, S., Leathley, M., and Watkins, C. (2010) Stroke knowledge and awareness: an integrative review of the evidence. *Age and Ageing, 39(1),* 11–22. doi:10.1093/ageing/afp196