Original Research Article

DEVELOPMENT OF QUESTIONNAIRE FOR THE ASSESSMENT OF AWARENESS ABOUT HEART ATTACK AMONG ADULTS IN QUETTA PAKISTAN

Abstract

Objectives

Awareness of heart attack is very important to reduce the mortality and morbidity associated with a heart attack. The current study aims to develop a questionnaire to assess heart attack awareness among adults in Quetta, Pakistan, and also focused on translating into the Urdu language and validating the translated questionnaire.

Methods

The questionnaire was developed in English after the review of relevant literature and translated into Urdu. Content validity was performed by eight experts in medicine and pharmacy practice and a content validity index was calculated. Internal consistency and reliability were assessed by Cronbach alpha and corrected item-total correlation. Test re-test reliability was determined using the Spearman rank correlation coefficient. The cross-sectional pilot study was conducted among 100 adults and a chi-square test was done to find a correlation between score groups and demographics.

Results

A content validity index was 0.804 while the Cronbach alpha was .935 for the entire scale, indicating internal consistency. Spearman's rank correlation coefficient value of 0.78 (p = 0.006) was obtained during the evaluation of test-retest reliability. Significant relationships were observed between knowledge scores and gender, education level, and smoking during the pilot study.

Conclusion

The current study showed that the developed questionnaire is reliable and valid for accessing adults' awareness about heart attack

Keywords

Heart attack, mortality and morbidity, content validity, reliability, internal consistency. Quetta, Pakistan, pharmacy practice, medicine

Introduction

Cardiovascular disease is the number one killer in the world. According to the WHO, cardiovascular disease (CVD) caused 17.9 million deaths worldwide in 2019, accounting for 32% of all deaths. Heart attacks and strokes account for 85% of these deaths. [1]. As per data from the United States, CVDs are responsible for 25% of deaths yearly. Every 60 seconds, an American dies from MI.[2]. Three-quarters of CVD deaths occur in low and middle-income countries where the burden of CVD and its risk factors are increasing due to an ongoing epidemiological transition [3]. Pakistan is not an exception in this case and CVD accounts for 19 percent of all deaths in Pakistan [4].

Myocardial infarction or heart attack is permanent necrosis of heart muscles due to insufficient supply of blood, also known as ischemia. [5]. Several risk factors can contribute to heart attack i.e. hypertension, diabetes, obesity, hypocholesteremia, physical inactivity, unhealthy diet, smoking, and stress. [6]. Ischemic heart disease progresses in part due to these risk factors [7]. Knowledge and understanding of these CVD risk factors are vital in preventing CVDs and the complications that come with them[8].

Myocardial infarction is a life-threatening condition and a time-critical illness. The early administration of reperfusion therapy, either thrombolysis or PCI, has a significant impact on the outcomes of patients with AMI [9]. If reperfusion is performed within one hour of symptoms onset, survival chances improve up to 50%, and if it is attained in three hours of symptoms onset, survival rates improve by up to 23%. [10]. Symptoms associated with myocardial infarction include pain in the chest, arms, and jaws, shortness of breath, and other atypical symptoms.[11, 12]. The inability to identify the signs and symptoms of acute myocardial infarction has been recognized as the primary reason for the late presentation in several studies[13-15]. Thus the patient's awareness of symptoms is crucial in convincing them to seek treatment as soon as symptoms appear.

A number of studies had analyzed the awareness of the public regarding heart attack and its symptoms which revealed that there is a scarcity of awareness about the disease among the general population [16-22]. However, research is scarce that emphasizes exploring the awareness towards heart attack and its warning signs and symptoms in the lay public of Quetta Pakistan. It is vital to create a questionnaire in both English and Urdu before conducting the main research.

The current study intends to develop a questionnaire to assess heart attack awareness among adults in Quetta, Pakistan. The current study also focused on translating the developed

questionnaire into Urdu, examining its validity and reliability (internal consistency), and assessing the respondents' awareness in this pilot study.

Methodology

Study design and participants

The current study was a cross-sectional pilot study conducted in Quetta, Pakistan, among young and middle-aged adults. A sample size of 100 respondents, according to Rattray and Jones is sufficient for questionnaire design and development[23]. As a result, 120 respondents were recruited through convenience sampling at various institutes, colleges, universities, and public places. Medical professionals, students, and healthcare academicians were excluded from the study and enrolled all adults between 18 to 55 years old. A self-administered questionnaire was used to gather data from the participants. After providing informed consent, participants were asked to complete the questionnaire on the spot, and it was then collected. For those who were unable to understand the questionnaire, a face-to-face interview was provided.

Development of questionnaire

The questionnaire was developed following a review of relevant literature and prior studies conducted around the world.[21, 22, 24-26]. The first version had 25 questions: two on the introduction, one on the cause, five on risk factors, eight on symptoms, three on diagnostic and treatment strategies, one on complications, and five on prevention. However, the final questionnaire had 22 questions: two on the introduction, six on risk factors, eight on symptoms, four on diagnostic and treatment options, and two on heart attack consequences. Demographics were also taken into consideration. The questionnaire's final version was created after it was sent

to eight experts in the field, who assessed it for face and content validity. Following the inclusion of expert viewpoints, necessary modifications were done.

Translation of questionnaire

Since Urdu is Pakistan's national language, the questionnaire was first developed in English and then translated into Urdu. Two independent translators initially translated the questionnaire into Urdu. Only one of the translators was aware of the study's objective to ensure the quality of the translation. A multidisciplinary team of cardiologists, researchers, and pharmacists assessed the initial translated version. Back translation from Urdu to English was accomplished at the second stage by two different translators who were not engaged in the initial version's development. Another expert review compared the original and back-translated English versions, and the concerns with inconsistencies were addressed. The questionnaire was administered to ten lay adults in the final stage, who answered and commented on it. The researchers went over all of the questionnaire versions in detail, as well as the feedback from the respondents. The final Urdu version of the questionnaire for the reliability and validity study was developed after necessary changes were made.

Validation of questionnaire

Content validity

The degree to which the instrument content adequately reflects the construct being evaluated is referred to as content validity. It analyzes how much an item sample represents in a defined universe of the content domain [27]. Content validity is generally commenced by sox or more professionals. This validation process was carried out by eight experts that treat heart disease. Since there is no statistical test to examine content validity specifically, most researchers utilize a

qualitative method, involving an expert committee's assessment, followed by a quantitative approach using the content validity index (CVI). The experts' committee must have a concordance index of at least 0.80 and ideally greater than 0.90.[27].

Face validity

The instrument's appropriateness to evaluate the construct of interest is determined by its face validity. Face validity was determined in the current study using a standardized approach to analyze the Urdu version of the questionnaire. The face validity was performed by ten lay adults who were nominated at random. They looked at the instrument's general features as well as if the sentences were clear, concise, easy to read, and free of typographical errors. [28].

Scoring

The questionnaire comprised 22 questions, including two questions about the introduction, six questions about risk factors, eight questions about symptoms, four questions regarding diagnosis and treatment options, and two questions about heart attack complications. Each question received the same score (one point for each correct answer and zero otherwise). After then, the results were added together. Those who scored 0-11 received no to poor knowledge, whereas those who scored 12-22 received adequate to good knowledge.

RELIABILITY

Internal consistency refers to the degree to which scale items measure the same construct (i.e., scale homogeneity), and was measured in our study using Cronbach's alpha (should be > 0.70). Values above 0.7 were regarded as excellent reliability when interpreting the coefficients. [27].

Test-retest reliability

The extent to which individuals' responses to questionnaire items stay reasonably consistent throughout multiple administrations of the same questionnaire or alternate questionnaire versions is referred to as test-retest reliability. [29]. The test-reliability test was performed on the same respondent two weeks after the first instrument was administered in this study. The level of acceptance between tests and re-tests was determined using the Spearman rank correlation coefficient.

Analysis

Statistical Package for Social Sciences (SPSS version 25) was used to analyze the data after it was obtained, and descriptive and inferential statistics were used. To describe the variables, descriptive analyses were used. Cronbach's alpha coefficient was determined using a reliability test (internal consistency and corrected item-total correlation). The Chi-square test was used to see if there was any correlation between score groups and demographics. Statistical significance was defined as a *P* -value =.05.

Ethical approval

The study was approved by the ethical committee of the Department of Pharmacy Practice, Faculty of Pharmacy and Health Sciences, University of Baluchistan. Before collecting the data, the informed consent was taken from participants.

Results

Demographic characteristics of respondents

The final analysis included a total of 100 respondents. Males made up the majority of the respondents (n=60, or 60.0 percent), with more than half of the participants being between the

ages of 18 – 35. The majority of the study participants (n=67, or 67.0 percent) were married, with 60 percent (n=60) employed. In terms of education, 38 percent (n=38) possessed a bachelor's degree, whereas 10% were uneducated. When it came to family income, 37% (n=38) of respondents were unwilling to reveal it, and 7% had a monthly income of less than 10,000 PKR. Furthermore, 27.9% (n=31) of respondents stated that they had hypertension, 30% claimed they smoke, and 5% said they had personal experience with heart disease. Table 1 shows the demographic characteristics of the respondents.

Table 1 Demographic Characteristics of Participants

Demographics	**Frequency (n)**	**Percentage (%)**
Age		
18-35 (young adults)	53	53.0
35-55 (middle-aged adults)	47	47.0
Gender		
Male	60	60.0
Female	40	40.0
Education level		
Primary school	9	9.0
High school	13	13.0
College degree	21	21.0
Bachelor	38	38.0
Postgraduate	9	9.0
No education	10	10.0
Employment status		
Employed	60	60.0
Unemployed	40	40.0
Marital status		
Single	33	33.0
Married	67	67.0
Family income		
<10,000/month	7	7.0
10,000-30,000/month	16	16.0
30,000-50,000/month	16	16.0
50,000-70,000/month	16	16.0
>70,000/month	8	8.0
Don’t want to share	37	37.0
Self-reported risk factors		
Hypertension	31	27.9
Diabetes	16	14.4
High cholesterol	12	10.8
Smoking	30	27.0

Other diseases	22	19.8
Experience of heart disease		
Personal	5	5.0
Close relatives	49	49.0
Other relatives or friends	18	18.0
No experience	28	28.0

Reliability

Internal consistency

The mean awareness of a heart attack was 37.0 ±11.382, and Cronbach alpha was.935 for the entire scale, indicating internal consistency. Two questions on the introduction, six questions on risk factors, eight questions on symptoms, four questions on diagnosis and treatment, and two questions on heart attack complications were used to establish the internal consistency. Table 2 shows the item-total correlation between questions and the Cronbach alpha value of each item.

Table 2 Reliability tests of 22 items of awareness towards a heart attack

Questions	**Corrected Item-Total Correlation**	**Cronbach's Alpha if Item Deleted**
Have you ever heard about a heart attack?	.432	.935
Heart attack is a leading cause of death worldwide.	.628	.931
High blood pressure, high cholesterol levels, and diabetes are the major risk factors for heart attack.	.680	.930
Physical inactivity and an unhealthy diet are the risk factors for heart attack.	.707	.930
Family history of heart attack and old age further increases the risk of a heart attack.	.677	.930
Smoking is a risk factor for heart attack.	.639	.931
Being overweight increases the chance of getting a heart at.	.721	.930
Stressful life leads to a heart	.654	.931

attack.		
Pain, discomfort, pressure, and tightness in the chest is a symptom of heart attack.	.610	.932
Pain in the neck, jaws, and backside of the chest is a symptom of a heart attack.	.576	.932
Pain in the arms especially left arm and numbness in the arms is a symptom of a heart attack.	.690	.930
Nausea and vomiting is a symptom of heart attack.	.548	.933
Cold sweats and excessive fatigue is a symptom of heart attack.	.645	.931
Feeling light-headed and dizzy is a symptom of heart attack.	.567	.932
Shortness of breath is a symptom of heart attack.	.614	.931
Stomach pain and burning sensation in the chest is a symptom of heart attack.	.505	.933
Heart attack is usually diagnosed by ECG	.634	.931
Angiography is a diagnostic test used to find the blockage inside the arteries of the heart.	.605	.932
Angioplasty and bypass surgery are the treatment procedures for heart attack.	.631	.931
Heart attack can be treated by home remedies	.412	.934
Delay in the treatment of heart attack causes life-threatening complications like heart failure and cardiac arrest.	.563	.933
Delay in treatment of heart attack can cause death.	.658	.931

Test-retest reliability

The reliability of the pre-test and post-test of the reliability over two weeks was found to be satisfactory, with a Spearman's rank correlation coefficient value of 0.78 ($P = 0.006$) for heart attack awareness.

Validity

Content validity

This validation process was carried out by eight evaluators with a variety of experiences in dealing with cardiac diseases. The experts rated each item on four scopes using a dichotomous answer scale: "clear=1" vs. "not clear=0" after reviewing the 22-item Urdu version. The four scopes were item content consistency, item wording clarity, perceived item difficulty, and why the item should be included in a revised version of the test. As stated in table 3, an average content validity index of 0.804 was found. Since the suggested cutoff value for the content validity index is 0.8, the content validity index revealed that items were relevant and clear.[27]

Table 3 content validity of Urdu version questionnaire

Specialty	**Consistency**	**Clarity**	**Difficulty**	**Inclusion**	**Total**
Cardiologist (Resident)	20	19	18	19	76
Cardiologist (Consultant)	19	19	29	19	86
Academician	20	19	18	19	76
Pharmacist	20	20	21	19	80
Nurse	19	20	21	19	79
Internist	19	21	20	19	79
Community Medicine	20	20	22	22	84
Primary care physicians	20	21	21	21	83
Total					**643**
Content Validity Index					**0.804**

Face validity

The Urdu version was administered to ten adults nominated from public places for face validity, and the face validity was accomplished. The overall items were considered relevant to evaluate heart attack awareness by all respondents.

Awareness of score groups validity.

The correlation between score groups and demographic characteristics of respondents was demonstrated using the Chi-square test, and the p-value was calculated, revealing that some p values are significant while others are not. Female respondents had better awareness of heart attack than male respondents (*P*=.009), according to the analysis. There was also a considerable disparity between educated and uneducated respondents. Educated respondents were more aware than uneducated respondents (*P*=.004). Furthermore, smokers (*P*=002) were found to have a good awareness of heart attacks than individuals with other risk factors such as hypertension and diabetes. However, there was no noticeable link between age, employment status, marital status, income, and previous heart disease experience with knowledge of heart attack.

Table 4 Correlation between score groups and demographics of respondents

Demographics	**Poor Knowledge**	**Adequate knowledge**	***P* value**
Age			
18-35 (young adults)	45.3%	54.7%	.879*
35-55 (middle-aged adults)	46.8%	53.2%	
Gender			**.009***
Male	56.7%	43.3%	
Female	30.0%	70.0%	
Education level			
Primary school	88.9%	11.1%	**.004***
High school	46.2%	53.8%	
College degree	42.9%	57.1%	
Bachelor	36.8%	63.2%	
Postgraduate	11.1%	88.9%	
No education	80.0%	20.0%	
Employment status			

Employed	43.3%	56.7%	.512*
Unemployed	50.0%	50.0%	
Marital status			
Single	51.5%	48.5	.437*
Married	43.3%	56.7%	
Family income			
<10,000/month	71.4%	28.6%	.609*
10,000-30,000/month	50.0%	50.0%	
30,000-50,000/month	43.8%	56.3%	
50,000-70,000/month	50.0%	50.0%	
>70,000/month	25.0%	75.0%	
Don't want to share	43.2%	56.8%	
Self-reported risk factors			
Hypertension	50.7%	49.3%	.157*
Diabetes	45.2%	54.8%	.726*
High cholesterol	51.1%	48.9%	**.005***
Smoking	35.7%	64.3%	**.002***
Other diseases	51.3%	48.7%	.046*
Experience of heart disease			
Personal	60.0%	40.0%	.853*
Close relatives	42.9%	57.1%	
Other relatives or friends	44.4%	55.6%	
No experience	50.0	50.0%	
*Chi-square test Values in bold are statistically significant			

Discussion

To our knowledge, this is the first study in Quetta, Pakistan, to develop and validate a questionnaire to assess the general public's awareness concerning heart attacks. It can be used as a valid instrument in future studies to assess the general public's awareness about heart attacks.

In research, clinical practice, and health assessment, measurement instruments such as questionnaires play a significant role. It's possible that a questionnaire measuring the construct of interest isn't readily available, or that the published questionnaire isn't available in the language that the targeted respondents require. As a result, researchers may need to develop a new questionnaire or translate an existing one into the target respondents' native language. As a

result, the questionnaire was developed in English and subsequently translated into Urdu, Pakistan's official and national language. The questionnaire was developed and translated according to guidelines suggested by Guillemin et al [30] and Beaton el al [31]. According to the findings, the questionnaire was well translated into Urdu using clear and understandable sentences.

The psychometric properties of research instruments (questionnaires) determine their quality. The main psychometric properties of research instruments are reliability and validity. Validity refers to an instrument's ability to measure exactly what it proposes, whereas reliability refers to its ability to reproduce a result consistently in time and space.[27]. The content validity, internal consistency, and test-retest reliability of the currently translated questionnaire were all good. Cronbach's alpha coefficient determines internal consistency. Cronbach's alpha of at least 0.70 has been considered as an indicator of adequate internal consistency in practice [32]. Overall, the study had a high Cronbach alpha of.935, and the items were considered internally consistent because they all had a Cronbach's alpha value of greater than.90. Meanwhile, test-retest reliability was done to ensure the questionnaire's stability across time. Our study of the reliability pre-test and post-test over two weeks revealed satisfactory reliability and stability, with a Spearman's rank correlation coefficient of 0.78 ($p = 0.006$). These results revealed that the questionnaire has excellent reliability and good stability.

The content validity of an assessment tool, such as a questionnaire, must be established to support the validity of the tool, especially for research purposes. Likewise, content validity for this study was determined by calculating the value of the content validity index. For this study, the content validity index was 0.804, suggesting that the contents were highly relevant to the domains and also that the translated Urdu version was well adapted to the local context.

Knowledge score was found to have significant associations with gender, educational level, and smoking in our study, but no relation was noted with age, marital status, employment status, family income, risk factors (hypertension, diabetes), or previous heart disease experience. The findings demonstrated that female gender and formal education have an impact on heart attack awareness. Other studies conducted in Kuwait, Cameroon, Beijing, and Pakistan found similar results [22, 33-35].

Strengths and limitations of the study

This is the first study to develop the questionnaire to access adults' awareness about heart attacks in Quetta, Pakistan. According to the study's findings, the questionnaire is reliable and valid, and it may be utilized in future research with success. A limitation of this study is convenience sampling, which can result in selection bias and so restrict generalizability.

Conclusion

The developed questionnaire is reliable and valid for accessing adults' awareness about heart attack, according to the findings of the current pilot study. It can also be used to find out the correlation between respondents' sociodemographic characteristics and their awareness of heart attacks.

Abbreviations

AMI	Acute myocardial infarction
CVDs	Cardiovascular diseases
MI	Myocardial infarction
PCI	Percutaneous coronary intervention
PKR	Pakistani rupee
WHO	World health organization

Availability of data and materials

The manuscript contains all the data that had been reported. The Corresponding author can be contacted for inquiries to the data.

Ethics approval and consent to participate

Due to ethical limitations and personal data protection, data is available only upon request. The Urdu version of the questionnaire is also available from the authors upon request.

Ethical approval and consent to participate

All study participants provided written informed consent before enrolment into the study. This research was approved by the Ethical Committee of the Department of Pharmacy Practice, Faculty of Pharmacy and Health Sciences, University of Baluchistan.

References

1. World Health Organization. *Cardiovascular Diseases (CVDs)*. 2021,June 11; Available from: https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds).
2. Benjamin, E.J., et al., *Heart disease and stroke statistics—2017 update.* American heart journal, 2017.
3. Mensah, G.A., G.A. Roth, and V.J.J.o.t.A.C.o.C. Fuster, *The global burden of cardiovascular diseases and risk factors: 2020 and beyond*. 2019, American College of Cardiology Foundation Washington, DC. p. 2529-2532.
4. Organization, W.H., *Noncommunicable diseases country profiles 2018.* 2018.
5. Mechanic, O.J. and S.A. Grossman, *Acute Myocardial Infarction*, in *StatPearls [Internet]*. 2019, StatPearls Publishing.
6. Rathore, V., et al., *Risk factors for acute myocardial infarction: A review.* 2018. **2**(1): p. 1-7.
7. Hajar, R.J.H.v.t.o.j.o.t.G.H.A., *Risk factors for coronary artery disease: historical perspectives.* 2017. **18**(3): p. 109.
8. Ahmed, A.A.A., et al., *Awareness of the Risk Factors for Heart Attack Among the General Public in Pahang, Malaysia: A Cross-Sectional Study*. 2020. **13**: p. 3089.
9. Ibanez, B., et al., *2017 ESC Guidelines for the management of acute myocardial infarction in patients presenting with ST-segment elevation: The Task Force for the management of acute myocardial infarction in patients presenting with ST-segment elevation of the European Society of Cardiology (ESC).* 2018. **39**(2): p. 119-177.
10. Moser, D.K., et al., *Reducing delay in seeking treatment by patients with acute coronary syndrome and stroke: a scientific statement from the American Heart Association Council on Cardiovascular Nursing and Stroke Council.* 2007. **22**(4): p. 326-343.
11. Ferry, A.V., et al., *Presenting symptoms in men and women diagnosed with myocardial infarction using sex-specific criteria.* 2019. **8**(17): p. e012307.
12. Greenslade, J.H., et al., *Examining the signs and symptoms experienced by individuals with suspected acute coronary syndrome in the Asia-Pacific region: a prospective observational study*. 2012. **60**(6): p. 777-785. e3.
13. Khan, M.S., et al., *High prevalence of lack of knowledge of symptoms of acute myocardial infarction inPakistan and its contribution to delayed presentationto the hospital*. 2007. **7**(1): p. 1-8.
14. Khan, A., et al., *A study of prehospital delay patterns in acute myocardial infarction in an urban tertiary care institute in Mumbai.* 2017. **65**(5): p. 24-27.
15. Farshidi, H., et al., *Factors associated with pre-hospital delay in patients with acute myocardial infarction.* 2013. **15**(4): p. 312.
16. Barnhart, J.M., et al., *Awareness of heart attack symptoms and lifesaving actions among New York city area residents.* Journal of Urban Health, 2005. **82**(2): p. 207-215.
17. Fang, J., et al., *Awareness of heart attack symptoms and response among adults—United States, 2008, 2014, and 2017.* Morbidity Mortality Weekly Report, 2019. **68**(5): p. 101.
18. Jamaludin, T.S.S., S. Jorani, and S. Saidi, *Knowledge, awareness, and perception of coronary heart disease (CHD) among residents in Kuantan, Pahang, Malaysia.* Enfermeria clinica, 2019. **29**: p. 776-779.

19. Memis, S., et al., *A population-based study on awareness of heart attack in Aydın city-Turkey.* Anatolian Journal of Cardiology/Anadolu Kardiyoloji Dergisi, 2009. **9**(4).
20. Quah, J.L.J., et al., *Knowledge of signs and symptoms of heart attack and stroke among Singapore residents.* BioMed research international, 2014. **2014**.
21. Goff, D.C., Jr, et al., *Knowledge of Heart Attack Symptoms in a Population Survey in the United States: The REACT Trial.* Archives of Internal Medicine, 1998. **158**(21): p. 2329-2338.
22. Rasool, S.M., et al., *Assessment of Knowledge of Symptoms of Ischemic Heart Disease in Population Visiting a Tertiary Care Hospital in Pakistan.* 2019. **11**(8).
23. Rattray, J. and M.C.J.J.o.c.n. Jones, *Essential elements of questionnaire design and development.* 2007. **16**(2): p. 234-243.
24. Memiş, S., et al., *A population-based study on awareness of heart attack in Aydın city-Turkey.* 2009. **9**(4).
25. Whitaker, S., et al., *Public knowledge of the symptoms of myocardial infarction: a street survey in Birmingham, England.* 2012. **29**(2): p. 168-173.
26. Abdo Ahmed, A.A., et al., *Public Awareness of and Action towards Heart Attack Symptoms: An Exploratory Study.* 2020. **17**(23): p. 8982.
27. Souza, A.C.d., N.M.C. Alexandre, and E.d.B.J.E.e.S.d.S. Guirardello, *Psychometric properties in instruments evaluation of reliability and validity.* 2017. **26**: p. 649-659.
28. Taherdoost, H.J.H.t.t.t.v.o.a.q.s.i.a.r., *Validity and reliability of the research instrument; how to test the validation of a questionnaire/survey in a research.* 2016.
29. Tsang, S., C.F. Royse, and A.S.J.S.j.o.a. Terkawi, *Guidelines for developing, translating, and validating a questionnaire in perioperative and pain medicine.* 2017. **11**(Suppl 1): p. S80.
30. Guillemin, F., C. Bombardier, and D.J.J.o.c.e. Beaton, *Cross-cultural adaptation of health-related quality of life measures: literature review and proposed guidelines.* 1993. **46**(12): p. 1417-1432.
31. Beaton, D., et al., *Recommendations for the cross-cultural adaptation of the DASH & QuickDASH outcome measures.* 2007. **1**(1): p. 1-45.
32. Nunally, J.C. and I.H. Bernstein, *Psychometric theory*. 1978, New York: McGraw-Hill.
33. Aminde, L.N., et al., *Population awareness of cardiovascular disease and its risk factors in Buea, Cameroon.* 2017. **17**(1): p. 1-10.
34. Awad, A. and H.J.B.p.h. Al-Nafisi, *Public knowledge of cardiovascular disease and its risk factors in Kuwait: a cross-sectional survey.* 2014. **14**(1): p. 1-11.
35. Zhang, Q.-t., et al., *Public knowledge of heart attack symptoms in Beijing residents.* 2007. **120**(18): p. 1587-1591.