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PSYCHOMETRIC PROPERTIES OF A MALAYALAM VERSION OF MENTAL HEALTH GAP ASSESSMENT MODULE FOR DEMENTIA AMONG ELDERLY LIVING IN A COASTAL COMMUNITY OF SOUTH INDIA.

Medical Science

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ABSTRACT

INTRODUCTION: The prevalence of dementia in the population is increasing with time especially in developing Countries. In a country like India where scarcity of mental health resources are acute, appropriate screening tools can be developed so that community level health workers can screen and refer dementia cases.

OBJECTIVE: To establish the psychometric properties of a Malayalam Version of Mental Health Gap Assessment Module (mhGAP-AMD) for Dementia.

METHODS: 300 purposively selected elderly were assessed with mhGAP-AMD by community health workers and reassessed with Community Screening Instrument for Dementia (CSID BRIEF) by researchers.

RESULTS: mhGAP-AMD yielded a sensitivity of 1, specificity of 0.85, Positive Predictive Value of 0.36 and Likelihood Ratio (LR) of 6. Significant inverse correlation was found between mhGAP-AMD scores and CSID scores (r=0.85). AUC obtained was 0.7 in ROC analysis. Youdens index (J) found a cut-off point of 7 for maximum sensitivity and specificity.

DISCUSSION: The mhGAP-AMD can be used as an effective screening tool for identifying dementia by community health workers and can be referred to specialists cost effectively.

KEYWORDS

Psychometric properties; Elderly; Dementia; mhGAP Assessment Module; CSID;

Introduction

Globally, the population is ageing rapidly. Between 2015 and 2050, the proportion of the world's population of elderly will increase from 900 million to 2 billion people (WHO 2016). India had 90 million elderly in 2011, expected to grow to 173 million by 2026 (United Nations Population Fund and Help Age India 2016). Among this Kerala accommodates 4 million elderly because of higher life expectancy and decreased birth rates.

Over 20% of elderly suffer from any mental or neurological disorder. Out of these Dementia holds a major share. It is estimated that dementia affects one in 14 people over 65 years and one in six over 80 years (Judd N 2016). It is estimated that 47.5 million people worldwide are living with dementia. One new case of dementia is being identified in every 3.2 seconds (Agents, Site T, 2011, WHO, 2016). The total dementia cases are projected to increase to 135.5 million in 2050, with majority of sufferers living in developing countries. Already 58% of people with dementia live in developing countries. The fastest growth in the elderly population as well as Dementia is taking place in countries like China and India. (Agents, Site T, 2011).

In India there are 4.1 million people living with dementia, which accounts for about 11% of the total dementia cases in the world. (World Alzheimer's society 2015). Early detection of dementia provides an opportunity for the individual to adjust to the diagnosis and to participate actively in planning for the future which can reduce the heavy societal costs associated with institutionalization (Leifer BP., 2003).

Diagnosing dementia is often difficult, particularly in the early stages. Moreover, In India there is only 0.3 psychiatrist and 0.12 mental health nurses per 10 lakh population working in mental health sector (WHO 2016). So there exists a huge gap between the number of people affected and the services available. In recognition of this 'treatment gap' the WHO developed Mental Health Gap Action Programme (mhGAP) with the objective of bridging the gap between the community needs and mental health services available developing countries. It proposes training of non-specialists in identifying and managing conditions in community itself for countries especially like India. The mhGAP model guide is developed for health-care providers working in non-specialized health-care settings (WHO 2016).

In developing country like India with limited mental health resources, it is not possible to screen and identify the dementia cases in the community by the psychiatrists or mental health personnel. So a community based approach for screening dementia is the best possible alternative to identify the cases. It can be achieved through training and empowering the community level health workers in screening dementia cases. So they can provide better referrals and effective management of dementia is possible.

Ethical consideration

The study protocol was approved and monitored by Institutional Research Committee (IRC) and Institutional Ethics Committee (IEC). Participants and their caregivers were informed signed the consent form. All personal details were kept confidential.

Methodology

A non-experimental research approach with a descriptive cross sectional survey design was used. Researchers purposively sampled 300 elderly with more than 60 years of age and living with same primary caregiver for last 6 months.

Following tools were used

1. Mental Health Gap Assessment Module (mhGAP-AMD): developed from dementia module of mhGAP intervention guide. The tool has two sections. First section has 7 questions for caregivers which asks changes in behaviour, memory, daily functioning and language. Score ranges from 0 to 7. If participant scored 1 or above, can move to second section with 13 questions which asks caregiver about duration, type of onset and interference with social life because of the symptoms

mentioned in first section then finally check orientation, language and memory of the elderly. Scores ranges from 0 to 13. If the person scores 3 or above in second session, the elderly is likely to be suffering from dementia.

Tool was validated by 6 subject experts. Content validity index was calculated as 0.98 (ranging from 0.82 to 0.98 for individual items). Pretesting done on community health workers and elderly and was found to be easy to administer. Test retest reliability was found to be 0.85 (intra class correlation method). (Table 1)

Table 1 Test retest reliability of mhGAP-AMD

(n=8)

Tool	Test 1 Mean	Test 2 Mean	Lower bound	Upper bound	Intra class correlation coefficient	p value
mhGAP-AMD	8.38	7.75	0.43	0.97	0.85*	0.002

*significant at p <0.05

2. Community Screening Instrument for Dementia (CSID-BRIEF) is a standardised community screening tool for identifying dementia among elderly used as gold standard (Hall et al., 2000, Prince M et al., 2011). It has 2 sections. First section has 9 questions to the elderly which check language, comprehension, orientation to time, place, person and immediate memory. Score ranges from 0 to 9 and a score of 6 or below is an indication of possible dementia (Loevinger coefficient (H= 0.64). Second section is confirmatory section with 6 questions and to be asked to the caregiver about changes in cognition, behaviour, memory and dressing. (H =0.68). It has an AUROC ranged from 0.94 to 0.98.

Study procedure

We have selected 10 health workers of Thalikkulam area, Kerala, who are working with the community in delivering health services. We conducted a training program using PowerPoint presentation, interactive sessions and hand outs on how to screen elderly using mhGAP-AMD including scoring the tool. Later they have been asked to screen all 300 elderly using mhGAP-AMD residing in a particular geographic region. Two days later, the houses were re visited by researchers and screened with gold standard CSID BRIEF. Written instructions were followed by community health workers and researchers to ensure uniform administration procedures. R statistical package was used to analyse the data.

Results

Sample consisted of 188 females (67%) and 112 males (37%) with an average age of 72.4 (SD-6.89) years. While screened with mhGAP-AMD by community health workers, 61 (20.33%) elderly included to possible dementia category. When the researchers screened the elderly with CSID BRIEF, 22 elderly (7.34%) were found to be in possible dementia category. Karl Pearson correlation was calculated for concurrent validity of mhGAP-AMD against gold standard which described a statistically significant moderate negative correlation between mhGAP-AMD scores and CSID BRIEF scores. (Table 2)

Table 2: Dementia among participants

(n=300)

Variables		Frequency	Percentage	Mean score	SD	Karl Pearson correlation coefficient	P value
mhGAP AMD	Possible dementia	61	20.33	7.61	1.35	-0.46**	0.001
	No dementia	239	79.67				
CSID BRIEF	Possible dementia	22	7.33	7.18	1.49		
	No dementia	278	92.67				

**Significant at p <0.001

Sensitivity, Specificity, Positive Predictive Value and likelihood ratio

mhGAP-AMD yielded Sensitivity of 1, specificity of 0.85 and a positive predictive value of 0.36 while compared with CSID BRIEF. Likelihood ratio was calculated as 6.66. (Table 3)

Table 3: sensitivity, specificity and positive predictive value of mhGAP AMD versus CSID

(n=300)

	CSID positive	CSID negative	Total	Sensitivity	Specificity	Positive predictive value
mhGAP AMD positive	22	39	61	1.00	0.85	0.36
mhGAP AMD negative	0	239	239			
Total	22	278	300			

3.4 Diagnostic accuracy

ROC curve is plotted to check the diagnostic accuracy of mhGAP-AMD against CSID and AUC was 0.7. (Figure 1). While calculating Youden's index (J) a diagnostic cut off point 0f 7.5 was observed where we get maximum sensitivity (0.6) and specificity (0.3). (Table 4)

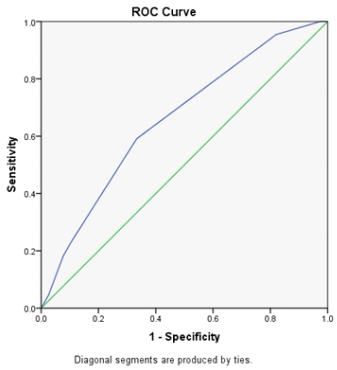

Fig 1 ROC curve for mhGAP AMD and CSID in detecting dementia.

Table 4 ROC analysis of mhGAP AMD and CSID

N=61

AUC	Std. Error	P value	95% Confidence Interval	
			Lower Bound	Upper Bound
0.659*	0.072	0.041	0.517	0.800

*significant at p <0.05 , AUC- Area Under the Curve

Discussion

Analysis of sensitivity scores revealed that of mhGAP-AMD has 100% ability to correctly identify true positive cases of dementia which is comparable to sensitivity of many screening tools for dementia like Intervention for Dementia in Elderly Africans (IDEA- 91.7%) (Grey W et al., 2014), Complex Figure Test (CFT- 73.8%) (Hong X et al., 2013), Rowland Universal Dementia Assessment Scale (RUDAS- 69%) (Nielson T et al., 2013) and Mini Mental Staus Examination (MMSE-100%) (Gagnon M et al., 1990).

Specificity of mhGAP-AMD denotes that it has 85% ability to screen out true negative cases of dementia which is good while compared to specificity of IDEA, CFT, RUDAS and MMSE were 61.7, 93.8, 80 and 78 respectively (Grey W et al., 2014), (Hong X et al., 2013, Nielson T et al., 2013, Gagnon M et al., 1990).

Positive predictive value explains that after getting a positive case with mhGAP-AMD, there is a 36% chance for that case to be true positive of dementia with CSID BRIEF. A moderate Positive predictive value suggests that mhGAP-AMD can be best used for screening dementia rather than a case identifier/ diagnostic tool. Likelihood ratio value explains that a positive case reported by mhGAP AMD is 6 times likely to be true positive.

Since the AUC is more than 0.5, mhGAP-AMD found as diagnostically accurate while setting CSID BRIEF as gold standard. Youden's index (J) of 7.5 denotes that mhGAP-AMD is a best screening tool for community health workers and confirmation to be done with clinical diagnosis.

3.5 Limitations

Purposive sampling and single setting limited the generalization of findings of this study. Similarly, comparison with more tools including clinical diagnosis could have made the methodology stronger.

3.6 Conclusion

The mhGAP-AMD is in general, a good tool with excellent sensitivity, good specificity and moderate positive predictive value and can be best used as a screening tool in non-specialized community health settings. It also has good face validity, concurrent validity and test retest reliability and is suitable for community screening of dementia. More screening tools to be designed in developing countries so that early diagnosis and treatment of dementia can be done cost effectively.

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