International Journal of Psychological Rehabilitation, Vol.24, Issue 07, 2020
ISSN: 1475-7192

Diagnostic Test of Frailty Syndrome Based on Scoring Systems of Cardiovascular Health Study (CHS), Study of Osteoporotic Fracture (SOF), and Tilburg Frailty Indicator (TFI) to Frailty Index Based on Comprehensive Geriatric Assessment (FI-CGA)

Rastita Widyasari[1], Novira Widajanti[2], Jusri Ichwani[2]

Abstract:*The Cardiovascular Health Study (CHS), Study of Osteoporotic Fracture (SOF), and Tilburg Frailty Indicator (TFI) scoring systems are known to be more applicable than Frailty Index Based on Comprehensive Geriatric Assessment (FI-CGA) in community health services but their diagnostic capabilities have not been known. The objective of this study was to find out the diagnostic test of frailty syndrome based on CHS, SOF, and TFI to FI-CGA scoring system in Surabaya elderly community. This study was a cross-sectional analytic study with diagnostic test approach that is calculating sensitivity, specificity, positive predictive value, negative predictive value, positive likelihood ratio, negative likelihood ratio, and ROC curve of CHS, SOF, and TFI to FI-CGA scoring system as reference standard. A total of 170 females and males aged ≥60 years who were enrolled in elderly health center in this study. To classify frail and non-frail conditions, CHS had 78.57% sensitivity, 71.8% specificity, and AUC value of 0.802 (CI=95%, p<0.001), SOF had 23.8% sensitivity, 87.5% specificity, and AUC value of 0.739 (CI=95%, p<0.001), TFI had 71.43% sensitivity, 78.13% specificity, and AUC value of 0.859 (CI=95%, p<0.001). CHS and TFI have a good diagnostic capability to diagnose frailty syndrome in health center for elderly in Surabaya.*

Keywords: *frailty; elderly; CHS; SOF; TFI; FI-CGA*

I. INTRODUCTION

In the elderly, health problems come from declining body cells, so the function and body endurance decreased along with increased risk factors for diseases and infections.[1], [2] Health status is divided into 3 in elderly, there are fit/robust, pre-frailty, and frailty. An elderly person is regarded fit/robust when the cell homeostatic reserve exceeds the number of the deficits, pre-frailty (latent and reversible clinical phase) when physiological reserves are sufficient to

[1] [1]Departement of Internal Medicine, Faculty of Medicine-Dr. Soetomo Teaching Hospital, Universitas Airlangga, Surabaya 60131, Indonesia
[2]Geriatric Division, Departement of Internal Medicine, Faculty of Medicine-Dr. Soetomo Teaching Hospital, Universitas Airlangga, Surabaya 60131, Indonesia , **Corresponding Author :Novira Widajanti,** novirawidajanti@yahoo.com
Geriatric Division, Department of Internal Medicine, Faculty of Medicine, Universitas Airlangga, Surabaya 60131, Indonesia

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

respond to stressors, while frailty when body physiological reserves and cell homeostasis are reduced, resilience against stressors decreased, and increased susceptibility to illness, hospitalization and death.[3]–[5] Besides, the elderly person is susceptible to memory loss and especially in women will experience menopause which can cause depression.[6], [7]

One of the most common causes of disability and death in elderly is frailty syndrome.[3] Frailty syndrome is associated with an increased risk of death, falls, hospitalization, decreased functional capacity, and disability.[8]–[11] However, frailty syndrome is known to have dynamic properties so that it can be prevented and restored.[12], [13] The problem is, until now there is no guidance on simple measuring tools for the diagnosis of frailty syndrome, especially in community health services.[10]

Diagnostic measuring tools for frailty syndrome were developed as a scoring system with the aim of accommodating multidimensional factors of frailty. According to the calculated variables, the frailty syndrome diagnosis scoring system is classified into 3 models, phenotypic model such as Cardiovascular Health Study (CHS) and Study of Osteoporotic Fracture (SOF), multidimensional model such as Tilburg Frailty Indicator (TFI), and deficit accumulation model such as Frailty Index 40 item (FI-40) and Frailty Index based on Comprehensive Geriatric Assessment (FI-CGA).[8], [14]

The FI-40 scoring system began to be developed in 2001 by Rockwood and Mitnitski and it is widely regarded as the gold standard for measuring frailty syndrome. However, FI-40 has limitations to use in community health services because it, for example, requires special measuring devices (spirometer and dynamometer), trained examiners, and takes a long time to process for 20-30 minutes.[14], [15] Compared to FI-40, FI-CGA is easier and shorter because it does not require special tools.[8], [16]

The FI-CGA system is one of the best measuring tools for diagnosing frailty syndrome because it includes physical, social, and psychological components of frailty, has a high correlation with negative outcomes from frailty, and can be done in community health services and clinic.[16], [17] Several studies report that the FI-CGA scoring system has the ability to predict negative outcomes from frailty as good as the FI-40 scoring system. In predicting the mortality rate in the next 2 years and 5 years, the Receiver Operating Characteristic (ROC) analysis shows that the Area Under Curve (AUC) of FI-40 and FI-CGA have differences that are not much different. The FI-40 scoring system had AUC in predicting mortality of the next 2 years and 5 years of 0.77 (95% CI, 0.75–0.79) and 0.75 (95% CI, 0.74–0.77); followed by the FI-CGA scoring system with AUC of 0.75 (95% CI, 0.73–0.77) and 0.74 (95% CI, 0.72–0.75).[17] The limitations of FI-CGA are that it requires impractical examination procedures due to the large number of items being assessed and requires expert examiners.[12] With the consideration that FI-CGA is easier to use in community health services and has the same diagnostic capability as FI-40, in this study FI-CGA was chosen as a reference standard for other scoring systems.

On the other hand, a diagnosis scoring system for frailty syndrome that is easy to do by doctors and medical personnel in community health services includes the CHS scoring system, the SOF, and the TFI. However, the diagnostic ability of each of these scoring systems in community health services in Indonesia has not been widely known.[8], [14] Therefore, this study examined the diagnostic test for frailty syndrome based on CHS, SOF, and TFI scoring systems according to the FI-CGA scoring system in elderly community treated at integrated care post at a community health center in Surabaya.

II. EXPERIMENTAL, MATERIALS AND METHODS

This study was an analytic study with cross sectional design. A total of 170 research subjects were randomly selected from 5 integrated care post (posyandu) from each health centers in regions of Central, North, South, East and West Surabaya. Subjects were women and men aged ≥60 years registered at the integrated care post (posyandu) of health centers in Surabaya in 2018 and able to communicate in Indonesian. Exclusion criteria of this study were elderly

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

with acute infectious disease, hospitalization history of <30 days, history of unstable angina, myocardial infarction <2 months before examination, impaired intellectual function and or severe cognitive decline (AMT score <8, MMSE score <18), as well as a history of new fractures and or a history of surgery <6 months.

In the sampling activities, the assessment of frailty syndrome based on FI-CGA as the reference standard was only carried out by the researchers, while the assessment of frailty syndrome based on CHS, SOF, and TFI was carried out by two research assistants who had been trained. In an effort to avoid bias, researchers and research assistants did not know each other's results. Before conducting the study, the researchers conducted an inter-rater agreement between research assistants in the form of a frailty diagnosis examination based on CHS, SOF, and TFI scoring systems in 10 patients of the Geriatric Clinic, Dr. Soetomo Hospital. From the subjects, we collected data through interviews, physical examination, functional status, cognitive, physical performance, anthropometric measurements based on questionnaires and procedures for measuring the FI-CGA, CHS, SOF, and TFI scoring systems. All research data were tabulated and analyzed using SPSS version 20.0 software to calculate the value of sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV), positive likelihood ratio, negative likelihood ratio, and Receiver Operating Characteristic (ROC) curve to obtain the Area Under Curve (AUC) value. AUC interpretation with a statistical approach classifies the strength of the diagnostic value to be very weak (AUC 50-60%), weak (AUC 60.1-70%), moderate (AUC 70.1-80%), good (AUC 80.1-90 %), and very good (AUC> 90%).

III. RESULTS AND DISCUSSION

In this study the prevalence of frailty syndrome yielded a wide variety of values when measured with 4 system scores (FI-CGA 24.7%, CHS 40.6%, SOF 15.3%, and TFI 34.1%). The subjects of this study were 170 members of the Elderly Integrated Care Post in Surabaya consisting of 130 females (76.5%) and 40 males (23.5%) with the age of 60 years, median 63 years, and age range 60-84 years. Frail subjects had older age median, which was 65 years. Most of the subjects had a low level of education (62.3%, n=106), sufficient economic level (77%, n=131), not working (65.3%, n=111), and in full family coverage (51.8%, n=88) (Table 1). The geriatric profile showed that most of the study subjects were independent elderly (71.2%, n=121), had normal cognitive function (71.2%, n=121), without signs of depression (90.6%, n=154), had normal nutritional status with good MNA (70%, n=119) and with normal BMI (54.7%, n=93), and had musculoskeletal comorbidities (68.8%, n=117). The physical performance of most of the study subjects showed a slowing of walking speed with examination of timed up and go (TUG) test (77.1%, n=131) and 15 feet walking test (15FWT) (81.8%, n=139), balance disorder with functional reach examination (51.2%, n=87), normal hand grip strength (66.5%, n=113), normal physical activity (63.5%, n=108), and normal results of 5 time sit to stand test (94.1%, n=160).

Diagnostic Tests of CHS, SOF, and TFI to FI-CGA Scoring systems

In this study, the results of the diagnostic tests were sensitivity, specificity, PPV, NPV, positive likelihood ratio, negative likelihood ratio, and AUC for each scoring system shown in Table 2 and Figure 1. The CHS scoring system has a sensitivity value of 78.57%, specificity 71.8%, PPV 47.8%, NPV 91.1%, RKP 2.8, RKN 0,3 and AUC were 0.802 (CI=95%, p <0.001). The SOF scoring system had a sensitivity value of 23.8%, specificity 87.5%, PPV 38.46%, NPV 77.78%, positive likelihood ratio 2, negative likelihood ratio 0.86, and AUC 0.739 (95% CI, p<0.001). The TFI scoring system had a sensitivity value of 71.43%, specificity of 78.13%, PPV of 51.72%, NPV of 89.29%, positive likelihood ratio of 3, 26, negative likelihood ratio 0.37, and AUC of 0.859 (CI=95%, p<0.001) which was the highest AUC value among the three scoring systems tested, CHS, SOF, and TFI.

The CHS and TFI scoring systems had good diagnostic ability to diagnose frailty syndrome in the community. While the SOF scoring system did not have good diagnostic capabilities. Even so, the positive results obtained from the

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

diagnosis of frailty syndrome based on the CHS and TFI scoring systems must be accompanied by a confirmation of frailty diagnosis in higher geriatric health services. This statement is similar to the previous statement that concluded that CHS and TFI scoring systems may be used as diagnostic measures in the community, but frailty index scoring system still required further confirmation.[18], [19]

Physiologically elderly experience irreversible decline in cognitive function due to the aging process and progressive degenerative changes.[20] One of various risk factors can affect cognitive status was vascular condition which cause increase in blood pressure.[21], [22] This study found that AUC values were not much different but had different sensitivity and specificity values compared with the other studies.[5] This difference can be due to differences in the characteristics of the study subjects, where the subjects in this study were younger and had good cognitive status compared to other studies. The higher sensitivity value in this study was suggested to result from the subjects who had a good cognitive status in answering questionnaire and following the examination instructions. This was evident from the percentage of measurement domains through interviews, which in this study yielded higher results in the domain of fatigue and the domain of decreased physical activity. While the difference in the value of specificity was also thought to be due to differences in the characteristics of the research subject. Previous study found that 65.5% of the frail research subjects experienced weakness in hand grips, whereas in this study only the percentage was 12.7%. On the other hand, the CHS scoring system in this study was not much different in AUC value compared with other studies.[5]

The SOF scoring system had a sensitivity value of 23.8%, specificity 87.5%, PPV 38.46%, NPV 77.78%, positive likelihood ratio 2, negative likelihood ratio 0.86, and AUC 0.739 (95% CI, $p < 0.001$). The low sensitivity value of the SOF scoring system was supported by the previous study which obtained a SOF sensitivity value of 17.6% and 99.5% specificity to distinguish frailty and non-frailty conditions.[23] The sensitivity value of the low SOF scoring system was thought to be due to the lack of sensitivity of the 5 time of sit to stand (5TSST) examination test in assessing the physical performance of an elderly person. The assumption resulted from the findings in this study that most of the subjects had normal results in the 5TSST examination, but showed a decrease in physical performance on TUG and 15FWT measurements. The person in advanced age is likely to experience a decrease in physical quality such as a weakness in his legs.[24] Also, the 5TSST is a qualitative assessment by only assessing the ability to complete examination orders without time constraints, while the TUG and 15FWT examination is an examination with a time limit as the examination procedures to be re-categorized according to the percentile (semi-quantitative). In addition, the AUC value was not much different from that in a previous study which conducted SOF diagnostic test on 9704 women aged 65 years in the United States community. Their study found that the SOF scoring system had AUC of 0.72 ($p=0.10$) to predict mortality in frail patients.[25] The AUC value of the study was not much different caused by the characteristics of the subjects in this study, where the majority of whom were females.

The findings in TFI scoring system had a sensitivity value of 71.43%, specificity of 78.13%, PPV of 51.72%, NPV of 89.29%, positive likelihood ratio of 3, 26, negative likelihood ratio 0.37, and AUC of 0.859 (CI=95%, $p<0.001$) which was the highest AUC value among the three scoring systems tested, CHS, SOF, and TFI. The value obtained by this study did not show much difference compared with the other studies in predicting frail elderly disability. It is caused by the psychological domain which dominated the frail subjects. Most of the frail subjects showed positive results on anxiety feeling domains and feelings of inferiority.[5]

This study had several limitations, including the characteristics of subjects who showed that the ratio of females and males was much higher than the general ratio of elderly females and males in general in Indonesia. Thus, further studies with the characteristics of subjects that are closer to the characteristics of the elderly in general in Indonesia is highly necessary.

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

IV. CONCLUSION

CHS and TFI scoring systems can be used as diagnostic tools for frailty syndrome in community health services.

REFERENCES

[1] R. Amelia, J. Harahap, A. S. Wahyuni, and A. Pratama, "Health status of elderly based on daily activities living, cholesterol and uric acid profile in Medan city," 2018, vol. 125, no. 1, doi: 10.1088/1755-1315/125/1/012175.

[2] M. Miftahussurur and Y. Yamaoka, "Helicobacter pylori virulence genes and host genetic polymorphisms as risk factors for peptic ulcer disease," *Expert Rev. Gastroenterol. Hepatol.*, vol. 9, no. 12, p. 1535, 2015.

[3] J. Bauer and C. Sieber, "Sarcopenia and frailty: A clinician's controversial point of view," *Exp. Gerontol.*, vol. 43, pp. 674–678, Aug. 2008, doi: 10.1016/j.exger.2008.03.007.

[4] P.-O. Lang, J.-P. Michel, and D. Zekry, "Frailty syndrome: a transitional state in a dynamic process.," *Gerontology*, vol. 55, no. 5, pp. 539–549, 2009, doi: 10.1159/000211949.

[5] M. Roppolo, A. Mulasso, R. J. Gobbens, C. O. Mosso, and E. Rabaglietti, "A comparison between uni- and multidimensional frailty measures: prevalence, functional status, and relationships with disability.," *Clin. Interv. Aging*, vol. 10, pp. 1669–1678, 2015, doi: 10.2147/CIA.S92328.

[6] Raodah, Masni, and R. M. Thaha, "Relationship between hormonal contraception use with age of menopause among elderly at Posyandu Sidodadi village Wonomulyo subdistrict Polewali Mandar district," 2018, pp. 68–72, doi: 10.1145/3242789.3242801.

[7] B. Thalib, B. Horas, E. Machmud, Asmawati, and R. Hasyim, "Alteration of memory and depression in elderly with full overdenture - Pilot study," *J. Int. Dent. Med. Res.*, vol. 11, no. 1, pp. 62–65, 2018.

[8] G. A. Aguayo *et al.*, "Agreement Between 35 Published Frailty Scores in the General Population," *Am. J. Epidemiol.*, vol. 186, no. 4, pp. 420–434, Jun. 2017, doi: 10.1093/aje/kwx061.

[9] B. J. Buta *et al.*, "Frailty assessment instruments: Systematic characterization of the uses and contexts of highly-cited instruments.," *Ageing Res. Rev.*, vol. 26, pp. 53–61, Mar. 2016, doi: 10.1016/j.arr.2015.12.003.

[10] J. Apóstolo *et al.*, "Predicting risk and outcomes for frail older adults: an umbrella review of frailty screening tools," *JBI Database Syst. Rev. Implement. Reports*, vol. 15, pp. 1154–1208, Apr. 2017, doi: 10.11124/JBISRIR-2016-003018.

[11] V. G. Moreira and R. A. Lourenço, "Prevalence and factors associated with frailty in an older population from the city of Rio de Janeiro, Brazil: the FIBRA-RJ Study," *Clinics (Sao Paulo).*, vol. 68, no. 7, pp. 979–985, Jul. 2013, doi: 10.6061/clinics/2013(07)15.

[12] A. B. Mitnitski, A. J. Mogilner, and K. Rockwood, "Accumulation of deficits as a proxy measure of aging," *ScientificWorldJournal.*, vol. 1, pp. 323–336, Aug. 2001, doi: 10.1100/tsw.2001.58.

[13] G. A. Van Kan, Y. Rolland, H. Bergman, J. E. Morley, S. B. Kritchevsky, and B. Vellas, "The I.A.N.A Task Force on frailty assessment of older people in clinical practice.," *J. Nutr. Health Aging*, vol. 12, no. 1, pp. 29–37, Jan. 2008, doi: 10.1007/bf02982161.

[14] E. Dent, P. Kowal, and E. O. Hoogendijk, "Frailty measurement in research and clinical practice: A review," *Eur. J. Intern. Med.*, vol. 31, pp. 3–10, Jun. 2016, doi: 10.1016/j.ejim.2016.03.007.

[15] K. Rockwood and A. Mitnitski, "Frailty defined by deficit accumulation and geriatric medicine defined by frailty.," *Clin. Geriatr. Med.*, vol. 27, no. 1, pp. 17–26, Feb. 2011, doi: 10.1016/j.cger.2010.08.008.

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

[16] D. M. Jones, X. Song, and K. Rockwood, "Operationalizing a frailty index from a standardized comprehensive geriatric assessment.," *J. Am. Geriatr. Soc.*, vol. 52, no. 11, pp. 1929–1933, Nov. 2004, doi: 10.1111/j.1532-5415.2004.52521.x.

[17] O. Theou, T. D. Brothers, A. Mitnitski, and K. Rockwood, "Operationalization of frailty using eight commonly used scales and comparison of their ability to predict all-cause mortality.," *J. Am. Geriatr. Soc.*, vol. 61, no. 9, pp. 1537–1551, Sep. 2013, doi: 10.1111/jgs.12420.

[18] S. F. Metzelthin, R. Daniëls, E. van Rossum, L. de Witte, W. J. A. van den Heuvel, and G. I. J. M. Kempen, "The psychometric properties of three self-report screening instruments for identifying frail older people in the community.," *BMC Public Health*, vol. 10, p. 176, Mar. 2010, doi: 10.1186/1471-2458-10-176.

[19] T. Pialoux, J. Goyard, and B. Lesourd, "Screening tools for frailty in primary health care: a systematic review," *Geriatr. Gerontol. Int.*, vol. 12, no. 2, pp. 189–197, 2012.

[20] Kushariyadi, "Memory Stimulation, Intervention Increase Elderly Cognitive Function," *J. Ners*, vol. 8, no. 2, pp. 317–329, 2013, doi: http://dx.doi.org/10.20473/jn.v8i2.3836.

[21] F. I. Fitri and A. S. Rambe, "Correlation between hypertension and cognitive function in elderly," 2018, vol. 125, no. 1, doi: 10.1088/1755-1315/125/1/012177.

[22] M. Sulam, "Correlation Between Nutritional Status And Waist Circumference With The Incidence Of Hypertension In The Elderly," *J. Berk. Epidemiol.*, vol. 8, no. 1, pp. 81–88, 2020, doi: http://dx.doi.org/10.20473/jbe.V8I12020.81-88.

[23] E. Seto, S. Setiati, P. W. Laksmi, and T. Z. Tamin, "Diagnostic test of a scoring system for frailty syndrome in the elderly according to cardiovascular health study, study of osteoporotic fracture and comprehensive geriatric assessment based frailty index compared with frailty index 40 items," *Acta Med. Indones.*, vol. 47, no. 3, 2015.

[24] B. Siregar, U. Andayani, R. P. Bahri, Seniman, and F. Fahmi, "Real-time monitoring system for elderly people in detecting falling movement using accelerometer and gyroscope," 2018, vol. 978, no. 1, doi: 10.1088/1742-6596/978/1/012110.

[25] K. E. Ensrud *et al.*, "Comparison of 2 Frailty Indexes for Prediction of Falls, Disability, Fractures, and Death in Older Women," *Arch. Intern. Med.*, vol. 168, no. 4, pp. 382–389, Feb. 2008, doi: 10.1001/archinternmed.2007.113.

Table 1. Characteristics of research subjects on various frailty statuses based on the FI-CGA scoring system

Variables		**Total (Percentage)**	**Frail subjects n=42**	**Pre-frail subjects n=50**	**Fit subjects n=78**
Gender	• Females	130 (76.5%)	32 (18.8%)	36 (21.2%)	62 (36.5%)
	• Males	40 (23.5%)	10 (5.8%)	14 (8.2%)	16 (9.4%)
Marriage status	• Married	91 (53.5%)	26 (15.3%)	24 (14.1%)	41 (24.1%)
	• Widow/~er due to death	72 (42.4%)	17 (10%)	22 (12.9%)	33 (19.5%)

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

	• Widow/~er, divorced	3 (1.8%)	0 (0%)	2 (1.2%)	1 (0.6%)
	• Unmarried	4 (2.4%)	1 (0.6%)	0 (0%)	3 (1.8%)
Level of education	• Low • (no education - elementary)	106 (62.3%)	35 (20.6%)	23 (13.5%)	48 (28.2%)
	• Middle • (junior-senior high)	53 (31.2%)	16 (9.4%)	12 (7.1%)	25 (14.7%)
	• High (university)	11 (6.5%)	1 (0.6%)	5 (2.9%)	5 (2.9%)
Economic status	• Low	31 (18.2%)	9 (5.4%)	11 (6.8%)	11 (6.8%)
	• Moderate	131 (77%)	32 (18.8%)	40 (23.5%)	59 (34.7%)
	• More than moderate	8 (4.7%)	3 (1.8%)	1 (0.5%)	4 (2.4%)
Living coverage by	• Self	40 (23.5%)	3 (1.8%)	11 (6.5%)	26 (15.2%)
	• Part from others/family	42 (24.7%)	10 (5.9%)	17 (10%)	15 (8.8%)
	• Fully from others/family	88 (51.8%)	29 (17.1%)	22 (12.9%)	37 (21.8%)
Recent occupation	• No work (including retired)	111 (65.3%)	32 (18.8%)	29 (17.1%)	50 (29.4%)
	• Entrepreneur	43 (25.3%)	8 (4.8%)	16 (9.4%)	19 (11.1%)
	• Private sector	9 (5.3%)	2 (1.2%)	1 (0.6%)	6 (3.5%%)
	• Others	7 (4.1%)	0 (0%)	4 (2.4%)	3 (1.7%)

Table 2. Comparison of CHS, SOF, and TFI scoring systems in distinguishing frailty and non-frailty syndromes (fit and prefrail)

	Sensitiviy	Specificity	PPV	NPV	positive likelihood ratio	negative likelihood ratio	AUC
CHS	78.57%	71.8%	47.8%	91.1%	2.8	0.3	0.802
SOF	23.8%	87.5%	38.46%	77.78%	2	0.86	0.739

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019

TFI	71.43%	78.13%	51.72%	89.29%	3.26	0.37	0.859

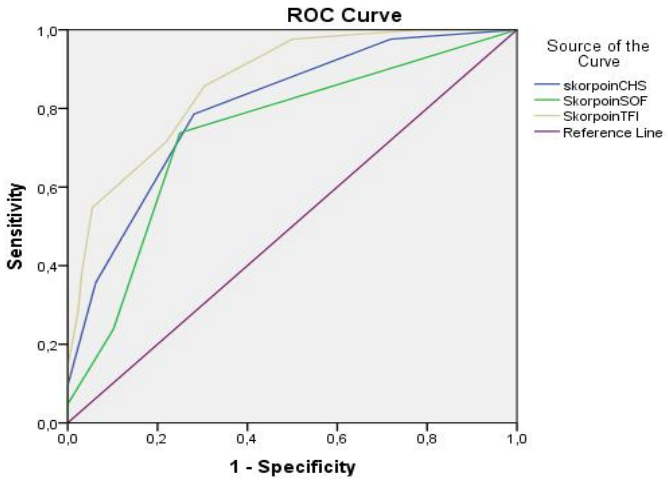

Figure 1. ROC curve of the diagnostic test of CHS, SOF, and TFI scoring systems to FI-CGA in classifying frailty and non-frailty

Received: 10 Nov 2018 | Revised: 20 Dec 2018 | Accepted: 02 Jan 2019