

1 **Psychometric Properties of the Spanish Version of the Functional Evaluation of**
2 **Cardiac Health Questionnaire “FETCH-Q™” for Assessing Health-related**
3 **Quality of Life in Dogs with Cardiac Disease**

4

5 [Spanish version of the FETCH-Q™ for assessing health-related quality of life in](#)
6 [Dogs with cardiac disease](#)

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22

23 **Acknowledgements:** The authors would like to thank Dr. John Rush, Dr. Lisa
24 Freeman and Professor Carmen Dussan-Lubert for their invaluable help in the
25 project and statistical advices for this study. The authors are also grateful for the
26 efforts made by Dr. Pablo Carle, Dr. Sergio Sanchez, Dr. Marianela Rausseo, Dr.
27 Adelaida Mejia and Dr. Jose Yañez; without their great job, this project would not
28 have been possible.

29

30 **Abstract**

31 Objective

32 To evaluate the psychometric properties of the Spanish version of the "FETCH-Q™"

33 Animals

34 Two hundred forty dogs with cardiovascular diseases and no comorbidities

35 Methods

36 After forward and back translation, the content validity was evaluated through
37 feedback from veterinary colleagues. For convergent validity, the total score was
38 correlated with the heart disease/failure (ISACHC) class. For construct validity, the
39 overall quality of life of the dog and the results obtained in each item was correlated.

40 The reliability of the questionnaire was assessed using the Cronbach's alpha test. To
41 evaluate the test-retest validity the intra-class correlation coefficient and Wilcoxon-
42 rank test were used to analyze the changes in total score of dogs that were
43 reexamined.

44 Results

45 A good agreement with the original questionnaire was evident. The face and content
46 validity was appropriate. For construct validity, the questionnaire obtained $r > 0.096$
47 to < 0.82 ; ($p < 0.05$). The convergent validity was appropriate and the correlation was r
48 = 0.819 ($p < 0.001$). Cronbach's alpha test was ($\alpha = 0.887$) showing an appropriate
49 internal consistency. The test-retest evaluation revealed adequate repeatability (ICC
50 = 0.87 ; $p < 0.001$). There was no difference in the owner responses to the
51 questionnaire at baseline and two weeks later ($p > 0.05$) in dogs that had stable
52 cardiac disease. The mean and standard deviation (SD) of patients with the
53 maximum score obtained was 3.5 ± 1.5 . The mean and SD of patients with the
54 minimum score obtained was 7 ± 2.4 .

55 Conclusion

56 This study supports the conclusion that this Spanish version of the functional
57 evaluation of cardiac health questionnaire "FETCHSV2-Q" to assess HRQoL in dogs
58 with cardiovascular disease is valid.

59

60 **Key Words:** Qualities of life, health-related, fetch questionnaire, psychometric
61 evaluation, dog, congestive heart failure

62

63 Introduction

64 Traditionally, physicians and veterinarians have acquired key information from
65 patients and pet owners that focuses on history, including the frequency and severity
66 of clinical signs at presentation, and on recurrence of events, such as hospitalization
67 [1-3]. In recent decades, especially in human medicine, additional information has
68 been sought out and collected regarding variables that are indicative of the day-to-

69 day changes in variables that relate to quality of life that are important to patients and
70 owners [1, 4, 5]. This concept is known as patient-reported outcome measures
71 (PROMs), with the health-related quality of life (HRQoL) measures being the most
72 important [6-9]. PROM is a broad term that refers to the standardized collection of
73 information that is focused on the perspective that the patient or owner has on the
74 quality of life at a point in time. This information is commonly obtained through a
75 validated questionnaire [1, 2, 10]. The primary focus is often to monitor the
76 progression of the diseases and the impact of therapeutic intervention [4, 11]. PROM
77 can also be useful in predicting outcome and survival [5, 12, 13].

78

79 Measures of quality of life are used to complement traditional measures of success
80 such as to survival time [1, 14]. They have been used in areas as diverse as drug
81 discovery [15] and clinical practice [4]. Their significance in documenting therapeutic
82 success has been reported [16, 17]. Agencies such as the European Medicines
83 Agency [18] and the US Food and Drug Administration [19] recommend the use of
84 HRQoL measures to document the effects of drugs in public health [20], clinical
85 medicine and preventive care settings [3]. The American Heart Association (AHA)
86 [21] and Colombian Society of Cardiology (SCC) [22] also support this approach in a
87 wide spectrum of approaches to heart disease and during cardiovascular
88 rehabilitation [23].

89

90 Quality of life is a broad multidimensional concept that usually includes subjective
91 evaluation of variables that have both positive and negative effects on life [24, 25].
92 HRQoL refers specifically to the impact of a disease and its clinical consequences on

93 individual quality of life [26-28]. HRQoL functions as a common reference point that
94 can then be used to measure the impact of different interventions and treatments for
95 the same health conditions [29]. The instruments that assess HRQoL have evolved
96 to measure the impact of the disease, the effect of specific treatment and a range of
97 other health-related variables on the lives of patients [26, 30]. It is essential to subject
98 any instrument that is designed to assess HRQoL to rigorous testing to determine if
99 these instruments are reliable and valid forms of measurement within the target
100 population (e.g., dogs with cardiac disease). That is, the instrument must be
101 psychometrically analyzed. In addition to the test (usually a questionnaire) being valid
102 and reliable, it should also be easy to interpret and evaluate before being used in a
103 clinical setting [31-33].

104

105 The application of a questionnaire in a specific setting does not mean it will work in
106 another setting [34-36]. Some of the most important limitations of using a
107 questionnaire in a different setting are language and culture [3]. Oftentimes a
108 questionnaire needs to be adapted to the context of a new population that has
109 different sociocultural characteristics [37, 38]. Often, the grammar, the syntax and the
110 semantic differences upset the reliability and repeatability of the questionnaire [35,
111 38].

112

113 The Functional Evaluation of Cardiac Health Questionnaire "FETCH-Q™" created in
114 2005 by Freeman and colleagues [39] was originally developed and validated with
115 360 dogs belonging to English-speaking owners. The questionnaire was designed to
116 be used as a disease-specific instrument for assessment of health-related quality of

117 life in dogs with congenital and acquired heart disease. To use this questionnaire
118 within the Spanish-speaking community, it is necessary to investigate the
119 psychometric properties (the reliability and validity of these forms of measurement) of
120 the questionnaire in this population of owners of dogs with cardiac disease.
121 Therefore, the aim of this cross-sectional multicentre study was to evaluate the
122 psychometric properties of a Spanish version of the "FETCH-Q™" and validate its
123 use with Spanish-speaking owners of dogs with cardiac disease.

124

125 **Materials and method**

126 Two professional translators translated the FETCH-Q™ from English into Spanish
127 independently. After forward and back translation, the face and content validity of the
128 FETCHSV2-Q were evaluated by non-experts (lay persons), ethologists and
129 veterinary colleague's feedback. The structure of the questionnaire consists of
130 eighteen items that ask about how a cardiac disease negatively affects the quality of
131 life (see appendix). These questionnaires only ask to the owner about the last two
132 weeks of life of their pets. The possible score in the FETCHSV2-Q™ ranked between
133 (0 - 85 points) was transformed to a percentage by dividing the score obtained for
134 each patient by the maximum possible score and multiplied by 100. In the initial study
135 (n = 360) the FETCH-Q™ showed good internal consistency [39]. High scores on
136 the FETCH-Q™ indicate a negative impact of heart disease on quality of life. The
137 validation procedure of the Spanish version of the FETCHSV2-Q was performed
138 according to the instructions of the Mapi Research Institute [40] and the Scientific
139 Advisory Committee of the Medical Outcomes Trust [41]. Finally, the Functional

140 Evaluation of Cardiac Health - Spanish Version Questionnaire (FETCHSV2-Q) was
141 created.

142

143 **Study population**

144 Any dog diagnosed with congenital or acquired heart disease with or without
145 documented congestive heart failure (CHF) that was examined between January
146 2015 and December 2016 was eligible to be included in this study. Dogs could be of
147 any age, weight, breed or sex. The dogs were examined at seven private veterinary
148 clinics and one veterinary teaching hospital located in four Spanish-speaking
149 countries (Manizales-Colombia, Medellin-Colombia, San Martin de los Andes-
150 Argentina, Buenos Aires-Argentina, Caracas-Venezuela, Malaga-España, Vigo-
151 España). After obtaining institutional review board approval from the ethics
152 committee of the University of Caldas, the respective review committees at each
153 clinic approved the project and informed consent was obtaining from each owner.

154

155 **Data Collection**

156 The referring clinician and cardiologist provided routine clinical and diagnostic data
157 for each dog that included an echocardiogram, thoracic radiographs, an
158 electrocardiogram, cardiac biomarkers (NT-proBNP or cardiac troponin I), an
159 assessment of the functional class of heart failure (ISACHC class) and the results of
160 the FETCHSV2-Q™. The questionnaire was completed by each owner using a
161 website designed to collect these data (www.scorefetchsv2.wixsite.com/inicio). All
162 owners had to be willing to participate in the study, had to have Spanish as their

163 native language, had to have an acceptable level of education, had to have no
164 history of cognitive impairment and had to have lived with the dog for at least six
165 consecutive months prior to entry.

166

167 **Reliability Cohort**

168 Randomly selected, 51 owners completed the questionnaire during the first visit and
169 again 2 weeks later to perform the questionnaire's test-retest reliability [42]. Clients
170 included in this group completed the questionnaire two weeks after completing the
171 questionnaire for the first time. Because of this, the most severe affected dogs were
172 not included in this analysis because it was essential that the patients remained
173 stable during this observation period.

174

175 **The FETCH-Q™ and FETCHSV2-Q**

176 The FETCH-Q™ is a questionnaire devised to be easily completed by owners. It
177 only takes into account the last two weeks of the pet's life. In the initial study (n =
178 360) it showed good internal consistency [39]. High scores on the FETCH-Q™
179 indicate a negative impact of heart disease on quality of life. The validation procedure
180 of the Spanish version of the FETCHSV2-Q was performed according to the
181 instructions of the Mapi Research Institute [40] and the Scientific Advisory Committee
182 of the Medical Outcomes Trust [41]. Finally, the Functional Evaluation of Cardiac
183 Health - Spanish Version Questionnaire (FETCHSV2-Q) was created.

184

185

186 **Validation of the FETCHSV2-Q instrument**

187 To demonstrate convergent validity the total FETCHSV2-Q score was correlated with
188 the ISACHC class (International Small Animal Cardiac Health Council) using
189 Spearman rank correlation test. For construct validity, owners at the same time were
190 asked to evaluate the overall quality of life of the dog and their answers were
191 correlated with the results obtained in the individual items using Spearman rank
192 correlation test. A p-value < 0.05 was considered statistically significant.

193

194 **Statistical analysis for reliability and repeatability**

195 All the statistical analyses were carried out using the statistical software R V.2.15.3.
196 Data normality was evaluated using the Kolmogorov-Smirnov test. The reliability of
197 the questionnaire was assessed with the Cronbach's alpha test (α) [43]. This test
198 reflects the cohesion of each item or question with the same objective (e.g., assess
199 the impact of disease on quality of life). Cronbach's alpha (α) values ≥ 0.7 have been
200 considered acceptable, a value > 0.8 have been considered good and a value > 0.9
201 has been considered excellent. To evaluate the test-retest repeatability of the
202 questionnaire, the intra-class correlation coefficient and the Wilcoxon rank test were
203 used to analyze the changes in FETCHSV2-Q score of patients that were followed-
204 up two weeks later as described by Terwee [42]. The intra-class correlation
205 coefficient (ICC) denotes the proportion of variability in scores and an ICC > 0.4 , 0.6
206 and 0.8 indicate moderate, substantial and excellent repeatability, respectively. The
207 ceiling and floor effect was displayed with the mean scores, standard deviation and
208 percentage of patients with the maximum possible score and minimum possible
209 score, respectively as described by Gonzalez [44]. A p-value < 0.05 was considered
210 statistically significant.

211

212 **Results**

213

214 **Population**

215 Records from Two hundred forty dogs (n = 240) were evaluated. Table 1 shows the
216 demographic information and Figure 1 shows the distribution of the different stages
217 of heart disease/failure. Most dogs were suffering from myxomatous atrioventricular
218 valve disease (n = 159, 66%). Dilated cardiomyopathy was present in 29 % of the
219 dogs (n = 69), most frequently affecting giant breeds and cocker spaniel. Pulmonary
220 hypertension (n = 3) and arrhythmogenic right ventricular cardiomyopathy of Boxers
221 (n = 4) were present in 3% of dogs. Atrial septal defect (n = 2), cor triatriatum dexter
222 (n = 1), subaortic stenosis (n = 1) and patent ductus arteriosus (n = 1) added up to 2
223 % of the diseases of dogs included in this study. Twenty-seven dogs (11 %) had died
224 by the time of data collection.

225

226 **Validation**

227 After forward and back translation, no changes were identified in the questionnaire
228 and a good agreement with the original questionnaire was subjectively evident. The
229 face and content validity were approved by all the pre-evaluators who considered it to
230 be appropriate easy to understand by the owner. For construct validity, each item
231 was correlated with the overall quality of life evaluated by the owner. Correlations (r)
232 ranged > 0.096 to < 0.82; (p< 0.05). The convergent validity was appropriate (Figure
233 2) and the correlation between a set of ranges of the total score obtained in the

234 FETCHSV2-questionnaire and the classes of heart disease/failure ISACHC was $r =$
235 0.82 ($p < 0.001$).

236

237 **Reliability and repeatability**

238 The Kolmogorov-Smirnov test showed a non-normal data distribution ($p < 0.05$).
239 Cronbach's alpha was ($\alpha = 0.887$) showing an appropriate internal consistency of the
240 questionnaire. The test-retest had an adequate repeatability on the intra-class
241 correlation coefficient test (ICC = 0.87; $p < 0.001$). The Wilcoxon rank test showed no
242 difference in responses at baseline and two weeks later ($p > 0.05$). The mean,
243 standard deviation (SD) and percentage of patients with the maximum score
244 obtained (ceiling effect) was 3.5 ± 1.5 (0.77 %). The mean and SD of patients with
245 the minimum score obtained (floor effect) was 7 ± 2.4 (1.05 % of total population).

246

247 **Discussion**

248 Our research describes step-by-step the rigorous psychometric evaluation to which
249 the Spanish version of the functional evaluation of cardiac health questionnaire
250 (FETCHSV2-Q) was submitted in a cross-cultural validation context. It proved to be a
251 questionnaire that was apparently clear, valid, reliable, repeatable in clinical settings
252 and useful as a measurable result for clinical research. The high internal consistency
253 ($\alpha = 0.887$) supports the evidence that all eighteen items are highly correlated with
254 each other and suggests that the instrument is reliable for measuring the health-
255 related quality of life in this group of dogs with different naturally occurring
256 cardiovascular diseases. This value was somewhat lower than the results obtained
257 during the initial validation of the FETCH-Q instrument [39] where authors obtained α
258 > 0.90 . Nevertheless, our research still confirms the FETCHSV2-Q can be used to

259 evaluate the clinical course of cardiovascular diseases in dogs since there was a
260 strong correlation with the functional class of CHF (ISACHC) [45]. However, the
261 scattered correlation of each item suggests that some questions may not be
262 important enough to remain in the questionnaire. In addition, the high correlation
263 between all items (Cronbach alpha greater than 0.90) means there may be
264 redundant items in the questionnaire [1] [31]. On the other hand, in this study a
265 reliability coefficient > 0.80 is excellent as it implies that 80% of the measured
266 variances are reliable and only 20% are due to random error [46, 47].

267 In the study design, if more than 30% of the FETCHSV2-Q questions were not
268 properly filled in, the questionnaire was excluded from the statistical analysis. The
269 fact that no questionnaire was excluded demonstrates the ease and simplicity of
270 completing the questionnaire and apparently confirms to some extent the content
271 validity [48]. The need for a questionnaire to be simple (easy to understand) has
272 been reported in other research in order for it to be a valid instrument for clinical use.
273 [45, 49].

274
275 The growing need to use alternative tools to demonstrate treatment outcomes for
276 cardiovascular disease has placed focus on HRQoL questionnaires in public health
277 where the QoL of the patient is often considered to be the main objective [38].
278 Currently in human health economics, HRQoL questionnaires are adjusted to reflect
279 the quality of life over years. This has been identified as a useful tool in cost-utility
280 analyses [50]. Moreover, HRQoL questionnaires have become a widely used tools
281 for assessing the rehabilitation of several different chronic diseases [51, 52],
282 demonstrating particular advantages over traditionally measured biological variables
283 [36]. It is clear that the evaluation of biological outcomes such as the development of

284 congestive heart failure, ventricular function and survival time are not all the essential
285 evidence needed to provide proper management of dogs with cardiovascular disease
286 [21, 26, 53]. Addressing only objective variables and survival fails to address the
287 multi-dimensionality of quality of life in an animal [54]; especially the subjective
288 nature of some of its components [55, 56]. The evaluation of some results as
289 subjective factors [57] that can be measurable is the complement that must be
290 necessarily included in future investigations that evaluate the success of a medical or
291 surgical treatment [16, 58, 59]. Some subjective non-physical aspects such as
292 emotional stress, physical discomfort, restrictions on daily life and loss of social-
293 affective interaction are indicators of health-related quality of life in dogs [60, 61].
294 Thus, improvement in HRQoL is considered an important therapeutic benefit, similar
295 to mortality and morbidity [60, 62, 63]. In addition, congestive heart failure morbidity
296 not only increases the recurrence of hospitalization [21, 64] and limitations during
297 exercise (fatigue, dyspnea or syncope), but is also responsible for psychological and
298 emotional complications in people and animals affecting well-being [37, 56]. In
299 contrast, in some studies HRQoL has been shown to be a good predictor of mortality
300 and hospitalization in patients with CHF [65]. However, even after evidence, health-
301 related quality of life is not yet a primary goal in some treatments [26].

302

303 It has been shown that disease-specific questionnaires are superior to general
304 questionnaires. In humans, general questionnaires cannot properly evaluate and take
305 into account the complexity of the psychosocial and physical sequelae of a particular
306 disease and so can create erroneous results [45, 66]. It is also possible that specific-
307 disease questionnaires are superior to general questionnaires in dogs if they can be
308 shown to have adequate psychometric properties for a particular sick dog population

309 [67, 68]. An example of a specific questionnaire in humans is the Minnesota Living
310 with Heart Failure Questionnaire, which is the most frequently used questionnaires in
311 people with CHF [37]. It is used to evaluate patients' perceptions of the effects of a
312 variety of physical and emotional variables on the lives of people with heart failure.
313 There are at least 34 different language versions of the questionnaire [34]. The
314 original English version was developed by Thomas Rector in 1987 [69] to assess the
315 impact of CHF on HRQoL. Most of the linguistic adaptations of the MLHFQ have
316 been created following the same forward and back translation process used in the
317 current study [37].

318

319 There are several limitations in our study that deserve consideration. First, the
320 sample size was relatively small. However, this study was conducted at different
321 veterinary centers in four countries, providing a wide range of sociocultural,
322 economic, educational and environmental contexts that enriches the psychometric
323 properties of the questionnaire with a heterogeneous group of dogs and possibly
324 overcome the limitation of sample size. Second, it is unknown if the questionnaire is
325 unidimensional or multidimensional in nature. All items in the questionnaire were
326 treated as if they were equally important. There is a possibility that some factors may
327 be more important than others in dogs with heart disease and future research is
328 necessary to determine these different factors by advanced statistical methods [70],
329 such as principal component analysis [71] or by a subjective approach [72]. Third, no
330 sub-group analysis was done. This occurred because the number of dogs from each
331 clinic was too small for robust statistical analysis; the entire population was
332 considered as a total sample. The small number of critical dogs ($n = 9$) in the late
333 stages of heart failure was also a limitation. Unfortunately, the difficulty of follow-up

334 dogs limited the collection of data for evaluated the responsiveness of the
335 questionnaire to changes in the clinical status of the disease or the impact of the
336 therapy over time and further research is needed.

337

338 **Conclusion**

339 The results of this study support the validity of the Spanish version of the functional
340 evaluation of cardiac health questionnaire "FETCHSV2-Q" to evaluate HRQoL in
341 dogs with naturally occurring cardiovascular disease. These results provide new
342 information that justifies its use in clinical settings and the authors hope it will be use
343 in future research where the quality of life is an important goal. In the other hand, the
344 satisfaction of dog health care needs can be promoting through the HRQoL
345 assessment. However, the cooperation of owners and their participation in the health
346 care of their own pet are the most important factors that facilitate education,
347 communication and improve adherence with cardiologist's recommendations,
348 especially in decision-making (e.g definitive surgical correction, rehabilitation and
349 change in therapy or euthanasia). Finally, future researches should be develop to
350 demonstrate responsiveness of the FETCH-Q or FETCHSV2-Q to change in the
351 clinical status of dogs with heart disease as well as responsiveness to change when
352 a therapy is established.

353

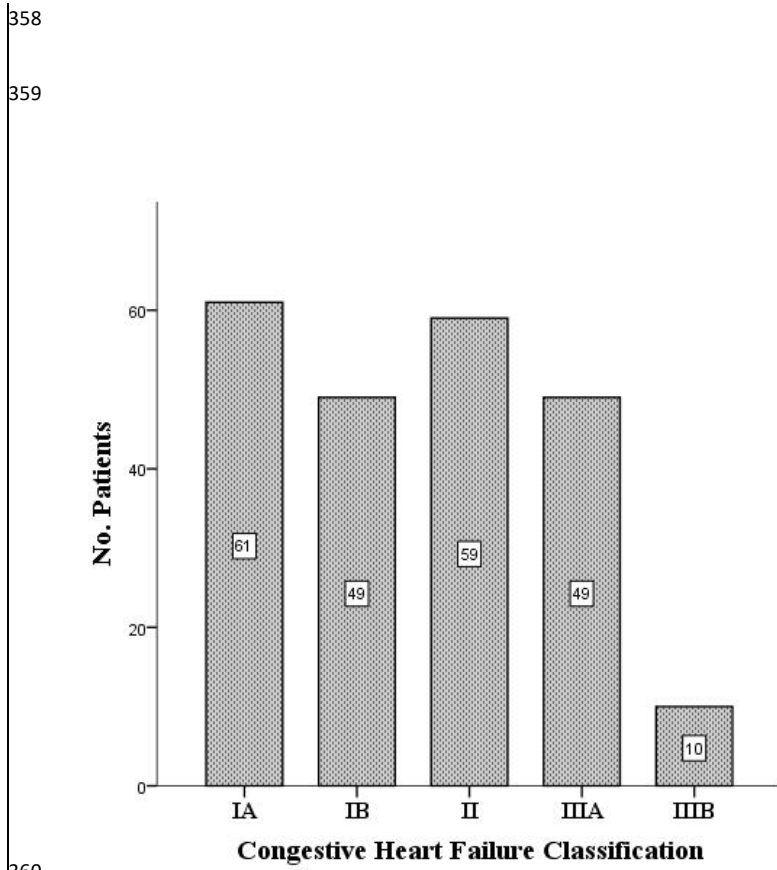
354 **Conflict of Interest Statement**

355 The authors do not have any conflicts of interest to disclose

356

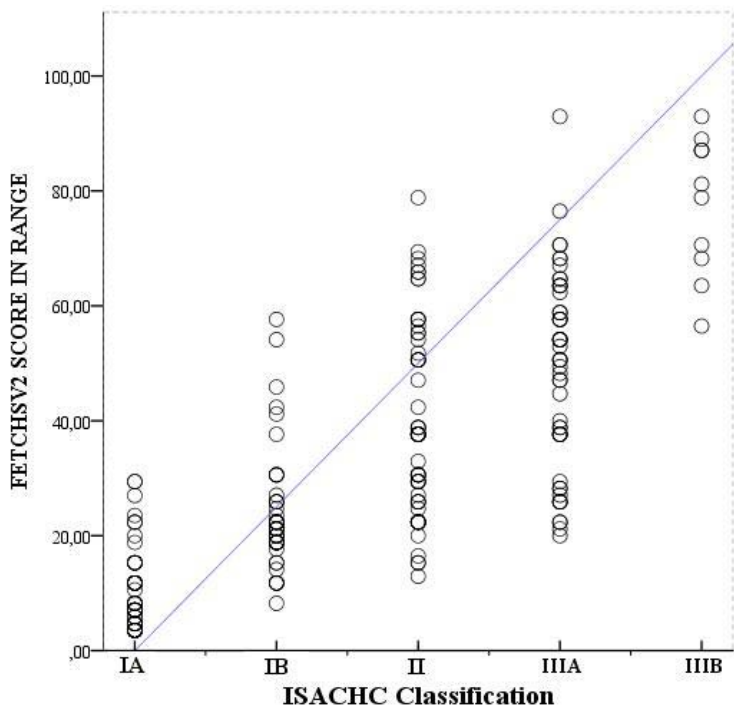
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360
361 **Figure 1— Distribution of patients in the different CHF class based on ISACHC Classification.**

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362

363 Figure 2 -- Comparison between ISACHC Classification and the FETCHSV2 total score
 364 ranged to 100. (n = 228 Dogs with cardiac disease). The solid line represent the linear
 365 correlation (r = 0.819; p < 0.001).

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589 Table 1 - Demographic characteristics of dogs without CHF and with CHF

	Non-CHF	CHF	Range/ Percentage***
Ages (years)	8.9 ± 4.2*	12.1 ± 5.4*	1.2 – 17.1**
Sex (females)	111 ± 22*	47 ± 9*	19.5 - 46.2 %
Weight (Kg)	16.72 ± 5.9*	12.28 ± 7.0*	3.9 – 59.7**
Neutered	87 %	49 %	-

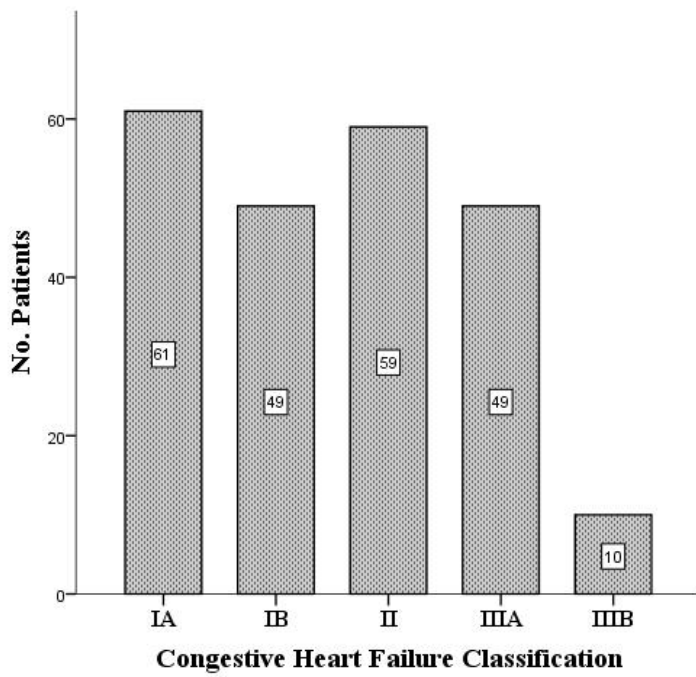
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591 (*Mean ± SD) (**Range)(***total population)

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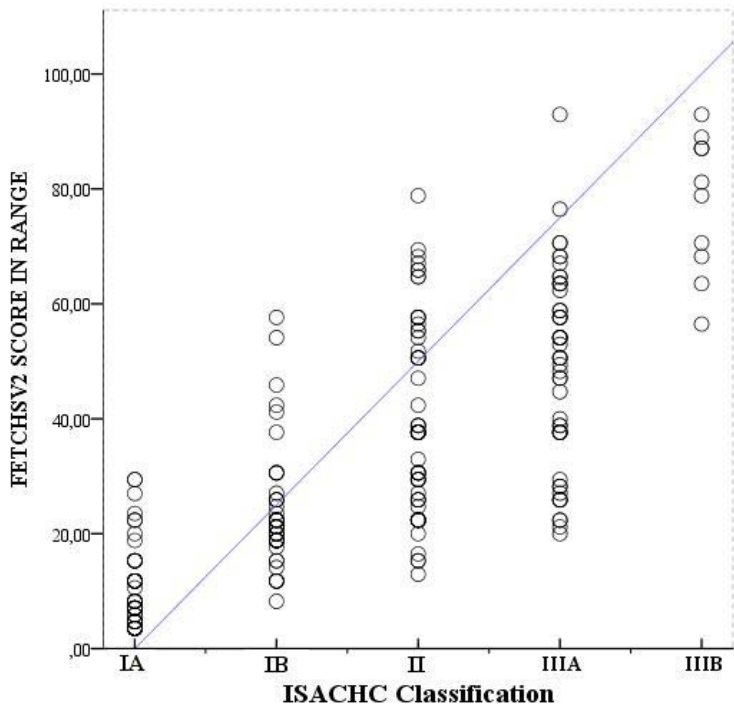
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Figure 1 - Distribution of patients in the different CHF class based on ISACHC Classification.



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598 [Figure 2 - Comparison between ISACHC Classification and the FETCHSV2 total score](#)
 599 [ranged to 100. \(n = 228 Dogs with cardiac disease\). The solid line represent the linear](#)
 600 [correlation \(r = 0.819; p < 0.001\).](#)

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