

1 Primary health care (PHC) faces an increasing number of patients with complex healthcare
2 needs (physical and mental multimorbidity, functionality decrease, and health service
3 overuse).[1] Thus, there is growing recognition of the importance of using a valid and reliable
4 method or instrument to identify individual healthcare needs in PHC practice.[2] A method or
5 instrument of this nature could help in the planning and personalized delivery of care and
6 facilitate the stratification of the assisted population into different levels per health care
7 needs[3] and age groups.

8 The INTERMED case complexity is used in hospitals [4], ambulatory, [5] and PHC [6]
9 settings to assess case complexity; biopsychosocial and person-centered approaches form its
10 foundation. Recently, we demonstrated its validity in a Brazilian PHC setting that cares for
11 some of the most medically and socially vulnerable people in the world [7].

12 This study measured the agreement, inter-rater reliability, and internal consistency of the
13 INTERMED in a Brazilian PHC setting.

14 We conducted between December 2018 to July 2019, a cross-sectional study with Brazilian
15 adult patients, interviewed using demographic questionnaire, developed to this study and the
16 INTERMED tool. One researcher (CAO) consecutively invited in 3 Brazilian PHC services, a
17 non-probabilistic sample who sequentially arrived at the reception of PHC services. Individuals
18 living in the area covered by the service were eligible for inclusion. We excluded those who
19 did not complete the interviews.

20 The INTERMED is a semi-structured interview with a total score ranging from 0 to 60, and
21 each domain score ranging from 0 to 15, [8] that synthesizes and standardizes data from 4
22 domains: 1) biological, 2) psychological, 3) social, and 4) health system, each of which has 5
23 items described as health risks and needs with an ordinal score ranging from 0 (no need of
24 health care) to 3 (immediate need of health care). A 20/21 cutoff point has been used in
25 specialized services to differentiate complex (≥ 21) from non-complex patients (≤ 20).[9]

26 The researcher who translated the Portuguese version of the instrument [10] trained the CAO,
27 enabling her to train other professionals. In December 2018, CAO trained a nurse, a
28 psychologist, and an occupational therapist on the meaning of each INTERMED item and
29 anchor point score, totalizing four hours of training. For the INTERMED score calibration, the
30 lead researcher and the professionals applied the instrument to three pilot patients in the health
31 units at the time of the research.

32 The lead researcher formed pairs with other professionals (nurse, psychologist and
33 occupational therapist), and each rater independently scored each item. Intraclass correlation,
34 weighted Cohen's kappa (κ), Kendall's tau-b (τ), and McDonald's omega correlation (ω)
35 coefficients were used to measure the agreement of domains and total INTERMED score
36 between the lead researcher and the other raters.

37 We invited 128 patients, 125 of them agreed to participate (participation rate: 97.7%). One
38 patient did not complete the interview and was excluded from the analysis. The mean age was
39 45.5 (\pm 15) years.

40 The analysis for intraclass correlation, without distinction between raters, ranged from 0.85
41 (95% CI 0.76, 0.90) for the psychological and health system domain to 0.93 (95% CI 0.89,
42 0.95) for the INTERMED total score, Table 1. In patient screening (cut-off score 20/21), the
43 agreement between the group of 3 raters and the lead researcher was 97.6%, as demonstrated
44 by the kappa value (0.90, $P < 0.001$), which was considered excellent. Excellent agreement
45 was achieved for the INTERMED items, ranging from psychiatric dysfunction and residential
46 instability (both $\kappa = 0.81$), treatment experience ($\kappa = 0.84$), job and leisure problems ($\kappa = 0.85$),
47 poor social support ($\kappa = 0.86$), and chronicity ($\kappa = 0.88$).

48 To the best of our knowledge, this is the first published study of the reliability of the face-to-
49 face INTERMED interview version with PHC patients: Other studies have reported reliability
50 in tertiary and secondary contexts [11], creating a milestone for PHC. We demonstrated the

51 adequate reliability for using this tool. Previous INTERMED reliability studies in hospital and
52 ambulatory care contexts demonstrated the importance of the instrument for facilitating
53 communication between patients, professionals, and the health system, improving the quality
54 of care, increasing treatment adherence, and organizing personalized care planning. Another
55 important result was the diversity of professional disciplines in complexity screening (nurse τ
56 = 0.85 and κ = 0.88, psychologist τ = 0.88 and κ = 0.88, and occupational therapist τ = 0.68
57 and κ = 0.68) ranging from moderate to excellent agreement, indicating compatibility with the
58 multidisciplinary aspect of PHC.

59 Since we did not include other raters who work in PHCs belonging to the multidisciplinary
60 team (doctor, nutritionist, and physiotherapist) a gap in reliability was caused, making it
61 difficult to compare the reliability of all the diversity in the primary care team. The second
62 limitation is that we conducted the research only in PHC context, without comparing other
63 levels of care (tertiary and secondary) to generalize the data.

64 This study showed that the INTERMED had adequate reliability to help multidisciplinary
65 teams assess the complexity of patient health needs.

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76 **References**

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