REVIEWS

Measures of Organizational Culture and Climate in Primary Care: a Systematic Review

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BACKGROUND: Primary care is increasingly contributing to improving the quality of patient care. This has imposed significant demands on clinicians with rising needs and limited resources. Organizational culture and climate have been found to be crucial in improving workforce well-being and hence quality of care. The objectives of this study are to identify organizational culture and climate measures used in primary care from 2008 to 2019 and evaluate their psychometric properties.

METHODS: Data sources include PubMed, PsycINFO, HAPI, CINAHL, and Mental Measurements Yearbook. Bibliographies of relevant articles were reviewed and a cited reference search in Scopus was performed. Eligibility criteria include primary health care professionals, primary care settings, and use of measures representing the general concept of organizational culture and climate. Consensus-Based Standards for the selection of health Measurement Instruments (COSMIN) guidelines were followed to evaluate individual studies for methodological quality, rate results of measurement properties, qualitatively pool studies by measure, and grade evidence.

RESULTS: Of 1745 initial studies, 42 studies met key study inclusion criteria, with 27 measures available for review (16 for organizational culture, 11 for organizational climate). There was considerable variability in measures, both conceptually and in psychometric quality. Many reported limited or no psychometric information.

DISCUSSION: Notable measures selected for frequent use and strength and applicability of measurement properties include the Culture Questionnaire adapted for health care settings, Practice Culture Assessment, and Medical Group Practice Culture Assessment for organizational culture. Notable climate measures include the Nurse Practitioner Primary Care Organizational Climate Questionnaire, Practice Climate Survey, and Task and Relational Climate Scale. This synthesis and appraisal of organizational culture and climate measures can help investigators make informed decisions in choosing a

measure or deciding to develop a new one. In terms of limitations, ratings should be considered conservative due to adaptations of the COSMIN protocol for clinician populations.

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INTRODUCTION

In a nation with health care system flaws and rising costs, health care reformers and political leaders are looking to primary care for solutions.¹ Primary care providers are charged with improving preventative care, managing chronic diseases, and keeping patients out of hospitals, but face significant challenges, including time pressure, documentation burden, and an increasingly aging population.^{2–4} Organizational factors, including organizational culture and climate, are increasingly recognized as crucial to strengthening the primary care workforce and improving the quality of primary care.^{5–7}

Organizational *culture* in health care is defined as the norms, values, and basic assumptions of a given organization, which drive both the quality of work life and the quality of care.^{8–10} Organizational *climate* is defined as the collective perception of the organization's culture and how it impacts personal well-being and functioning.¹⁰ Organizational culture and climate are interconnected; an organization's beliefs and values (culture) govern its members' experience (climate). Together, they make up the "feel" of an organization.^{11,12} Unfavorable organizational cultures, such as those characterized by chaotic work environments, time pressures, and lack of control, have been associated with poorer outcomes, including greater provider burnout.^{2,13} Hierarchical cultures and those resistant to change have also been identified as significant barriers to innovation and implementation of evidence-

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based practices.^{14–16} In contrast, favorable cultures and climates, such as those that enhance autonomy, promote diversity and inclusion, and facilitate cooperation and collaboration, are associated with better outcomes, including provider well-being and engagement in quality improvement.^{17,18}

Moving forward with research on organizational culture and climate in primary care requires greater attention to measurement. Although many tools to measure culture and climate have been used in health care settings, variation in measure domains and psychometric properties makes it difficult to draw consistent and reliable conclusions.^{10,19,20} Additionally, measures developed for other types of health care organizations, such as hospitals, may not be valid for primary care.²¹ Identification of validated measures for primary care will encourage more informed instrument selection in future research and foster greater understanding of the organizational culture and climate of these settings, leading to effective and sustainable ways to achieve organizational changes that improve the quality of care.

We conducted a systematic review to identify measures of organizational culture and climate used in primary care within recent years (2008–2019) and evaluate their psychometric properties. We focused on measures used with primary care practitioners who have direct patient contact, whose experience of culture and climate is likely to have the most direct influence on patient outcomes. We aimed to formulate recommendations on instrument selection based on these findings and suggest directions for future research.

METHODS

Protocol and Registration

This systematic review follows the publishing guidelines set forth by PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses),²² was assessed for quality using the AMSTAR checklist (https://amstar.ca/Amstar_Checklist.php), and contains a registered protocol with PROSPERO (CRD 42019133117). Our protocol is based on the Consensus-Based Standards for the selection of health Measurement Instruments (COSMIN) methodology.^{23–25}

Eligibility Criteria

Eligibility criteria were determined a priori (Table 1). In summary, included articles met the following criteria: published 2008 and after, quantitative or mixed methodology were used, majority of the population were primary health care professionals, setting in primary care, and the target population completed an instrument measuring the general concept of organizational culture or organizational climate. Non-English articles were included; Google Translate was used to translate articles into English.²⁶ Empirical research articles from journals and dissertations were included; cross-sectional, case-control, cohort studies, and clinical trials were also included.

Table 1 Study Eligibility Criteria

Study component	Inclusion criteria	Exclusion criteria
Publication type	<ul style="list-style-type: none"> • Empirical research articles from journals and dissertations; cross-sectional, case-control, cohort studies, clinical trials • Studies using quantitative or mixed methods 	<ul style="list-style-type: none"> • Articles outside of original research, including reviews, opinions, comments, editorials, conference proceedings, protocols, reports, etc. • Studies using qualitative methods only
Population	<ul style="list-style-type: none"> • > 50% participants are primary care health professionals who have regular direct patient contact, including physicians, physician assistants, nurse practitioners, nurses • ≤ 50% participants are primary care health professionals, but a representative subgroup analysis has been performed on primary care health professionals 	<ul style="list-style-type: none"> • Personnel who do not have regular direct patient contact, including staff, administrators, managers, researchers, etc.
Intervention/exposure	<ul style="list-style-type: none"> • Primary care settings • Medical centers, Veterans Affairs, hospitals, and health care systems ONLY if they are mentioned in the context of primary care 	<ul style="list-style-type: none"> • Nonprimary care settings • Medical centers, Veterans Affairs, hospitals, and health care systems with no mention of the primary care context
Comparator Outcome	<p>N/A</p> <ul style="list-style-type: none"> • Use of measures representing the general concept of organizational culture or organizational climate • Organizational culture and climate are defined by the following: <ul style="list-style-type: none"> - “Organizational culture has been defined as the norms, values, and basic assumptions of a given organization...Organizational climate, in comparison, more closely reflects the employees’ perception of the organization’s culture; for example, it is a collective reflection of their experience of the culture.”⁹ 	<p>N/A</p> <ul style="list-style-type: none"> • Measures representing specific concepts of organizational culture, including research culture, safety culture, innovation culture, etc. • Measures representing specific concepts of organizational climate, including team climate, safety climate, implementation climate, etc.
Time	<ul style="list-style-type: none"> • Studies published on or after 2008, up to the date the search is performed 	<ul style="list-style-type: none"> • Studies published before 2008

Information Sources and Search Strategy

Two health sciences librarians with systematic review experience (BF, HVV) developed searches for the databases PubMed, PsycINFO, HAPI (Health and Psychosocial Instruments), CINAHL (Current Index to Nursing and Allied Health Literature), and Mental Measurements Yearbook. The initial PubMed search was developed (BF) using a combination of MeSH terms; title, abstract, and keywords were checked against a known set of studies. The search was then adapted to search other databases (HVV). Search strategies, dates, and

results for each database were recorded in an Excel workbook and are found in ESM Appendix Table 1. The last database search was conducted on May 10, 2019.

We further manually reviewed bibliographies of articles selected for analysis and conducted a cited reference search using Scopus. Cited reference searches have been found to be a more sensitive search strategy than keyword searches for identifying articles using specific measurement instruments.²⁷ Titles and abstracts of identified citations were initially reviewed by the first author (KSH) and selected citations underwent study selection procedures. EndNote was used to store all citations found in the search process and to check for duplicates. The last cited reference search was conducted on December 17, 2019.

Study Selection

Citations and abstracts were uploaded into DistillerSR (Evidence Partners, Ottawa, Canada) for study selection. Two reviewers at any one time (KSH, JC, AG, RK) independently screened all titles and abstracts. The two reviewers met to discuss and reach consensus on differences, consulting a third reviewer (EAM) as needed. Following, two reviewers (KSH, JC) conducted independent full-text screening of included articles. Differences were discussed and consensus reached, consulting a third reviewer (EAM) as needed. Screening results using a sample of references from a preliminary search yielded a weighted average kappa value of 0.73, indicating moderate interrater reliability.²⁸

Data Extraction

A graphic representation of the methods used to perform data extraction, risk of bias, and summary of findings is shown in Figure 1. Two reviewers (KSH, JC) independently extracted data for each study using DistillerSR with differences resolved through discussion and consultation with a third reviewer (EAM) as needed. Study-relevant characteristics extracted included sample size, sample demographics, and setting. Measure-relevant characteristics included measure name, source reference, method of administration, composition (e.g., domains, subdomains, number of items), response options, and method of scoring. Study authors were contacted via email to identify missing information.

Evaluation of Methodological Quality of Measurement Properties for Individual Studies

After data extraction, two independent raters trained in psychometrics (KSH, JC) used the COSMIN Risk of Bias checklist to evaluate methodological quality of measurement properties in each study.²⁴ The COSMIN Risk of Bias checklist was originally designed for patient-reported outcome measures (PROMs); minor modifications were made for our target population of professionals (ESM Appendix Table 2). The quality of each measurement property (i.e., structural validity, internal consistency, cross-cultural validity/measurement invariance, reliability, measurement error, criterion validity,

hypothesis testing for construct validity, responsiveness) was rated as very good, adequate, doubtful, inadequate, or N/A. Ratings followed the “worst score counts” principle—the lowest rating of any standard for that property was taken as its overall rating. Differences were resolved through discussion and consultation with an expert psychometrician (GES).

Rating Results of Measurement Properties of Individual Studies

Following the rating of methodological quality of measurement properties of each study, two authors (KSH, JC) rated results of measurement properties in each study using Prinsen and Terwee’s criteria for good measurement properties.²⁴ Results were rated as sufficient (+), insufficient (−), or indeterminate (?) (i.e., not enough information available).

The Prinsen and Terwee protocol was further modified to omit ratings of content validity, which is more time- and resource-intensive than that of other measurement properties. It requires strong knowledge of PROM development and qualitative methodology, expertise in the field of interest (organizational culture and climate), and experience with the target population of interest for reviewers to rate the content of measures directly. Rating content validity to this standard was deemed beyond the scope of the study.

Data Synthesis

Following their appraisal, studies were grouped by measure, with results pooled into a qualitative summary for each measure. This summary was again rated against Prinsen and Terwee’s quality criteria for good measurement properties to obtain a measure rating. Ratings were given as sufficient (+), insufficient (−), inconsistent ($\pm$) (i.e., no explanation found for inconsistent results), or indeterminate (?). Finally, to determine the quality of the pooled result rating, the evidence was graded using a modified Grading of Recommendations Assessment, Development, and Evaluation (GRADE) approach as high, moderate, low, or very low quality. Definitions of quality levels are in ESM Appendix Table 3. The modified GRADE approach is adapted from the standard GRADE approach;²⁹ quality of evidence is initially assumed to be high, then downgraded based on four factors: (1) risk of bias of individual studies (i.e., COSMIN ratings of methodological quality), (2) inconsistency, (3) imprecision, and (4) indirectness.²⁴ Rating and grading were done independently by two authors (KSH, JC). Differences were resolved through discussion and consultation with a psychometrics expert (GES) as needed.

RESULTS

Study Selection

The electronic database search yielded 1782 records, 42 of which were selected for analysis. The selection process is detailed in Figure 2.

Figure 1 Data extraction, risk of bias, and summary of findings methods.

Across the 42 included studies, we identified 16 culture measures in 25 studies and 11 climate measures in 17 studies. After combining those that were variations of the same source measures (e.g., slight variations in wording or number of items; different domains or subscales), there were a total of 7 culture measures and 8 climate measures. Table 2 summarizes the measure characteristics. Measures varied in length from 15 to 50 items for organizational culture and 6 to 64 items for organizational climate. Number of domains ranged from 3 to 10 domains for culture and from 2 to 7 domains for climate. All but one measure were developed in English (Organizational Climate for Health Care Organizations,⁷¹ developed in Spanish). Most used Likert scales; however, some measures from the Competing Values Framework³⁰ used an ipsative scale, where points are distributed among response options. Measure characteristics for individual studies can be found in ESM Appendix Table 4.

Summary of Evidence

Table 3 shows the pooled qualitative summaries of measurement properties, their ratings, and an assigned GRADE for each measure. For ratings of methodological quality and results of measurement properties of individual studies, see ESM Appendix Table 5. Breakdown of GRADE assignments

can be found in ESM Appendix Table 6. Overall, the most frequently reported measurement property was internal consistency, followed by structural validity. Cross-cultural validity was evaluated for two measures: the Medical Group Practice Culture Assessment (MGPCA)⁴³ was translated into and adapted for the Italian language,⁴⁸ and the revised Organizational Culture Profile⁵² was adapted for the Greek-Cypriot dialect.⁵³ No psychometric properties were reported for seven culture measures and one climate measure. We describe measures that were cited by three or more studies, reported results for three or more measurement properties, have more than one measurement property with high-quality evidence, or were found to be originally developed for primary care (discovered through author correspondence or mentioned in the study).

Organizational Culture Measures. We summarize the findings for 3 of the 16 identified culture measures: Culture Questionnaire adapted for health care settings, Practice Culture Assessment, and revised Organizational Culture Profile. The most frequently used measure, the Culture Questionnaire adapted for health care settings,³⁶ had insufficient internal consistency based on high-quality evidence. The Practice Culture Assessment, used by three studies, had insufficient

Figure 2 Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) flow diagram of the search and screening process.

structural validity based on low-quality evidence and sufficient internal consistency based on moderate-quality evidence. Reasons for low/moderate-quality evidence were indirectness of evidence due to the population being a mix of clinicians and staff and the risk of bias from a lack of very good-quality studies. The revised Organizational Culture Profile⁵³ reported many measurement properties, albeit the majority having very low-quality of evidence due to lack of available studies of very good quality. Downgrading also occurred due to risk of bias—structural validity was performed with a small sample size, and cross-cultural validity testing lacked direct comparisons between two culturally different groups. Among all culture measures, the Practice Culture Assessment⁵⁶ is the only measure that was found to be originally developed in primary care health professionals and used in its original form. The MGPCA and the Primary Care Organizational Questionnaire⁵⁹ were also developed in primary care; however, the included studies use modified forms from the original measure.

Organizational Climate Measures. We summarize findings for 4 of the 11 identified climate measures: Nurse Practitioner Primary Care Organizational Culture Questionnaire (NP-PCOCQ), Task and Relational Climate Scale, Practice Climate Survey, and Workplace Climate Survey. The climate measure used by most studies, all of which were by the measure developer, was the field-tested version of the NP-PCOCQ.⁶³ It also had the most reported measurement properties, with high-quality evidence for sufficient structural validity and internal consistency. The Task and Relational Climate Scale,⁷ derived from a larger survey administered by the Veterans Affairs, also had high-quality evidence for sufficient structural validity and internal consistency, although based on a single study. The NP-PCOCQ,⁶³ Workplace Climate Survey,⁷⁷ and Practice Climate Survey⁷⁴ were found to be developed in primary care settings—NP-PCOCQ with NPs and Practice Climate Survey and Workplace Climate Survey with primary care providers and staff. The Practice Climate Survey had high-quality evidence for sufficient internal consistency,

Table 2 Characteristics of Included Measures of Organizational Culture and Organizational Climate

Measure	Included studies	Domains (no. of items)	Response options
Organizational culture measures Competing Values Framework 1. Culture Questionnaire ³⁰	Ghazeeb et al., 2018 ³¹	4 domains (16 items): 1. Organization's character (4); 2. Organization's managers (4); 3. Organization's cohesion (4); 4. Organization's emphasis (4) Items in each domain reflect 4 culture types: group, developmental, hierarchical, and rational	Ipsative scale, where respondents distributed 100 points among 4 culture types in each domain
2. Organizational Beliefs Questionnaire ³²	Willcocks and Milne, 2013 ³³	4 domains, 10 subdomains (50 items): 1. People orientation/clan culture (work should be fun (5), worth and value of people (5), importance of shared philosophy (5)); 2. Innovation orientation/developmental culture (taking thoughtful risks (5), quality (5)); 3. Results/outcomes orientation/rational culture (being the best (5), growth, profit, and other indicators of success (5), hands-on-management (5)); 4. Control/hierarchical culture (attention to detail (5), communicating to get the job done (5))	5-point Likert scale, rating the extent to which participants agree with each statement about their practice
3. Organizational Culture Assessment Instrument ³⁴	Scammon et al., 2014 ³⁵	6 domains (24 items): 1. Organizational character (6); 2. Managers and leadership (6); 3. Organizational cohesion (6); 4. Management of employees (6); 5. Organizational emphases (6); 6. Criteria for success (6) Items in each domain reflect 4 culture types: group, developmental, hierarchical, and rational	Ipsative scale, where respondents distributed 100 points among 4 culture types in each domain
4. Culture Questionnaire adapted for health care settings ³⁶	Bosch et al., 2008 ³⁷ Brazil et al., 2010 ³⁸ Howard et al., 2011 ³⁹ Hung et al., 2014 ⁴⁰ Hung et al., 2016 ⁵ King et al., 2018 ⁴¹ Radwan et al., 2017 ⁴²	5 domains (20 items): 1. Practice character (4); 2. Practice managers (4); 3. Practice cohesion (4); 4. Practice emphasis (4); 5. Practice rewards (4) Items in each domain reflect 4 culture types: group, developmental, hierarchical, and rational	Ipsative scale, where respondents distributed 100 points among 4 culture types in each domain
5. Medical Group Practice Culture Assessment ⁴³	Kralewski et al., 2008 ⁴⁴	8 domains (18 items): 1. Collegiality; 2. Quality emphasis; 5. Organizational trust; 3. Participative management style; 4. Cohesiveness; 6. Adaptive; 7. Business orientation; 8. Autonomy	4-point Likert scale, with 1 = not at all; 4 = to a great extent
6. Mechaber et al., 2008 ⁴⁵	Mechaber et al., 2008 ⁴⁵	5 domains (26 items): 1. Alignment between leadership and physician values (8); 2. Practice emphasis on quality (6); 3. Sense of trust or belonging (5); 4. Practice emphasis on information systems and communication; 5. Cohesiveness (3)	4-point Likert scale, from 1 = not at all to 4 = to a great extent
7. Linzer et al., 2009 ⁴⁶	Linzer et al., 2009 ⁴⁶	5 domains (30 items): 1. Alignment of values between physicians and leaders (8); 2. Practice emphasis on quality (11); 3. Trust (4); 4. Information and communication (3); 5. Cohesiveness (4)	4-point Likert scale, from 1 = not at all to 4 = to a great extent
8. Dugan et al., 2011 ⁴⁷	Dugan et al., 2011 ⁴⁷	3 domains (15 items): 1. Collegiality (6); 2. Quality emphasis (6); 3. Autonomy (3)	4-point Likert scale, from 1 = not at all to 4 = to a great extent
9. Pracilio et al., 2014 ⁴⁸ (Italian)	Pracilio et al., 2014 ⁴⁸	6 domains (16 items): 1. Collegiality (5); 2. Quality emphasis (4); 3. Organizational trust (1); 4. Information emphasis (2); 5. Management style (1); 6. cohesiveness (3)	4-point Likert scale: 1 = do not agree at all 2 = sometimes agree 3 = often agree 4 = agree to a great extent
10. Zink et al., 2017 ⁴⁹	Zink et al., 2017 ⁴⁹	10 domains: 1. Collegiality; 2. Quality emphasis; 3. Organizational trust; 4. Information emphasis; 5. Management style; 6. Cohesiveness; 7. Adaptive; 8. Business orientation; 9. Work ethic; 10. Group practice integration	5-point Likert scale, with 5 being highest
11. Linzer et al., 2019 ⁵⁰	Linzer et al., 2019 ⁵⁰ Prasad et al., 2019 ⁵¹	5 domains (31 items): 1. Values alignment between clinicians and their leaders (8); 2. Emphasis on quality vs productivity (10); 3. Trust (5); 4. Emphasis on communication and information (4); 5. Cohesiveness (4)	4-point Likert scale, from 1 = not at all to 4 = to a great extent
	Zachariadou et al., 2013 ⁵³		5-point Likert scale:

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Table 2. (continued)

Measure	Included studies	Domains (no. of items)	Response options
12. Organizational Culture Profile, revised ⁵² (Greek-Cypriot)		7 domains (28 items): 1. Supportiveness (4); 2. Innovation (4); 3. Competitiveness (4); 4. Performance orientation (4); 5. Stability (4); 6. Emphasis on rewards (4); 7. Social responsibility (4)	1 = very much 2 = considerably 3 = moderately 4 = minimally 5 = not at all 5-point Likert scale, ranging from not at all to a very great extent
13. Culture construct, Organizational Social Context ^{54*}	Kramer et al., 2017 ⁵⁵	3 domains, 6 subdomains (42 items): 1. Rigidity (centralization (7), formalization (7)); 2. Proficiency (responsiveness (7), competence (8)); 3. Resistant (apathy (6), suppression (7))	5-point Likert scale, ranging from 1 = strongly disagree to 5 = strongly agree
14. Practice Culture Assessment ⁵⁶	Dickinson et al., 2014 ⁵⁶ Dickinson et al., 2015 ⁵⁷ Jorberg et al., 2019 ⁵⁸	3 domains (22 items): 1. Change culture (10); 2. Work culture (8); 3. Chaos (4)	
Primary Care Organizational Questionnaire ⁵⁹	Hall et al., 2010 ⁶⁰	8 domains (40 items): 1. Conflict resolution (8); 2. Perceived effectiveness (7); 3. Communication between clinicians and staff (5); 4. Communication among clinicians (5); 5. Physician leadership (6); 6. Decision authority (3); 7. Communication timeliness (4); 8. Psychological job demands (2)	5-point Likert scale: Conflict resolution: 1 = not at all likely; 5 = almost certain Perceived effectiveness, communication between clinicians and staff, communication among clinicians, physician leadership, communication timeliness: 1 = strongly disagree, 5 = strongly agree Decision authority, psychological job demands: 1 = never; 5 = always
16. Adaptive reserve domain, Clinician and Staff Questionnaire ⁶¹	Friedberg et al., 2017 ⁶²	6 domains (23 items): 1. Relationship infrastructure (10); 2. Facilitative leadership (4); 3. Sensemaking (2); 4. Teamwork (2); 5. Work environment (2); 6. Culture of learning (3)	6-point Likert scale: 1 = strongly disagree2 = disagree3 = neither agree nor disagree4 = agree5 = strongly agree6 = does not apply or don't know
Organizational climate measures Nurse Practitioner Primary Care Organizational Climate Questionnaire ⁶³	Poghosyan et al., 2013 ⁶³ Poghosyan L and Aiken LH, 2015 ⁶⁴ Poghosyan L, Shang J, and Liu J, 2015 ⁶⁵	5 domains (34 items): 1. NP-physician relations (8); 2. Organizational support and resources (5); 3. Autonomy and independent practice (6); 4. NP-administration relations (8); 5. Professional visibility (7)	4-point Likert scale: 1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree
18. Field-tested version ^{63,b}	Poghosyan et al., 2013 ⁶³ Poghosyan L, Chaplin WF, et al., 2017 ⁶⁶ Poghosyan L, Liu J, and Norful AA, 2017 ⁶⁷ Poghosyan L, Liu J, Shang J, et al., 2017 ⁶⁸	4 domains (29 items): 1. NP-physician relations (7); 2. Independent practice and support (9); 3. Professional visibility (4); 4. NP-administration relations (9)	4-point Likert scale: 1 = strongly disagree 2 = disagree 3 = agree 4 = strongly agree
19. IRT model ⁷⁰	Poghosyan et al., 2018 ⁶⁹ Poghosyan et al., 2019 ⁷⁰	4 domains (24 items): 1. NP-physician relations (5); 2. Professional visibility (3); 3. NP-administration relations (8); 4. Independent practice and support (8)	4-point Likert scale: 1 = strongly disagree2 = disagree3 = agree4 = strongly agree
20. Organizational Climate for Health Care Organizations ⁷¹ (Spanish)	Cruvinel et al., 2013 ⁷²	7 domains (64 items): 1. Leadership; 2. Professional development; 3. Relationship and team spirit; 4. Relationship with the community; 5. Safety; 6. Strategy; 7. Remuneration	5-point Likert scale, from 1 = strongly disagree to 5 = strongly agree
21. Climate construct, Organizational Social Context ⁵⁴	Kramer et al., 2017 ^{55*}	3 domains, 8 subdomains (46 items): 1. Engaged (personalization (5), personal accomplishment (6)); 2. Functional (growth and development (5), role clarity (6), cooperation (4)); 3. Stressful (emotional exhaustion (6), role overload (7), role conflict (7))	5-point Likert scale, ranging from not at all to a very great extent
22. Kolko et al., 2014 ⁷³	Kolko et al., 2014 ⁷³		5-point Likert scale, from 0 = not at all to 4 = to a very great extent

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Table 2. (continued)

Measure	Included studies	Domains (no. of items)	Response options
23. Practice Climate Survey ⁷⁴	Grace et al., 2016 ⁷⁴	2 domains, 4 subdomains (26 items): 1. "Positive" (cooperation (6), personal accomplishment (6)); 2. "Negative" (role conflict (7), role overload (7))	5-point Likert scale from strongly disagree to strongly agree
24. Primary Care Practice Climate ⁷⁵	Rodriguez et al., 2015 ⁷⁵	5 domains (26 items): 1) Team structure (5); 2) Team functioning (5); 3) Readiness for change (6); 4) Skills and knowledge (3); 5) Leadership (7)	5-point Likert scale from strongly disagree to strongly agree
25. Summary Practice Climate Scale ⁷⁶	Becker and Roblin, 2008 ⁷⁶	2 domains, 4 subdomains (17 items): 1. Team composition and characteristics (practice decision-making (4), practice communication (5)); 2. Organizational context (psychological safety (4), leadership facilitation (4))	5-point Likert scale: Domain 1: 1 = strongly disagree to 5 = strongly agree Domain 2: 1 = highly inaccurate to 5 = highly accurate
26. Task and Relational Climate Scale ⁷⁷	Benzer et al., 2011 ⁷⁷	8 domains (21 items): 1. Medical record availability (1); 2. Time for tasks (4); 3. Delegation and collaboration among team members (4); 4. Skip pattern (2); 5. Patient focus (2); 6. Collaboration and continuity of care (2); 7. Team ownership (1); 8. General autonomy (5)	Likert scales with 4, 5, or 7 response options: 1), 2), 3), 4), 5), 7): very dissatisfied to very satisfied 6): none to max
27. Workplace Climate Survey ⁷⁷	Friedberg et al., 2016 ⁷⁷ Martisolf et al., 2018 ⁷⁸	2 domains (6 items): 1. Task climate (3); 2. Relational climate (3)	5-point Likert scale
		3 domains, 4 subdomains (44 items): 1. Clinic workload (6); 2. Teamwork (8); 3. Clinic functionality (staff relationships (7), QI orientation (12), manager readiness for change (7), staff readiness for change (4))	5-point Likert scale, with 43 of the items ranging from 1 = strongly disagree to 5 = strongly agree; the remaining item assessed clinic atmosphere and ranged from 1 = calm to 5 = hectic/chaotic

NP, nurse practitioner

*This reference is repeated twice as it includes both a culture and climate construct

while the Workplace Climate Survey had no measurement properties of high-quality evidence.

DISCUSSION

In this systematic review, we identified and evaluated the psychometric properties of instruments used from 2008 to 2019 to measure organizational culture and organizational climate for primary health care professionals in primary care settings. Overall, we found considerable variability in measures, both conceptually, in that they differ in the domains and subdomains assessed and in psychometric quality. Only a handful of measures (6 of 27) were used in more than one study, and many studies reported limited or no psychometric information. Accordingly, we were unable to pool many psychometric results.

One explanation for the variability of measures is the lack of a consensus on what domains define these two constructs.^{9,20,80} Generally, the domains of management, relationship infrastructure, and trust seemed to appear in several culture measures, and leadership, teamwork, and autonomy in climate measures. Thus, while evaluating content validity against a "gold standard" remained outside of our review scope, this work serves as a reference point to better understand the breadth of available domain conceptualizations. Until such standards are developed, we suggest that when choosing an organizational culture or climate measure, in addition to considering the quality of evidence, one should consider if its domains are suitable for one's study purpose.

Lacking robust high-quality evidence, we cannot confidently recommend any one measure for use in measuring organizational culture or climate in primary care. We highlight below some of the most promising measures based on the evidence available so far. In choosing these measures, we consider its frequency of use, evidence for robust measurement properties, and if it was originally developed in primary care.

Recommendations: Organizational Culture

The Culture Questionnaire adapted for health care settings³⁶ is the most frequently used measure of organizational culture in this review. It uses an ipsative scale design, where the respondent distributes 100 points among four items, each representing a culture type. With ipsative scales, the items are interdependent, which may confound validity and reliability (e.g., internal consistency, factor analysis). However, this design allows culture to be interpreted as a composition of multiple cultures to varying degrees, which may better represent true culture. Additionally, its widespread use makes it easily comparable across studies.

The Practice Culture Assessment⁵⁶ is a newer scale originally developed in primary care settings. Testing the measurement properties of this measure for clinicians separately from staff who do not provide patient care can increase the quality of evidence for its psychometric properties.

Table 3 Qualitative Summaries, Ratings, and GRADE for Measurement Properties Pooled by Measure

Measure name	Measurement property*	Qualitative summary	Overall rating ^{†‡}	GRADE
Organizational culture measures Competing Values Framework ⁷¹	N/A	N/A	N/A	N/A
Culture Questionnaire ⁷¹ (1 study)	N/A	N/A	N/A	N/A
Organizational Beliefs Questionnaire ⁴³ (1 study)	N/A	N/A	N/A	N/A
Organizational Culture Assessment Instrument ⁵² (1 study)	Content validity	10 experts rated relevance of items using the CVI. All items were rated as relevant, with CVI > 0.93. Questionnaire was piloted among 30 eligible participants with modifications made based on feedback.	Not evaluated	
Culture Questionnaire adapted for health care settings ⁴⁶ (7 studies)	Internal consistency	Practitioners only: range (0.46, 0.89), total <i>n</i> = 944 Practitioners and staff: range (0.73, 0.81), total <i>n</i> = 593	Practitioners only: – Practitioners and staff: ?	Practitioners only: high Practitioners and staff: moderate
Medical Group Practice Culture Assessment ⁷⁹ (Kralewski et al., 2005)	N/A	N/A	N/A	N/A
Kralewski et al., 2008 ⁷⁶ (1 study)	Internal consistency	Range (0.66, 0.88), total <i>n</i> = 422	–	N/A
Mechaber et al., 2008 ⁷¹ (1 study)	Internal consistency	Range (0.66, 0.86), total <i>n</i> = 422	–	High
Linzer et al., 2009 ³² (1 study)	Structural validity	EFA (<i>n</i> = 293) was conducted with varimax rotation, yielding a 3-factor model.	–	High
Dugan et al., 2011 ³³ (1 study)	Cross-cultural validity	Experts and study investigators revised the scale for the Italian health care system. 3 domains were dropped, and the scale was translated and back-translated independently 3 times. The tool was piloted among 5 clinical and policy decision makers and modified based on feedback.	?	Very low
Pracilio, 2014 ³⁴ (Italian) (1 study)				
Zink et al., 2017 ³⁵ (1 study)	N/A	N/A	N/A	N/A
Linzer et al., 2019 ³⁷ (2 studies)	Structural validity	EFA was conducted with varimax rotation; factor loading cutoff of 0.5 yielded 6-domain model. A 7-domain model was chosen due to high internal consistency and test-retest reliability.	N/A	Very low
Organizational Culture Profile, revised ³⁹ (Greek-Cypriot) (1 study)	Internal consistency Reliability	Range (0.53, 0.78), total <i>n</i> = 223 Test-retest reliability was performed over a 2-week period among a pilot group of 30 nurses and physicians at a hospital. Pearson correlation coefficient = 0.78.	– +	High Very low
	Cross-cultural validity	A pretest was performed among 20 employees of a general hospital among the Greek-Cypriot population; items were rephrased based on feedback. A pilot study assessing test-retest reliability and internal consistency was then performed among 30 nurses and physicians in the hospital.	?	Very low
Climate construct, Organizational Social Context ⁵⁴ (1 study)	Internal consistency	Range (0.61, 0.94), total <i>n</i> = 497	–	Moderate
Practice Culture Assessment ⁵⁶ (3 studies)	Structural validity	EFA (<i>n</i> = 379) was conducted with oblique rotation, giving a 3-factor model	–	Low
Primary Care Organizational Questionnaire ⁴⁷	Internal consistency	Range (0.78, 0.91), total <i>n</i> = 379	+	Moderate
Hall et al., 2010 ⁶⁰ (1 study)	Internal consistency	Range (0.67, 0.94), total <i>n</i> = 130	–	High
Adaptive reserve domain, Transformed Clinician and Staff Questionnaire ⁶¹ (1 study)	N/A	N/A	N/A	N/A
Organizational climate measures Nurse Practitioner Primary Care Pilot-tested version ⁶³ (3 studies)	Organizational Climate Questionnaire ⁵⁴ Content validity	See qualitative summary for field-tested version	Not evaluated ?	Moderate
Field-tested version ⁶³ (5 studies)	Internal consistency Content validity	Range (0.80, 0.93), total <i>n</i> = 81	Not evaluated	

(continued on next page)

Table 3. (continued)

Measure name	Measurement property*	Qualitative summary	Overall rating ^{†‡}	GRADE
IRT model ⁷⁰ (1 study)	Structural validity	Two meetings were held; the first consisted of 3 experts who were asked to assess each item on relevance, representation, specificity, and clarity on a 4-point scale, and to give their suggestions. In the second meeting, 7 experts met for relevance and comprehensiveness; item-CVI and scale-CVI were computed, with 6/7 experts rating 41/55 items as relevant (I-CVIs 0.86–1.00). For 10 items, minor revisions were made according to expert feedback. Three questions did not receive high ranking from the experts because of clarity in language and were reworded substantially. None of the experts identified any additional content to be added (S-CVI 0.90).		
	Internal consistency	EFA ($n = 278$) was conducted with Geomin rotation, giving a 4-factor model with RMSEA = 0.06 and CFI = 0.94. CFA ($n = 314$) supported a 4-factor model, with RMSEA = 0.08, CFI = 0.97, TLI = 0.96. A 5-factor model improved model indices slightly; however, one subscale did not meet their standard acceptable criterion of at least four indicators for each latent construct, and two factors were excessively correlated.	+	High
	Criterion validity	Range (0.87, 0.95), total $n = 314$ Linear and logistic regression showed scale-predicted NP job satisfaction and plans to leave current position, $p < 0.001$ and $p = 0.011$, respectively.	?	High Low
	Structural validity	An IRT model showed no violation of unidimensionality, local independence, and monotonicity. Model was fit to Samejima's graded response model (Samejima 1969). No model fit indices were reported.	?	High
Organizational Climate for Health Care Organizations ⁶⁵ (Spanish) (1 study)	Cross-cultural validity/measurement invariance	Significant baseline differences between NPs in New York and those in Massachusetts (e.g., age, gender, highest nursing degree, years in current position, average hours worked per week, main practice site, practice location). Nonuniform DIF found in 5 items, which were subsequently removed.	–	Very low
	Internal consistency	Range (0.77, 0.93), total $n = 149$	+	High
	Internal consistency	Range (0.61, 0.94), total $n = 497$	–	Moderate
	Internal consistency	N/A	N/A	N/A
Climate construct, Organizational Social Context ^{54,58} (1 study) Kolko et al., 2014 ⁷³ (1 study) Practice Climate Survey ⁷⁴ (1 study)	Structural validity	EFA was conducted with promax (oblique) and varimax (orthogonal) rotations. CFA yielded a 5-domain model.	?	Low
	Internal consistency	Range (0.76, 0.94), total $n = 542$	+	High
	Internal consistency	Range (0.83, 0.91), total $n = 418$	?	High
	Internal consistency	Range (0.66, 0.85), total $n = 97$	–	Very low
Primary Care Practice Climate ⁷⁵ (1 study) Summary Practice Climate Scale ⁷⁶ (1 study) Task and Relational Climate Scale ⁷ (1 study)	Structural validity	2-level CFA ($n = 223$ clinics, at least 5 individuals per clinic): CFI = 0.98; RMSEA = 0.03; SRMR (within) = 0.03; SRMR (between) = 0.03	+	High
	Internal consistency	Individuals: range (0.86, 0.87), total $n \geq 1115$ Clinic: range (0.93, 0.94), total $n = 223$	+	High
	Structural validity	EFA ($n = 401$) was conducted with Geomin (oblique) rotation in Mplus; CFA ($n = 200$): CFI = 0.943, TLI = 0.939, RMSEA = 0.045	+	Very low
	Internal consistency	Range (0.72, 0.96), total $n = 1047$	?	Moderate

CVI, content validity index; EFA, exploratory factor analysis; CFI, confirmatory factor analysis; CFI, comparative fit index; TLI, Tucker–Lewis index; RMSEA, root mean square error of approximation; IRT, item response theory; CTT, classical test theory; SRMR, standardized root mean residuals

*Internal consistency was calculated using Cronbach's alpha for all studies

†+ = sufficient; – = insufficient; ± = inconsistent; ? = indeterminate

‡Rating content validity is outside the scope of the study

§This reference is repeated twice as it includes both a culture and climate construct

The MGPCA⁴³ is worth considering as it is a frequently cited source measure by several of our included studies and was also developed for primary care.⁴³ Because each of the included studies used modified versions of the MGPCA that all lack strong validity evidence, clear recommendations cannot be made about which specific version to use. The developers recommend their most up-to-date version, a 17-item measure with eight domains (not included in this review). Testing psychometric properties of this scale and its modified versions is warranted for future use.

Recommendations: Organizational Climate

Among organizational climate measures, the field-tested version of the NP-PCOCQ⁶³ for nurse practitioners has the strongest psychometric evidence, with high-quality evidence for sufficient structural validity and internal consistency. Further strengthening of this tool necessitates validation by investigators independent of the scale developers.

The Practice Climate Survey⁷⁴ and the Task and Relational Climate Scale⁷ are more recently developed measures that have been developed in primary care. Additionally, they have at least one good measurement property based on strong evidence, although this is based on a single study for each. These measures would benefit from additional use and validation.

We caution users who may be applying these measures to their own work that, when aggregating individual results to the organizational level using means (as many of our included studies had done), variability is overlooked, resulting in information loss and bias.⁷⁹ Thus, aggregated results should be interpreted accordingly.

Limitations

While COSMIN guidelines provide a strong framework for systematic evaluation of measures, there were two areas where adaptations to these guidelines were necessary in the current review. First, as COSMIN guidelines are tailored to *patient*-reported outcome measure evaluation, we adapted the scope for relevance to a target population of health care professionals (ESM Appendix Table 2). Second, evaluation of content validity was omitted, as there was insufficient consensus in the literature to provide a gold standard for evaluating conceptual domain scope. Consequently, the ratings assigned in this review should be considered conservative.

At a review level, we recognize that all studies may not have published all methods and results of the measurement properties for the measures they used. This could negatively impact the ratings of methodological quality that were assigned to them and, subsequently, our final recommendations. To mitigate this limitation, we attempted to contact authors by email to fill in missing information when possible.

Future Directions

Based on our review of organizational culture and climate measures, we offer suggestions to build upon this work. Foremost, investigators should consider drawing on or expanding upon existing tools, before developing new competing tools in this milieu. Further validation is particularly warranted when adapting existing tools to other diverse settings or populations within primary care, expanding into new subdomains, creating short forms from already validated measures, or recalibrating scoring procedures.

Additionally, clinicians should be examined separately from nonclinical staff when measuring organizational culture or climate. For the Culture Questionnaire adapted for health care settings, pooled internal consistency results improved markedly when practitioners only were examined, compared to when practitioners and staff were examined together (Table 3). The study of Becker et al.⁷⁶ illustrates how clinicians and staff were given separate, structurally different versions of a climate instrument.

The field of organizational culture and climate is one that is constantly conceptually expanding,¹⁰ with no consensus by which these constructs should be measured.²⁰ The dynamic nature of this field presents as a limitation to its objective measurement, as demonstrated in our review. The question remains on what the best way is to objectively measure organizational culture and climate. It may require a completely new measure with a more inclusive conceptual framework, or multiple measures to capture the diversity of the concept. To work toward filling these research gaps, one research team has proposed key dimensions to comprise organizational culture in primary care.⁶ Future work may build upon or confirm similar work and move toward designing standards for these constructs in primary care.

Conclusion

In conclusion, we present a systematic review on instruments that measure organizational culture and climate in primary care settings. A variety of measures were found with diverse and nonuniform dimensions. Overall, more high-quality evidence on their measurement properties in primary care is needed. The lack of a standard framework for culture and climate could be contributing to the difficulty in performing rigorous validity testing. Suggestions for further research include better measurement and reporting of the psychometric properties of existing instruments, exploring differences in culture and climate between practitioners and support staff, and supporting work toward standardizing dimensions for these constructs. We hope that compiling organizational culture and climate measures in a single review can help researchers make more informed decisions when choosing a measure or when deciding to develop a new one.

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