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Discussion kernel

Prakriti-based research: Good reporting practices

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ABSTRACT

The recent advances in the fields of genomics, personalized medicine, and *Ayurveda* have motivated many researchers to look at the relationship between *Prakriti* (phenotype-based *Ayurveda* constitution) and various objective biological parameters. As a result, a number of studies reporting such a relationship have made their way into mainstream scholarly journals. However, when it comes to the protocols that these workers follow to identify one's *Prakriti*, there are several issues that are yet to be resolved. In this communication, we propose a few reporting practices that such workers are required to be encouraged to follow, while submitting their work on *Prakriti* to scholarly journals. We have arranged this proposal under the following domains that may serve as a preliminary checklist in this context: The textual references, validation process, assessment of characters, scoring pattern, weightage assignment, criterion for expressing the final *Prakriti* type, and a need to publish the complete *Prakriti*-determination tool. We advocate that only if the workers in the field adhere to these good reporting practices, one will be able to draw meaningful, generalizable, and applicable interpretations out of such studies. We also suggest that the editors of relevant scholarly journals may recommend these reporting practices while considering such reports for publication.

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1. Introduction

Current advances in the fields of *Ayurveda*, genomics, and personalized medicine have motivated several workers to explore a possible association between the *Prakriti* (*Ayurveda* constitution) and different objective parameters encircling the fields of hematology, biochemistry, physiology, psychology, and genomics [1–11]. Although the trend is a welcome step in validating and evaluating the applicability of the *Ayurvedic* conceptual framework, there are certain issues that are required to be addressed by the scientific community and academia so as to render the results reported by these studies into generalizable, reproducible, and applicable inferences.

To be specific, the problems in the determination of one's *Prakriti* are the ones that have not yet been completely overcome. This is, especially true when it comes to the fulfillment of the research requirements, where a reliable, validated, and reproducible method becomes essential. Although there have been several attempts at designing the reliable tools and protocols for this

purpose, each of these suffers from its own limitations [12–20]. The common problems that are encountered in these protocols can be listed as follows: (a) Discrepancies related to the adherence to the textbooks, (b) ambiguities in assessing the characters, (c) inadequate attention given to inter-rater variability, (d) inadequate attention paid at the scoring pattern and weightage assignment, (e) ambiguities in assigning the criteria followed to express the final “*Prakriti*” type, (f) nondisclosure of the complete protocol used to identify *Prakriti*, etc.

Therefore, there is a need to develop a universally acceptable standard tool/protocol with a consensus of the entire scientific community working in this field. However, since this may take a few years of time to materialize, we advocate that the workers in the field must adhere to certain good reporting practices while submitting their *Prakriti*-based research work to scholarly journals. In the following paragraphs, we summarize our proposal, which is of course, open for debate and further corrections.

2. Textual references

There are variations and at times contradictions in the description of characters or assessment methods among different

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classical textbooks of *Ayurveda* [21–23]. For instance, in the case of body frame, *Alpa Sharira*, *Hrasva Sharira* (small body frame, short stature) has been indicated as a feature of *Vata Prakriti* in *Caraka Samhita*, whereas, *Dirgha Sharira* (height more than average) has been suggested as a feature by *Vagbhata* in *Ashtanga Hridaya*. Similarly, according to *Sushruta*, a person belonging to *Vata Prakriti* tends to have an inclination for stealth, which possibly translates into some form of deviation from normalcy with reference to psycho-social health. On the other hand, the individual belonging to *Vata Prakriti* has been described to be of normal psycho-social health in *Caraka Samhita*.

Further, *Caraka* has laid down the least emphasis on the physical features of an individual while explaining *Prakriti*, whereas, *Vagbhata* has emphasized much on this domain. For instance, the physical description of hair, forehead, skin, eyes, eye lashes, nails, teeth etc., are either not described at all, or have been described just as a passing reference in *Caraka Samhita*, whereas they have been described at length with extensive details in *Ashtanga Hridaya*.

A researcher is, therefore, expected to clearly state as to which textbook was taken as reference for determining *Prakriti* of the individuals (volunteers/patients) in the study and therefore, we propose that the terms such as “*Carakokta Prakriti*” (*Prakriti* as described by *Caraka*) or “*Sushrutokta Prakriti*” (*Prakriti* as described by *Sushruta*) be used while reporting *Prakriti*-based work. If at all the workers still wish to use a mixed tool, incorporating references from all the texts, they must clearly mention as to how they circumvented these contradictions.

3. Validation details

It is advisable and preferable to administer any questionnaire/tool only after it is validated. There are different methods to validate the tools ranging from simple one, such as “face validity” to complex ones, such as “concurrent validity.” The validation of questionnaire/tool may itself prove to be an extensive exercise and therefore, needs to be carried out systematically. We, therefore, propose that the validation methods have to be reported adequately.

Although the objective behind developing questionnaire/tool is to bring objectivity, many aspects of *Prakriti* assessment fall in the realm of subjectivity. To overcome the issue of subjective interpretation of questions and the prejudice while answering certain questions, majority of the existing tools make it necessary for a researcher to take a detailed interview of each participant, examine the participant physically, and fill in the details. However, there are a few tools which are “self-reporting” in nature, where the individual participant has to fill in the details. The limitation with the self-reporting tools is that the participants may not be able to report certain traits in an objective manner because of several biases. On the other hand, the positive aspect of the self-reporting tools is that the participants feel no inhibition while responding to some personal questions. Ideally, for the purposes of research, it is advisable to determine *Prakriti* in two different methods and to include (wherever feasible) only those volunteers/subjects whose *Prakriti* determined by two methods match. Alternatively, two physicians can determine *Prakriti* of all the participants separately and only those volunteers/subjects may be included in the study whose *Prakriti* matches. This takes care of inter-rater variability. What is important, however, is to report clearly as to how *Prakriti* was determined.

4. Assessment of characters

It is desirable that while reporting the *Prakriti*-based work, the researchers must specify as to how they recorded the different

physical parameters. For example, if the shape of the eye was recorded as “round” or “elongated,” what parameters were chosen to arrive at such a conclusion, must be specified. Similarly, skin color has several determinant factors, including exposure to Sun and ethnicity. We advocate that while recording the skin color as “dark,” for instance, the workers must clearly spell out the basis on which it was recorded as dark and how did they exclude the external factors such as exposure to Sun.

In addition, if a classical textbook has not described any specific variation for a character in case of a particular *Prakriti*, it is necessary to report whether the specific character was analyzed in case of that *Prakriti* or not. For example, there is no description of the specific body frame in case of *Pitta Prakriti*, therefore, if it was considered as a “medium” or “moderate,” it needs to be mentioned along with the rationale.

We propose that the description of the assessment methods can be added as a supplement as it may not be directly relevant to the topic of research.

5. Scoring pattern

Many *Prakriti*-assessment tools use different scoring patterns for final determination of the result. These scoring patterns are mainly of two types: Absolute and Relative. Most of the tools calculate the percentage contribution of each *Dosha* on a “relative” basis. In such a “relative” kind of calculation, if the contribution of a particular *Dosha* is stated to be, say, 50%, it need not necessarily mean that the concerned *Dosha* expresses 50% of the total traits ascribed to it. This is because, the denominator used in this calculation is not the maximum “attainable” scores for that *Dosha*; rather, it is the sum of the total scores “attained” for all the three *Doshas* by that individual. This calculation ignores the maximum attainable scores for a *Dosha* [11].

In the tools that are based on “absolute” calculation, the results are derived in terms of absolute percentage values, where, the calculation of contribution of one *Dosha* does not depend on the contribution of the other. Such a tool assumes that each *Dosha* can express itself in a person to its fullest extent (100%) and then calculates the percentage expression of that *Dosha* on an “absolute” basis. Therefore, if such kind of a tool expresses the contribution of a particular *Dosha* to be 50%, it means that the concerned *Dosha* expresses 50% of the total traits ascribed to it [11].

Though it is a matter of debate as to which kind of a calculation is more suitable for the purpose of research, we propose that the specific kind of calculation that was used to determine the *Prakriti* must be clearly reported by the workers.

6. Weightage assignment

Since the focus of every researcher is different depending on the study, he/she may assign a different degree of importance to different characters being assessed while determining *Prakriti*. For instance, one researcher might consider certain physical features such as height and bone length, to be relatively more stable throughout one’s life, and therefore, assign more weightage, while a second researcher may assign more weightage for the features that are likely to be easily identified/categorized, e.g., color of the iris, complexion of the skin, etc. It is possible that a third researcher might assign more weightage to “most specific” features of a particular *Dosha*, e.g., digestive capacity in case of *Pitta*, sleep duration and quality in case of *Kapha*, talkativeness in case of *Vata*, and so on. A fourth researcher, on the other hand, may assign different scores for different characters based on the “*Guna*” (attribute of a *Dosha*) that they represent [7].

Table 1
Summary of the major points addressed in this proposal.

Points	What descriptions are expected in the report
Textual references	Was the protocol based on one textbook or multiple textbooks? a. If based on one, mention the textbook b. If based on multiple textbooks, describe how did you address the issues related to variations and contradictions
Validation details	Mention if the tool/protocol was validated or not a. If validated, describe the process of validation b. Mention if the issues related to inter-rater variability were addressed or not c. If not validated, describe the reasons for not validating the same
Assessment of characters	Was the tool “self-assessment” in nature? If not, describe the assessment methods followed while recording the different characters
Scoring pattern	Describe the scoring pattern followed (absolute/relative) along with the formulae that were used
Weightage assignment	Describe the weightage assignment procedure followed Describe which characters received more weightage: a. That are relatively more stable throughout one’s life b. That are likely to be easily identified/categorized c. Most specific features of a particular <i>Dosha</i>
Final expression of <i>Prakriti</i> type	Mention if the weightage assignment was based on <i>Guna</i> algorithm or not What cut-off points were used to categorize the individuals into <i>Ekadoshaja</i> or <i>Dvandvaja</i> groups? Report the scores obtained for each <i>Dosha</i> by all the participants either in a table or as a supplementary file
The full <i>Prakriti</i> determination tool	Provide the full questionnaire/tool that was used to assess <i>Prakriti</i> along with the weightage assigned to each item

It is, therefore, ideal to describe the weightage assigned to various characters along with the basis for the same.

7. Final expression of *Prakriti* type

Since the textbooks do not specify as to when an individual must be categorized as *Ekadoshaja* (due to the dominance of one *Dosha*) and when as *Dvandvaja* (due to the dominance of two *Doshas*), it becomes essential for the researchers to state clearly on what basis the individuals were assigned to a particular group of *Prakriti* type. This becomes important considering the fact that every individual would have scored some points for every *Dosha*. Therefore, “extreme *Ekadoshaja*” individuals are extremely rare [7]. This necessitates the workers to report it clearly as to what cutoff points were used to categorize the individuals into *Ekadoshaja* or *Dvandvaja* individuals. It is ideal to report the scores obtained for each *Dosha* by all the participants as supplementary files or tables.

8. The full *Prakriti* determination tool

Since the *Prakriti*-based research work is still in its infantile stage, the workers need to be open-minded to publish the full questionnaire/tool that they used to assess *Prakriti* along with the weightage they assigned to each item along with the publication. This may be done as a supplementary file if the topic of their study does not allow it to be incorporated in the main article. This would help other workers in the field to test their tools or to improvise the tool in question so that a standard protocol may eventually emerge.

9. Conclusion

In this communication, we have enlisted a few vital points that the workers engaged in the field of *Prakriti*-based research may consider as a “checklist” and adhere to while communicating their work to scholarly journals. Table 1 summarizes these points. This, we believe, would help in deciphering the outcomes of these studies in a more meaningful way and in eventually building a strong evidence-base. We further suggest that the editors of the relevant scholarly journals may recommend or ask their reviewers to verify these points while considering such reports for publication.

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Nil.

Conflicts of interest

None declared.

References

- [1] Udupa KN, Singh RH, Dubey GP, Rai V, Singh MB. Biochemical basis of psychosomatic constitution. *Indian J Med Res* 1975;63:923–7.
- [2] Bhushan P, Kalpana J, Arvind C. Classification of human population based on HLA gene polymorphism and the concept of *Prakriti* in Ayurveda. *J Altern Complement Med* 2005;11:349–53.
- [3] Patwardhan B, Bodeker G. Ayurvedic genomics: establishing a genetic basis for mind-body typologies. *J Altern Complement Med* 2008;14:571–6.
- [4] Prasher B, Negi S, Aggarwal S, Mandal AK, Sethi TP, Deshmukh SR, et al. Whole genome expression and biochemical correlates of extreme constitutional types defined in Ayurveda. *J Transl Med* 2008;6:48.
- [5] Hankey A. Establishing the scientific validity of tridosha part 1: *Doshas*, *Subdoshas* and *Dosha prakritis*. *Anc Sci Life* 2010;29:6–18.
- [6] Aggarwal S, Negi S, Jha P, Singh PK, Stobdan T, Pasha MA, et al. EGLN1 involvement in high-altitude adaptation revealed through genetic analysis of extreme constitution types defined in Ayurveda. *Proc Natl Acad Sci U S A* 2010;107:18961–6.
- [7] Tripathi PK, Patwardhan K, Singh G. The basic cardiovascular responses to postural changes, exercise, and cold pressor test: do they vary in accordance with the dual constitutional types of Ayurveda? *Evid Based Complement Altern Med* 2011;2011. pii: 251850.
- [8] Ghodke Y, Joshi K, Patwardhan B. Traditional medicine to modern pharmacogenomics: Ayurveda *prakriti* type and CYP2C19 gene polymorphism associated with the metabolic variability. *Evid Based Complement Altern Med* 2011;2011:249528.
- [9] Bhalerao S, Deshpande T, Thatte U. *Prakriti* (ayurvedic concept of constitution) and variations in platelet aggregation. *BMC Complement Altern Med* 2012;12:248.
- [10] Dey S, Pahwa P. *Prakriti* and its associations with metabolism, chronic diseases, and genotypes: possibilities of new born screening and a lifetime of personalized prevention. *J Ayurveda Integr Med* 2014;5:15–24.
- [11] Rapolu S, Kumar M, Singh G, Patwardhan K. Physiological variations in the autonomic responses may be related to the constitutional types defined in Ayurveda. *TANG J Humanitas Med* 2015;5:e7.
- [12] Kurande V, Bilgrau AE, Waagepetersen R, Toft E, Prasad R. Interrater reliability of diagnostic methods in traditional Indian Ayurvedic medicine. *Evid Based Complement Altern Med* 2013;2013:658275.
- [13] Kurande VH, Waagepetersen R, Toft E, Prasad R. Reliability studies of diagnostic methods in Indian traditional Ayurveda medicine: an overview. *J Ayurveda Integr Med* 2013;4:67–76.
- [14] Rastogi S. *Prakriti* analysis in Ayurveda: envisaging the need for better diagnostic tools. In: Rastogi S, Chiappelli F, Ramchandani MH, Singh RH, editors. *Evidence-based practice in complementary and alternative medicine*. Berlin: Springer; 2012. p. 99–112.

- [15] Stempel HS, Cheston SE, Greer JM, Gillespie CK. Further exploration of the vedic personality inventory: validity, reliability and generalizability. *Psychol Rep* 2006;98:261–73.
- [16] Fave AD, Negri L, Manohar R, Morandi A, Bassi M. The Ayurveda concept of Prakriti and the western construct of personality: a comparative pilot study. *Eur J Integr Med* 2014;57:388.
- [17] Shilpa S, Venkatesha Murthy CG. Understanding personality from Ayurvedic perspective for psychological assessment: a case. *Ayu* 2011;32:12–9.
- [18] Rastogi S. Development and validation of a prototype prakriti analysis tool (PPAT): inferences from a pilot study. *Ayu* 2012;33:209–18.
- [19] Shilpa S, Murthy CG. Development and standardization of mysore tridosha scale. *Ayu* 2011;32:308–14.
- [20] Ayosoft: A Decision Support System for Ayurveda, Developed by C-DAC. Available from: http://www.cdac.in/index.aspx?id=hi_dss_ayusoft [accessed on 12.05.16].
- [21] Acharya YT, editor. *Charaka Samhita. Vimanasthana* 8/95. Varanasi: Chaukhambha Orientalia; 1997. p. 277–8.
- [22] Acharya YT, editor. *Sushruta Samhita. Sharirasthana* 4/65-76. Varanasi: Chaukhambha Sanskrit Sansthan; 2007. p. 361–2.
- [23] Nambodiri N, editor. *Ashtanga Hridaya of Vagbhata*, 3/84-102. Varanasi: Chaukhambha Krishndas Academy; 2010. p. 193–5.