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Development and Validation of a Questionnaire to Assess Apana Vayu Vaigunya in Atiyana

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ABSTRACT
Ayurveda is an ancient science of life that advocates certain guidelines to be followed for healthy living. The extensive journey has become an integral part of human life. The Apanavayu(One among the five subtypes of vata) is usually vitiated due to this continuous journey using the road, and train.etc. The clinical manifestation of Apanavayuvaigunya ranges from mild cases of constipation to severe cases of mental disturbances. Atiyana (excessive travel by any modality) is one of the prominent factors highlighted as a cause of Apanavaigunya. The symptoms of ApanaVayuvaigunya gathered from major classical books of Ayurveda reveal that Apanavata is invariably associated with the pathogenesis of 45 diseases starting from Vatavyadi, Arsas(piles), Asmari, Prameha, Sosha, Jwara, Rakthapitta(Bleeding disorders), Vatarakta, Gulma(phatomtumour), Udara, Mutrakrcha(difficulty in urination), etc. Later the symptoms possibly associated with the vitiation of Apanavata present in these diseases were listed and 332 symptoms were found to be associated with Apanavayukopa (vitiation of Apana). These symptoms were then tabulated as most repeatedly occurring symptoms, moderately repeated symptoms, and least repeated symptoms. Thus, out of 332 symptoms, 28 symptoms were selected. Based on these observations,the present study aims to explore the hidden concept of Apanavaigunya mentioned in Ayurvedic literature aboutatiyanaand to develop and validate a questionnaire to assess apanavayuvaigunya in relation with atiyana. This paper reviews the methodology for the development and validation of questionnaire for assessing Apanavayuvaignya in relation with atiyana available in published literature and proposes to integrate this in the field of Ayurveda.
Keywords: *Apanavayuvaigunya, atiyana, factor analysis, Scale wise content validity*

INTRODUCTION
The living body can function normally, only when its doshas, dhatus, and malas are in a state of equilibrium [1]. The normal physiological states of the doshas depend on the normalcy of vatadosha. Thus it is clear that, of the three doshas, Vata is undoubtedly the most fundamental and crucial dosha for survival (Sootrasthana/Chapter 12/Verse 7e8) [2]. Vatavaigunyakaravikara is a condition in which vata is in vitiated state and responsible for many pathological conditions. Vata is present all over the body, but it has variations in its guna and karma according to the sthana(site) it represents.All Acharyas have mentioned Pakvasaya(Large intestine) as the main sthana for vata [3].Prana, Udana, Vyana, Samana, and Apana are five types of vata. To [4]. Apanavayu the last among panchavayus is mainly concerned with the functions of the excretory system and the genitourinary system [5]. General sites of Apanavayu in the body are the pelvic region, umbilicus, intestines, urinary bladder, penis, testis, rectum, anus, and thigh. Pakvasaya is specific site of Apanavayu. The following are the physiological functions of Apanavayu in the body, which help in the process of micturition, evacuation of bowels, ejaculation of semen, the expulsion of menstrual discharge, and delivery of the fetus. Apanavayu gets aggravated by ingestion of dry and heavy foods, suppression or too much initiation of urges, excess indulgence in riding on animals and vehicles, sitting and walking for a long time, etc [8] gives rise to many diseases of the large intestine

(Pakvasaya), disorders of semen, diseases of urine, hemorrhoids, and prolapsed of rectum,etc In classics Atiyana is said to be the cause of many diseases. Even though the term Atiyana is not used in many of them, terms that resemble Atiyana were used. They are as follows atichamkramana, adhwa (excessive travel), margatikarsanath, sahasam (stressful work), aayasam, yanayana (long-distance travel), hayaostrayana (travel on elephants, horses, etc.), etc. Atiyana is regarded as one of the prime causes of the following diseases, Vatavyadi, vatajagulma, vatajakasa, kshatajkasa, was, rajayekshma, etc. Atiyana produces several physical and mental stress. In long run these physical and mental stress give way to severe musculoskeletal problems leading to loss of working hours due to ill health, thereby leading to loss of productivity in the nation at large. It is the right time to concentrate this issue on the concepts of Ayurveda, Apanavayuvaigunya, and atiyana. Based on these observations, the present study aims to develop and validate a questionnaire to assess apanavayuvaigunya in atiyana.

MATERIAL AND METHODS
Materials
The diagnostic tool is the questionnaire developed in eight steps:
1. **Conceptualization**–When conducting research, there must be a unified understanding of key concepts, or variables. Conceptualization is the process in which the researchers identify key concepts used in the research and provide a unified explanation of those concepts. This is the initial phase of research and it should allow validated assessment and be relatively short and single.

   A literary review was carried out through all the *Samhitas* with commentaries to derive the concepts. The tool development process begins with forming a concept and refining it by a theoretical definition**.** Each question was individually studied for its different meanings and its application in various situations across the classics to find out the exact meaning and depth. The linguistic study was done with the help of a language expert in the *Samhita, Sanskrit, and Sidhanta* Department. Each attribute was individually studied for its different meanings and its application. Thereferences regarding the lakṣaṇās from the available literature were collected through Ayurvedic authentic texts mainly *Caraka Samhita, Suśruta Samhita, Aṣṭāṅgasaṃgraha, Aṣṭāṅgahṛdaya,* with their respective commentaries, various books, articles, and online database. The symptoms of *Apana Vayuvaigunya* told in major classical books ofAyurveda were gathered to deduce a comprehensive understanding ofthe context. *Apanavata* is invariably associated with the component of pathogenesis in 45 diseases starting from *Vatavyadi, Arsas, Asmari, Prameha, Sosha, Jwara, Rakthapitta(*Bleeding disorders*), Vatarakta,[8] Gulma, Udara, Mutrakrcha,[9],* etc.Later, the symptoms possibly associated with the vitiation of *Apanavata* present in diseases were listed and 332 symptoms were found to be associated with *Apanakopa* (vitiation of Apana).
2. **Item generation-** Item generation represents a relatively new and unique research area where specific cognitive and psychometric theories are applied to test the construction practices to produce test items. The item generation was done based on a review of literature and conceptualization. The questions were formulated to measure the variables under Apana *navatavaigunya*.
3. **Item selection-** Theselection items or selected response items are test items on which the examinee selects one of a set of choices, rather than generating an original response. For item selection, the formulated questions were submitted to an expert panel for refinement. It is important to use clear and comprehensible language. Since people are different in their reading ability, items require only basic reading skills. The scales should be tested on the target group to verify that the used terms can be easily understood. Another potential problem related to language which results in unintended responses is its ambiguity. The items that incorporate two questions should also be avoided. Here the apanavayuvaigunaya symptoms were further tabulated according to the order of frequency of occurrence as most repeatedly occurring symptoms, moderately repeated symptoms, and least repeated symptoms. Thus, out of 332 symptoms, 28symptoms that can occur due to *atiyana* were selected.[10]
4. **Suitable response format** The response format is utilized to collect answers from the survey participants. The response format comprises survey response options found in the questionnaire. Four-point Likert scale was used in the questionnaire.(Always, Occasionally, Rarely, and Never)
5. **Face and content validity:** Validity means the degree to which a survey instrument assesses what it intends to measure**.** It is not the property of an instrument, but the property of scores achieved by an instrument used for a specific purpose on a special group of respondents.This is of four types-content, face, criterion, and construct validity.[11]Content validity refers to the

extent to which a measure thoroughly and appropriately assesses the skills or characteristics it is intended to measure. Face validity refers to how a measure appears on the surface.

Validation of the questionnaire was done by 11 subject experts.Face validity was found to be 75% after surviving 11 experts. Item wise content validity index was 0.94 for 11 experts, which shows a very high validity index. Scale-wise content validity (SCVI) was 0.944 (94%) which shows a high validity for the scale as a whole.

6. **Pilot study** Pilot studies are small-scale studies that aim to investigate whether the crucial components of the main study will be feasible. The Pilot study should be done on a small sample of the target population to check the feasibility of the questionnaire. Here pilot study was done on daily train travelers with a minimum of two hours of journey. The pilot study was conductedon 10 subjects.

KMO and Bartlett's test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.	0.329	
Bartlett's Test of Sphericity	Approx. Chi-Square	542.318
	Df	325
	Sig.	0.000

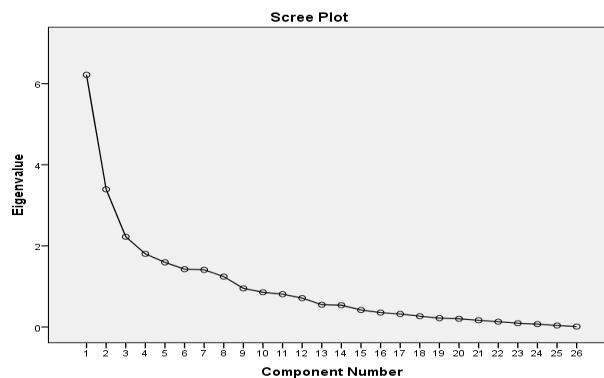It shows 0.329 which is moderately good

7. **Finalization of the instrument** The final version of the instrument in the target language should be the result of all the iterations described above. By following the above-mentioned steps, the tool will be scientific, reliable, and valid.

8. **Final administration** The finalized draft tool is then administered to the main target population.

Factor analysis

- In the process of factor analysis, the items are analyzed creating a mathematical model that estimates construct domains, within the pool of items.
- It assesses the inter-correlation between questions or up to what degree individual items are measuring a common factor or domain so that items with poor factor loading can be deleted from the tool.
- The main statistical methods used here are correlation coefficients and principal component analysis.
- Factor analysis of 50 respondents was done and fixed 8 factorsrelated to apanavayu vaigunya.

Figure-1:Screen plot of the 8 factors.

The developed questionnaire is arranged in alphabetical order,

1) *Aversion towards food*
   A) Always   B) Occasionally C) Rarely D) Never
2) *Belching*
   A) Always   B) Occasionally C) Rarely D) Never
3) *Burning sensation over the body*
   A) Always   B) Occasionally C) Rarely D) Never
4) *Colicky pain in the abdomen*
   A) Always   B) Occasionally C) Rarely D) Never
5) *Constipation*
   A) Always   B) Occasionally C) Rarely D) Never
6) *Cough*
   A) Always   B) Occasionally C) Rarely D) Never
7) *Cramps in calf & thighs*

A) Always   B) Occasionally C) Rarely D) Never

8) *Difficulty in passing the urine*
    A) Always   B) Occasionally C) Rarely D) Never
9) *Distension of abdomen*
    A) Always   B) Occasionally C) Rarely D) Never
10) *Dryness of mouth*
    A) Always   B) Occasionally C) Rarely D) Never
11) *Edema in feet*
    A) Always   B) Occasionally C) Rarely D) Never
12) *Flatulence*
    A) Always   B) Occasionally C) Rarely D) Never
13) *Giddiness*
    A) Always   B) Occasionally C) Rarely D) Never
14) *Gurgling sound in the abdomen*
    A) Always   B) Occasionally C) Rarely D) Never
15) *Headache*
    A) Always   B) Occasionally C) Rarely D) Never
16) *Heaviness in the lower abdomen*
    A) Always   B) Occasionally C) Rarely D) Never
17) *Indigestion*
    A) Always   B) Occasionally C) Rarely D) Never
18) *Irregular menstruation*
    A) Always   B) Occasionally C) Rarely D) Never
19) *Low backache*
    A) Always   B) Occasionally C) Rarely D) Never
20) *Pain in the back region*
    A) Always   B) Occasionally C) Rarely D) Never
21) *Pain in the bladder.*
    A) Always   B) Occasionally C) Rarely D) Never
22) *Pain in legs*
    A) Always   B) Occasionally C) Rarely D) Never
23) *Pain in anus*
    A) Always   B) Occasionally C) Rarely D) Never
24) *Pain in flanks*
    A) Always   B) Occasionally C) Rarely D) Never
25) *Piles*
    A) Always   B) Occasionally C) Rarely D) Never
26) *Rectal prolapse*
    A) Always   B) Occasionally C) Rarely D) Never
27) *Varicose veins*
    A) Always   B) Occasionally C) Rarely D) Never
28) *Weakness of body*
    A) Always   B) Occasionally C) Rarely D) Never

RESULT AND DISCUSSION

*Atiyana*or*aticham kramana* is described as an important cause for *Apanavayuvaigunya* in *Ayurvedic* classics. In the literature review, it was found that *Apanavata* was invariably associated with the component of the pathogenesis of about 45 diseases. Item wise content validity index was 0.94 for 11 experts, which shows a very high validity index. Scale-wise content validity (SCVI) was 0.944 (94%) which shows a high validity for the scale as a whole. The questionnaire was developed and the statistics were analyzed to explain the relationship between *atiyana* and *Apanavayuvaigunya*.

Apanavayu is more important as its functional area is Pakvasaya which is also the capital area of Vatadosa [6]. Apanavayu not only controls and coordinates the functions of its area but also that of the other subtypes of vata. Since the stana of apanavayau is the important site of vatadosa, through the treatment of apanavayu all the other subtypes of vata can also be managed. The important physiological function of Apanavayu is to facilitate the excretion of mala vayu (flatus), purisha (stool), and mutra (urine), Ejection of the sukra (semen), To cause the artavavahana (menstrual function),To bear down the garbha (fetus) at the time. Due to its location ruksha, guna is the most predominantly functioning guna of apanavayu. Hence it is principally responsible for all the physiological and pathological functions of apanavayu.

Atiyana or atichmkramana is described as an important cause for apanavayuvaigunya in Ayurvedic classics. In the literature review, it was found that Apanavata was invariably associated with the component of pathogenesis in 45 diseases starting from Vatavyadi, Arsas, Asmari, Prameha,etc. Later the symptoms possibly associated with the vitiation of Apanavata present in diseases were listed and 332 symptoms were found associated with Apanakopa vitiation. These symptoms were further tabulated according to the order of frequency of occurrence as most repeatedly occurring symptoms, moderately repeated symptoms, and least repeated symptoms. Thus out of 332 symptoms, 28 symptoms that can occur due to atiyana were selected. Soatiyana is an important causative agent for the manifestation of apanavayuvaigunya [1-12].

CONCLUSION

Designing a questionnaire in tune with contemporary scientific research requirements is a difficult task. This is a multistep process requiring a thorough analysis of needs and resources, followed by careful crafting. The craft is then required to be tested and retested on various parameters till it reaches a consensus of producing convincing, yet reproducible results in variable settings. Developing a questionnaire to assess apanavayuvaigunya and atiyana through the steps involved in tool development was done and its validation is also done.

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Conflict of Interest

There is no conflict of interest between the authors.

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