Assessment & Measurement of Anger in Behavioral and Social Sciences:
A Systematic Review of Literature

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Abstract

Introduction: Assessment and measurement of anger have been an interesting subject for experts in psychological and social sciences and have been done in varied forms especially in three different populations of ordinary, clinical, and military clusters.

Method: In the present systematic review, keywords include "anger assessment, anger measurement, anger assessment instruments, standardization of anger assessment instruments, standardization of anger measurement instruments, and anger test". These keywords were searched in "PubMed, ScienceDirect, Google Scholar, Google Patent, MagIran, SID, Proquest, Ebsco, Springer, IEEE, Kolwer, & IranDoc" search engines. According to the relation between the study sections, academic publishing, publishing after 2000 and Jadad system relevant sources were selected. The manuscripts were then finalized by the evaluation of five experts in anger domain via the Delphi method.

Results: According to analyses of ordinary, clinical, and military populations, four specific and three general-purpose instruments of anger assessment have been found which have at least more than three studies of standardization and validation.

Conclusion: According to the study findings, it is proposed to validate, and standardize NAS-PI in different populations in order to anger assessment and investigation in healthy and non-clinical, clinical and pathological, as well as military populations. The lack of biological and physiological anger assessment instruments is discussed as well.

Keywords: Anger, Anger Assessment, Anger Measurement, Systematic Review, Jadad Method, Delphi Method

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1.Introduction

Emotions can be defined as processes with identifiable periods of personal experiences and individual's capabilities with respect to their issues of importance, so that they have the ability to prepare people to act, react, and have acknowledgments of priorities and planning [1]. Anger is one of the major emotions which most people often experience in their every-day life. Contrary to the common sense, anger is not solely a negative emotion, like aggression and hostility; rather, is a normal emotion and an inclusive and global feeling [2]. Moreover, anger could act as a character armor in certain times. Although the feeling of anger can be expressed in a positive manner and considered as a health function, it also can cause much harm to individual and her/his surrounding environment [1].

Detection and recognition of anger means to learn about biological, physiological, and psychological structures that produce and influence anger expression, and (ir) rational beliefs, as well as environmental influences such as family, society, and culture. People need to know their anger and its level time to time, so that they can protect themselves against its negative impacts and be able to express their anger in a more positive and effective manner [3]. Anger is an absolutely natural and usually healthy and human emotion. However, when gets out of control, anger can result in problems in workplaces, interpersonal relationships, social relations, life satisfaction, total level of quality of life, and possibly personal and social levels of productivity [4, 5].

According to the importance of anger in human personal, and social life, assessment and measuring anger have gained much attention during the past decades, especially in psychological and social approaches considering the fact that irregular anger expression is a potential major harm to social adhesion and social capital. This, resulted in the development of various anger-assessment instruments, mostly based on self-report approach. Self-report instruments are those which are administered by individuals and they respond with respect to their subjective states. The results are then interpreted as a measure of rate, intensity, and type of respondents' anger [6]. Some instruments of anger assessment have been developed on the basis of objective evaluation and according to attendants' and observers' judgment which are a few [7].

Unfortunately, there have been few studies about anger assessment instruments. In Persian, there is only two exclusive anger assessment instruments have been standardized which include STAXI-II [8, 9], and second version of AQ [10]. Furthermore, because of similarities between anger and constructs such as aggression, hostility, violence, and impulsivity, many authors assumed them synonymous and used their assessment instruments to measure anger levels. This fault has generated many interference in result and caused incorrect interpretations due to assessment of a construct in favor of measurement and interpretation of the results for another construct [11]. Hence, the aim of the present study was to apply a systematic review methodology to review literature about instruments dedicated to assessment of anger construct to determine the fittest anger assessment instruments. This

would be a major basic step to unify the literature of anger studies in the future and make a consolidate framework for authors of this domain in their future studies. Moreover, the present paper could be a source for future standardizations of acknowledged anger assessment instruments and a comparison of their concurrent and predictive validities in various languages.

2. Method

2.1. Design

The present study was held in a systematic review manner. This type of study to gather, identify, evaluate, select, and synthesize all valuable research evidence about the research question(s) [12]. Systematic reviews have an objective and determined approach to synthesize results with the major goal of reducing biases. While some review studies do statistical analyses, most of them conduct qualitative assessments which are based on standards of collection, analysis, and report of the gathered evidence [13].

2.2. Sample and Procedure

The population of the present study comprised published English and Persian studies about anger between January, 1, 2000 and June, 1, 2014. The keywords of the research include : anger assessment, anger measurement, anger assessment instruments, standardization of anger assessment instruments, standardization of anger measurement instruments, and anger test which were searched in scientific search engines include PubMed, Science Direct, Google Scholar, MagIran, Google Patent, SID, Proquest, Kolwer, IEEE, Springer, Ebsco, and IranDoc, and the most related papers were selected. The inclusion criteria were date of publication (1/1/2000-6/1/2014), subjective relevance, academic source of publication, and the relevance rate to keywords according to search engines.

Jadad score was an additional criteria for experimental papers. Jadad scale which is also known as Jadad scoring method, or Oxford quality scoring system, is an independent assessment process of methodological quality of research [14].

2.3. Analysis

After data collection, with the use of the Jadad method, the most suitable resources for the study were determined and put to the dedicated part of the work. Results were collected, derived, and classified with the use of librarian study design and were analyzed by content analysis as well as citation rates.

Moreover, in order to improve the validity of the results and reducing biases in final analyses, the Delphi method was administered. The Delphi method helps to increase the level of novelty and creativity in the phase of exploration of new ideas and mostly is addressed as a novel inspiring method. Using dialectical logic, the Delphi method is to some extent alike the grounded theory research design and tries to collect, classify, and manage the existing knowledge of experts [15]. In the present study, to find the best anger assessment methods and instruments, the question was sent to three clinical psychologists (PhD of clinical psychologist with specialized work legislation) and three sociologists (PhD of sociology), all specialized in anger management and research, and were asked to provide the well-known, most applicable, and most suitable instruments of anger assessment. Their initial answers were summarized and unified and in the second round sent back to all the experts and were asked to modify if needed. The second round answers were integrated together and sent back to them for the third run. For the third time, experts were modified the list. These modifications were implemented in the synthetic form and were sent to the experts for the fourth time. In this phase, all the experts accepted the list and therefore, this consensual list shaped the final structure of the results structure of the study (Table 1).

2.4. Ethics

The most important ethical issue of the study, was respecting the copyrights of the authors of resources including papers, books, book chapters, manuscripts, dissertations, etc., which is directly done in the present study. The other issue was anonymity of the participants of Delphi method. The identity of all these experts kept anonymous. All the procedure and aims of the study were fully described to all them and they filled out written consent in which they fully understand the terms of participation. The results of the Delphi method administration and the study were sent to the aforementioned experts as part of mutual partnership.

3. Results

In order to investigate anger assessment instruments, 186 published articles and 107 books were evaluated from which 46 articles and 23 books have passed the inclusion criteria (English: 15 books, 20 research papers, 2 review papers, 4 systematic reviews, and 1 meta-analysis; Persian:

Table 1. Delphi method procedure to find the most suitable framework of the study

Stages of the procedure	Desirable structure of the frame work of the study
First run	ABS, TFQ, Rahmati Anger Questionnaire, STAXI-II, Iran Police Stress Scale, AQ, Challenge Assessment Questionnaire, IRQ, Rage evaluation Inventory, Pd in MMPI-II, Rage Control Checklist, Multidimensional Anger Scale (MAS), Repressed Hostility Scale (RHS), SAI Tehran, Hos in SCL-90-R, Buss-Durkee Hostility Inventory (BDHI).
Second run	Pd subscale in MMPI-II, Iran Police Stress Questionnaire, NAS-PI, Rage Control Checklist, STAXI-II, Hostile Behavior Inventory, AQ, Buss-Durkee Hostility Inventory (BDHI), Violent Behavior Questionnaire-Adult, IRQ/CIRQ, 6B subscale in MCMI-III, Hos subscale in SCL-90-R.
Third run	*General instruments of anger assessment:* Hos subscale in SCL-90-R, 6B subscale in MCMI-III, Pd subscale in MMPI-II. *Exclusive instruments of anger assessment:* NAS-PI, STAXI-II, AQ, IRQ/CIRQ

8 books, and 19 ordinary research papers). Meanwhile, with respect to the criteria of systematic review, 14 papers were chosen to shape the conceptual framework of the study (table 2).

The results are presented in two distinctive parts: Exclusive instruments of anger assessment, and general instruments with subscales of anger/ aggressive behavior assessment. While there are many instruments to assess anger and related concepts (such as, aggression, violence, hostility, impulsivity, etc.), there are only a few instruments which are valid and have more than three published papers about their standardization (only four exclusive and three general). Therefore, in order to maintain the validity of the present study, authors have just focused on these seven instruments to avoid announcing instruments without sound theoretical and empirical evidence. The capability of anger assessments have been evaluated in three populations of general civil, clinical, and military, as the evidence show significant differences between these three populations [16]. Moreover, neither authors could find comparative studies between these populations, nor the competitive advantage of any of these instruments. These anger assessment instruments are presented in table 3.

3.1. Exclusive instruments of anger assessment
3.1.1. The State-Trait Anger Expression Inventory, version II (STAXI-II)

Nowadays, The State-Trait Anger Expression Inventory (STAXI) is one of the most used instruments of assessing various dimensions of anger [17]. The first version of STAXI was published by Spielberger in 1988 according to his model of anger with 44-Likert items. This Inventory was revised in 1996 and some subscales and items were added up. In the revised version, the sum of items increased to 57 and this new version was published as State-Trait Anger Expression Inventory, version II (STAXI-II) [3].

STAXI-II has 57 items in the form of a 4-degree Likert structure (from Almost Never=1, to Almost ever=4) and six scales, five subscales, and one anger expression index which demonstrates a total degree of expression and control of anger in respondent. The inventory is applicable for 15-year-old respondents and above and its interpretation needs expertise in psychology, psychiatry, and/or educational tests. The scales and subscale of this inventory include State anger (anger feeling, intense need to verbal anger expression, intense need to physical anger expression), anger trait (angry temperament, angry reaction), anger externalization, anger internalization, anger externalization control, anger internalization control, and anger expression index. This Inventory has been used to study of anger in total population, healthy and non-clinical, clinical and pathological groups [18].

STAX-II has an acceptable and solid reliability and validity, compared to other instruments, over total, and clinical population in diagnosis of anger. For instance, cores of STAXI-II show correlation of .73 with Buss-Durkee Hostility Inventory (BDHI) [19] and .59 with psychosocial deviance (Pd) subscale of MMPI-II [20]. In addition, the Cronbach's alpha of the English version of the inventory for *State Anger* is .90 in men and .91 for women, for *Trait Anger* is .82 in both gender, and .73 to .85 for total inventory

in both genders [21]. In Persian version of STAXII-II, Cronbach's Alpha was estimated .92 in men and .93 in women, .83 in both genders, and .60 to .89 for total inventory in both genders. Inspecting the validity of STAXI-II, its scores showed 68% of correlation with Multidimensional Anger Scale, and 50% correlation with Repressed Hostility Scale [9, 10]. Authors have found no published information on the military usage of STAXII-II yet [17].

3.1.2. Novaco Anger Scale- Provocation Inventory (NAS-PI)

Novaco [22] has defined anger as a negative emotion, which is a state of arousal, experienced as being contradictory to a person or thing that is appeared to be a source of a given aversive event. In Novaco's model of anger, the focus is on the evaluation of three related cognitive, arousal, and arousal dimensions of anger. These dimensions have a mutual influence on each other in response to external anger-triggering situations. Whether individual chose to express her/his anger, or repress it, which is related to many factors, she/he experiences varied cognitive, physiological, and behavioral tendencies to act according to her/his emotions. Novaco's model of anger emphasizes on general potential for angry reactions, whether expressed, or repressed. Unlike Spielberger, Novaco makes no special distinction between expression and repression of anger. Novaco built up his own instrument of anger assessment according to this theoretical model of anger, which only evaluates clinical mediation of anger and a general potential to angry reactions [23].

Firstly, Novaco made the Novaco Anger Scale (NAS) according to his model with two distinct parts: Part A, and Part B [24]. Part A includes clinical cognitive, arousal, and behavioral dimensions of anger and is in the form of a three-degree Likert scale ("Never", "often", and "always"). The cognitive dimension of NAS assesses intermediation of cognitive factors in anger with four subscale of attentional focus (selective attention and negativity bias to provocative clues), suspicion (exaggerated expectations of others' misbehaves), rumination (attitude not to leave angry experiences), and hostile attitude (exaggerated readiness to negativity and overgeneralized responses). Cognitive dimension is very quick, automatic, and endogenous to perception, and therefore, does not necessarily contain explicit and conscious thinking [25].

The arousal dimension of NAS includes physiological activation processes in varied aspects of central and autonomic nervous systems, cardiovascular system, endocrine system, limbic system, and musculoskeletal tension. Subscales of arousal include intensity (intention to "intense response"), duration (resuming angry reaction), somatic tension (physical reactions that provoke angry reactions), and irritability (affective preparedness to perceived irritations by anger) [25]. The behavioral dimension of NAS emphasizes on the role of action impulse in anger. The assumed mutual relation between anger and aggressive behavior suggests that anger might be an outcome of behavioral intentions.Subscales of behavioral dimension consist of impulsive reaction (intention to reaction with anger in absence of inhibitory controls), verbal aggression, physical confrontation, and

Table 2. Resources of the Study

Resource Type	Book	Ordinary research paper	Review Articles		
			review	Systematic review	Meta-analysis
Persian	8	19	-	-	-
English	15	20	2	4	1
Sum	23	45	2	4	1
Total		Persian= 27	English= 42	Total= 69	

Table 3. Anger Assessment Instruments

Type	Name	Structure	Application
Exclusive	STAXI-II	57 Likert-scale items *A) State anger:* anger feeling, severe need to verbal expression of anger, severe need to physical expression of anger. *B) Trait anger:* angry temperament, angry reaction, anger externalization, anger internalization, anger externalization control, anger internalization control. *C) Anger expression index.*	Non-clinical and healthy; Clinical and Psychopathological Screening in general population No report/evidence about military usage
	NAS-PI	85 Likert-scale items *A) NAS:* 3-degree Likert scale include: *Cognitive dimension*: Attentional focus, suspicion, rumination, and hostile attitude. *Arousal dimension*: Intensity, duration, somatic tension, and irritability. *Behavioral dimension*: Impulsive reaction, verbal aggression, physical confrontation, and indirect expression. *Anger Regulation dimension*: cognitive coping, arousal calming, behavioral control. *B) PI:* 4-degree Likert scale include disrespectful treatment, unfairness/injustice, frustration/interruption, annoying traits, and irritations.	Non-Clinical and healthy; Clinical Psychopathological Screening in general population Standardized on US army soldiers
	AQ	34 5-degree Likert items General score of AQ (indicates general level of anger and aggression), physical aggression (PHY), verbal aggression (VER), anger (ANG), Hostility (HOS), and indirect aggression (IND)	Non-clinical and healthy Clinical Psychopathological Screening in general population No report/evidence about military usage
	IRQ/CIRQ	IRQ: 21 self-report items CIRQ: 10 caregiver/spouse measured items Both forms have 4-degree Likert scales: each item has 2 Likerts; one for frequency, and the other for intensity of angry events.	Clinical Psychopathological No report/evidence about military usage
General	Pd subscale in MMPI-II	50 yes/no items This scale indicates conflict, challenge, anger, and the degree to respect social regulations. The aim of the scale is mainly to evaluate general levels of social adjustment. Items of Pd are about domains such as conflicts with authorities, social unimpressionable ability, alienation with family members, anger, and social as well as personal alienation.	Non-Clinical and healthy Clinical Psychopathological Screening in general population Wide application in military recruitment
	Hos subscale in SCL-90-R	Six 5-degree Likert items Three forms of anger expression and its reaction like offensive states, irritability, and hostility are assessed.	Non-clinical and healthy Clinical Psychopathological Screening in general population Wide application in military recruitment and research
	6B subscale in MCMI-III	20 yes/no items This scale evaluates *Active-disagree* type of personality from Millon's typology (aggressive personality disorder). People with sublimity in this scale behave with others with anger and aggression and forcibly actions. Their behavioral profile is full of anger and verbal and behavioral aggression. These people tend to annoy others and neglect others' rights.	Clinical Psychopathological No report/evidence about military usage

indirect expression (displacement of anger on substitute goals). The total anger score is the sum of all these three aforementioned dimensions [25].

Part B comprises full version of Novaco's provocation Inventory (NPI) which is a list of 25 items about anger intensity and its generalization in five categories of provocation. These categories are disrespectful treatment, unfairness/injustice, frustration/interruption, annoying

traits, and irritations. Respondents would determine the degree of anger in each situation according to a four-degree Likert scale (from "not at all" to "very much") [25].

The next version of NAS is NAS-PI which is indeed the revised version of A and B forms of NAS. Compared to NAS, the new version contains major changes. The most important change was adding up a new dimension of "anger regulation" with the aim of investigation of personal efforts to control anger impulses. This dimension includes subscales of cognitive coping, arousal calming, and behavioral control. In NAS-PI, the items of the first part are 60, and the total items of the inventory have been increased to 85 [26].

Studies on reliability of NAS-PI, show Cronbach's alpha of .95 for both NAS and PI parts, and .85 to .98 for all subscales of the NAS-PI [27]. The validity of the NAS-PI has been proved by its scores correlation of 82% with BDHI [19], as well as 84% of correlation with STAXI [26]. Military standardization of NAP-SI on US soldiers in Iraq war showed a Cronbach's alpha of .91 for both NAS and PI, and .79 to .93 for subscales of NAS-PI. This instrument appears to have a desired capability of anger assessment during military situations and anticipation of individuals' behavior in crisis and during battles [28]. NAS-PI has been used in various conditions in total population, healthy and non-clinical, clinical and pathological, as well as military populations [27].

3.1.3. Aggression Questionnaire (AQ; Buss-Durkee Hostility Scale, BDHI)

This scale is one of the oldest instruments of anger and hostility assessment. This instrument has been used as a source for concurrent validity of other anger assessment instruments. Buss-Durkee Hostility Scale (BDHI) has been developed in 1957 primarily to assess hostility and anger [19]. As there were no other instrument to assess anger in that time, BDHI has been used widely by authors and researchers. The format of BDHI is self-report with 66 yes/no items. BDHI comprises seven scales of assault, indirect aggression (IND), irritability, negativism, resentment, suspicion, and verbal aggression. In spite of wide implementation and application of BDHI, its major deficiency was the lack of factorial validity [29].

Therefore, the second version of BDHI, with the name of *Aggression Questionnaire* (AQ; also known as *Buss and Perry Questionnaire*) [30], and its third version (AQ, also known as Buss and Warren Questionnaire) [31] were presented to overcome this issue. The third version of this questionnaire is in the form of self-report, designed for people aged between 9 to 88, and has 34 items in the format of the five-degree likert scale (1: never, 2: to some extent, 3:usually, 4: most of the time, 5: all the time). The results of the inventory are in the form of inconsistent responding index (INC; index of assessment of the level of inconsistency of respondent's answers. If INC is above 5, the results of the inventory are not valid. Scores below 5 show no level of inconsistency in response), total AQ score (indicates general level of anger and aggression), physical aggression (PHY; tendency to use physical force while expressing anger or aggression, and the degree of difficulty to self-control in dealing with impulses of physical

aggression), verbal aggression (VER; tendency to argue, dispute, and verbal tangle), hostility (HOS; feeling of annoyance, suspicion, alienation, and feelings that with others actions one's physical and mental health would be seriously endangered), and indirect aggression (IND; tendency to express anger in acts which avoiding direct confrontation). This instrument has been widely used to evaluate anger and hostility in total population, healthy and non-clinical, clinical and pathological groups. However, there have found no published evidence about military sectors [30].

Studies on standardization showed a desirable reliability of AQ. The Cronbach's alpha was .81 for INC, .83 for total score of AQ, .86 for physical aggression (PHY), .75 for verbal aggression (VER), .83 for anger, and .81 for indirect aggression (IND) [32]. Moreover, in order to assess the validity, factor analysis of AQ revealed a proper factorial index and presence of four powerful factors in the questionnaire [33]. The Persian version of the AQ, is from its second version (AKA, Buss and Perry Questionnaire) [32]. The Cronbach's alpha of Persian version of AQ was .89 for total score, half-splitting coefficient was .73, and test-retest coefficient was .78. Concurrent validity of the Persian version was assessed through measuring its correlation with scores in Hos subscale of SCL-90-R, with the rate of .78. In addition, factor analysis revealed a fit distribution of factors and confirmed the theoretical factorial load of the questionnaire [10].

3.1.4. Irritability Questionnaire (IRQ, and CIRQ)

The Irritability Questionnaire is designed in two forms of self-report (IRQ; 21 items) and caregiver/spouse form (CIRQ; 10 items). In both forms, each item has two parts for response in a four-degree likert scale: in the first part, for each question, the temporal frequency rate (0: never, 1: sometimes, 2: most of the times, 3: always), and in the second part the intensity (0: never, 1: a little, 2: moderate, 3: a lot) is questioned. Developing the self-report structure of IRQ, self-rating scale was chosen in order to facilitate the administration and reduction of interviewers' biases. Following the literature review, it has been revealed that irritable and provocative mood includes unpleasant subjective feelings, having a distinctive way of cognitive thinking, and is related to specific behaviors and consequences. Knowing that differences in mood states can result in categorization under names like affect, arousal, and preparedness to act, authors of IRQ have reached to the items through functional analysis of the construct "irritable mood" which is followed by readiness to anger. All the items include two dimensions of behavioral frequency, and intensity [34].

With respect to the fact that in many cases, irritability and readiness to anger show themselves in behavior, not changing in subjective state, and one might not be able to correctly and reliably evaluate her/his irritability, another form of IRQ developed for caregivers and/or spouses (CIRQ). Items of this questionnaire are designed in the way to ask caregiver/spouse of the individual about observing her/his irritable and angry behaviors, as well as mood

changes such as sulkiness, surliness, and short temperedness.

The aim of developing this form was the coverage of all ranges of possible behaviors, from mild irritability and getting angry to explicit and intensive aggressive behaviors. Frequency and intensity are investigated in CIRQ the same way as in IRQ. This questionnaire is administered on total population, healthy and non-clinical, clinical and pathological populations. There is no published report about its administration on total, and/or military populations. However, it appears that because of simplicity of administration and scoring as well as interpretation of IRQ, it would be considered as a suitable instrument of anger and aggressive behavior assessment. In addition, having a parallel observer form is suggested as a psychometric advantage of IRQ [7].

In order to evaluate the reliability of IRQ, Cronbach's alpha of .90 for the total items, and half-splitting coefficient of .78 were reported. Cronbach's Alpha for the frequency and intensity were .90 and .89, respectively. The validity of the questionnaire was evaluated by factor analysis which showed one strong factor. Reliability testing of CIRQ showed Cronbach's alpha of .86 for total items, and half-splitting coefficient of .77. Cronbach's alpha for frequency and intensity was .88 and .91, respectively. In order to validate CIRQ, its concurrent validity was measured by comparing CIRQ scores with the second part of the NAS-PI, which showed high levels of correlation [34, 7].

3.2. Anger assessment scales in general purpose psychological instruments

3.2.1. Psychosocial deviation scale (Pd) in MMPI-II

The forth scale of MMPI-II, psychosocial deviance (Pd), has 50 items and generally indicates conflict, challenge, anger, and the level of respect to social regulations. The aim of this scale is to assess the general level of social adjustment and adaptation. Items of the Pd scale are about domains such as social unimpressionability, problems with authorities, level of alienation with family members, and alienation (social and individual). People with high scores in this scale, obviously have conflicts with authorities, have problems in their work, family, and marital relations, and are impatient whenever confronting frustration, exhaustion, and dysphoria. These people are described as having angry counter-identification with family and/or society. Others know these individuals as angry, self-alienated, and disorganized [35].

History of such individuals contains legal trials, and substance abuse. With respect to their opposition to authorities, conflicts and problems in occupational and professional environments are likely. Behaviors of people with sublimity in Pd scale described as wrathful, aggressive, and even offensive. In addition, such people are more likely unstable, irresponsible, and ego-centric, and much of them have legal involvements, because of antisocial behaviors [36, 38].

This scale has been widely used in behavioral and screening studies to evaluate anger as well as validity testing of anger assessment scales. Frequent authors have used MMPI-II, as a screening instrument, extensively in general population in order to evaluate mental health, as well as pathological and clinical populations. Most job interviews, especially in military, incorporate administration of MMPI-II in order to global assessment of mental health and personality state of interviewees. Authors have found no proper published report of its military use for anger assessment, although MMPI-II is one of the major and primary screening instruments of US army recruitment and has a distinctive version for the military in USA [20].

3.2.2. Hostility scale (Hos) in SCL-90-R

The sixth scale of SCL-90-R is labeled *Hostility (aggression, Hos)* which contains six items and represents thoughts, feelings, and/or activities that determine negative mood state as a direct outcome of anger. These questions include three forms of anger expression and modalities of reacting to them such as irritability, hostility, and offensive states [39].

SCL-90-R is widely used in studies both in general and clinical populations for primary screening of mental health. According to its simplicity of administration and scoring, as well as the inclusion of a wide range of pathological indices, SCL-90-R has become a popular instrument in studies of general psychological assessment. In military settings, SCL-90-R has been frequently administered with the aim of evaluation of mental health. There found no published resource for pure anger assessment with the use of SCL-90-R in total population, healthy and non-clinical, clinical and pathological, or military populations [16].

3.2.3. Sadistic Personality Scale (6B) in MCMI-III

In the Millon Clinical Multiaxial Inventory III (MCMI-III), the eighth scale of clinical scales is 6B which is the clinical figure of sadistic personality. This scale has 20 items and evaluates active-disagree type from Millon's typology. Another name of the scale is *aggressive personality disorder*. People with sublimity in this scale behave with others in a rough and angry manner, have authoritarian and domineering behaviors, and show anger, rage, and behavioral and verbal aggression in their behavioral profiles. These people are disrespectful to others rights and simply hurt others feelings [40].

Some studies have used correlations between this scale and some anger assessment instruments in order to measure concurrent validity [41]. However, there is still no published resource of assessment of anger exclusively with 6B scale. In addition, according to the manual of MCMI-III, this instrument is applicable on clinical and pathological groups and its administration on non-clinical populations shall be under certain considerations. Also, there is no report on military usage of this scale for anger evaluation, as well [40].

4. Discussion and conclusion

Anger can cause many health and social problems. It is a pervasive and instinctive emotion, which can easily dominate one's actions, and therefore, shall be evaluated and controlled well to maintain social order. High levels of anger can significantly increase social medical care costs and produces interpersonal tensions in family and workplace. It could be considered as one of the major causes of all types of social stress, especially occupational stress and burnout, as anger is central to type D personality type

[42]. With respect to the current literature review, like previous studies on theoretical construct of anger [for a detailed description see, 11], it appears that authors have not reached to a general and global consensus about the criteria of anger assessment instruments. Authors have assumed aggression, violence, hostility, impulsivity, etc., equivalent to anger and used one's instruments to evaluate another and unfortunately, labeled them all as "anger assessment instrument" [e.g., 19].

In order to apply the results of the current review, in exclusive anger assessment instruments, it appears that in spite of popularity of STAXII-II for clinical and general population, most of the studies, include standardizations, are held out on non-clinical university student populations [e.g., 3, 9, 10, 18, 19]. Among all the aforementioned instruments, only NAS-PI has published reports of military usage, besides clinical and non-clinical populations [22, 28]. Therefore, the best instrument of anger assessment would be NAS-PI, which needs further comprehensive standardizations in all clinical, non-clinical, and military sectors to produce unified norms and standards of anger assessment in any given population.

In general purpose psychological assessment instruments, the main problem is that their anger-related scales have not been separately standardized for anger assessment. Despite the standardization of MMPI-II, and SCL-90-R in clinical, non-clinical, and military populations [16, 39], because of the wide range of factors which are assessed by their scales, the limitation of the items, especially in SCL-90-R, make in-depth anger assessment hard. Therefore, if the focus of the study is anger assessment, they cannot provide desirable results and hence, not suggested.

One major issue in the literature review was the lack of valid and reliable biological and physiological instruments of anger assessment. It would be plausible to find some biological antecedents of anger whether in CNS, ANS, and/or endocrine system which is accessible by non-invasive methods. The value of such detections are their direct and objective indices which are not distorted by human interpretation. In addition, biomarkers could be traced and classified more accurately and in less time, than paper-and-pencil instruments. The third advantage of such instruments would be the ability to administrate in a wide range of situations, especially in stressful situations. It appears that the next great step in anger assessment would be the development of such instruments.

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