Original Article of GARD Section

Global Asthma Network Phase I Syria asthma surveillance and the impact of the war

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Background: Asthma is the most prevalent chronic respiratory disease (CRD) in children. It causes extensive morbidity and mortality worldwide. Since the International Study of Asthma and Allergies in Childhood (ISAAC Phase III 2001-3), there have been no worldwide standardised surveys of prevalence and severity of asthma in school children. The Global Asthma Network (GAN) Phase I aims to provide this information. We participated in GAN with the aim of tracking changes in Syria and comparing the results to those of ISAAC Phase III. We also aimed to track the impact of war pollutants and stress.

Methods: GAN Phase I, following the same methodology of ISAAC in a cross-sectional study. The same ISAAC questionnaire translated into Arabic was repeated. We added questions about displacement from home, and the impact of war pollutants. We also added the Depression, Anxiety and Stress Scale (DASS Score). In this article, we focused on the prevalence of 5 core asthma indicators (wheezing in the past 12 months, wheezing ever, severe wheeze, exercise wheeze and night cough) in adolescents from two centres in Syria: Damascus and Latakia. Additionally, we investigated the impact of the war on our two centres, while the DASS score was investigated only in Damascus. We surveyed 1,100 adolescents from 11 schools in Damascus and 1,215 adolescents from 10 schools in Latakia.

Results: In Syria, which is a low-income country, wheeze prevalence before the war in ISAAC III was 5.2% for 13–14-year-old, whilst it was 19.28% in GAN during the war. Prevalence of severe asthma symptoms was 2.5% in ISAAC III and 12.8% in GAN. Wheezing appearing after the war or becoming more severe was statistically significant p=0.0001. War is associated with higher exposure to new environmental chemicals and pollutants and higher anxiety and depression scores.

Conclusions: It is paradoxical to note that in Syria, current wheeze and severity are much higher in GAN (19.8%) than in ISAAC III (5.2%), which seems positively associated with war pollution and stress.

Keywords: Asthma indicators; current wheeze; severe asthma; depression; war and asthma

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Introduction

The Global Burden of Diseases 2019 reported that 262 million people in the world suffer from asthma. Asthma is ranked 24th among the leading causes of years lived with disability, as measured by disability adjusted life years (DALYs), and causes 1,000 deaths per day (1). Asthma is the most prevalent Chronic Respiratory Disease (CRD) in children, causing extensive morbidity and mortality worldwide (2). Furthermore, in adolescents 13–14 years of age who completed the questionnaire, conducted by the International Study of Asthma and Allergies in Childhood (ISAAC) Phase I, the prevalence of current asthma was 10%, while in ISAAC Phase III, it was 14.1%. Globally, 6.9% of adolescents suffered from severe asthma symptoms (3) and 20% of current wheezers with symptoms of severe asthma did not report "asthma ever". This was more commonly seen in the Eastern Mediterranean (28.8%) and in Africa (28.5%), which can allude to underdiagnosis.

Following the same methodology as ISAAC (4), the Global Asthma Network Phase I (GAN I) offers an updated snapshot of the prevalence and severity of asthma, rhinoconjunctivitis and eczema symptoms from diverse centres around the world, some of which have never been surveyed before (5,6).

In Syria, three centres (Aleppo, Tartous and Latakia) participated in ISAAC Phase III, with the current asthma prevalence at 5.2%, and half of them suffering from severe asthma (7). Seventeen years later, we participated in GAN to measure the trends over time for asthma, rhinoconjunctivitis and eczema in adolescents. GAN surveyed 3 groups: children 6–7 years, adolescents 13–14 years and the parents of the participating children and adolescents. Two Syrian centres participated: Damascus and Latakia (2018–2019).

The ISAAC questionnaire that had been translated to Arabic was repeated (4,5). We wanted to take this opportunity to also track the influence of war over a period of ten years. Previous surveys in Syrian shelters showed a high prevalence of asthma symptoms and of post-traumatic stress disorder (PTSD) (8).

In this article, we focus on the impact of war on the 5 core asthma indicators as variables (wheezing in the past 12 months, wheezing ever, severe wheeze, exercise wheeze and night cough). To address this question of interest, we added questions to the GAN core questionnaire. These questions concerned displacement from home and the environmental impact of the war (Appendix 1) which was applied in the two centres of Damascus and Latakia. We also added the DASS Score to track the level of anxiety and depression (Appendix 2) which was investigated only in the Damascus centre.

The Global Asthma Report (GAR) 2022 (http://globalasthmareport.org/) highlights all the major issues related to the prevention and management of asthma, including access to affordable essential medicines (1). We present this article in accordance with the STROBE reporting checklist (available at https://jtd.amegroups.com/article/view/10.21037/jtd-23-251/rc).

Highlight box

Key findings

- For the Global Asthma Network Phase I (GAN I), the prevalence of current wheeze is 19.8% in adolescents 13–14 years old. And for severe wheeze, it is 12.8%. This was associated with War pollution and Stress.

What is known and what is new?

- GAN I used the same questionnaire of International Study of Asthma and Allergies in childhood (ISAAC), tracking the prevalence and risk factors for core asthma indicators. Prevalence of current wheeze in Syria was 5.2% in ISAAC in 2001, of severe wheeze was 2.5%.
- We found that exposure to war chemical pollution from weapons or from unusual fuel plays a significant role in this higher GAN I prevalence. Stress as well.

What is the implication, and what should change now?

- We urge academics to include these concepts in curriculum, and WHO to include war impact on training and audits.

Methods

The GAN questionnaire for the five Core asthma indicators was the same as the ISAAC questionnaire. It is a cross-sectional survey, translated into Arabic for the three centres that participated in ISAAC Phase III (4-5,7). The questions are:

(I) Current wheeze: defined by a positive answer to the question "Have you had any wheezing or whistling in the chest in the past 12 months?"
(II) Severe asthma symptoms: defined as those with current wheeze who had had ≥4 attacks of wheeze or ≥1 night per week of sleep disturbance from wheeze, or wheeze affecting speech in the past 12 months.
(III) Asthma ever: defined as a positive answer to the question "Have you ever had asthma?".
(IV) Exercise wheeze: defined by a positive answer to the question "In the past 12 months, has your chest sounded wheezy during or after exercise?"
(V) Night cough: defined as a positive response to the question "In the past 12 months, have you had a dry cough at night, apart from a cough associated with a cold or chest infection?"

Questionnaires were distributed by the investigator to all adolescents 13–14 years old in the school. The investigator read the questionnaire and then asked the adolescents if they had any concerns about any of the questions. The adolescents stayed in the classroom until the questionnaires were completed and returned to the investigator.

The study was conducted in accordance with the Declaration of Helsinki (as revised in 2013). The study was approved by the ministry of education ethics board (No. 2/11/11877) and individual consent was obtained from the participants' parents or legal guardians.

As mentioned, considering the special situation in Syria, we added questions to the GAN questionnaire about the war environmental pollutants and also the DASS score for anxiety and depression (Appendixes 1,2).

For the GAN survey, the optimal number of adolescents (13–14 years) to be surveyed was 3,000. However, 1,000 were deemed acceptable because of the number of hypotheses being tested (4-6).

Due to the difficulties in Syria, we surveyed 1,100 in Damascus from 11 schools and 1,215 in Latakia from 10 schools. The response rate was 98%.Our data was sent to the data centre in Auckland, New Zealand for initial checks. It was then submitted to the GAN centre in London for data checks, and was then accepted (6).

Data were presented as frequencies and percentages. The chi-square test was used to compare percentages between groups. All analyses were completed using the Statistical Package for the Social Sciences (SPSS) version 18 (IBM Corporation).

Results

Our main results for the prevalence of core asthma indicators in Syrian Arab Republic GAN Phase I in 13–14 years old are presented in *Table 1*: We notice that wheezing in the past 12 months is reported by 19.8%; And severe asthma symptoms in 12.8% of respondents while in 60% of wheezers. Asthma ever is reported only in 12.5%

In *Table 2*: War and Core asthma indicators in the Syrian Arab Republic GAN Phase I in 13–14 years old show that (I) prevalence of asthma (Wheezing last 12 months) and asthma severity are highly impacted by the war, P=0.0001 (II) wheezing appearing after the war or becoming more severe was statistically significant P=0.0001. (III) This is also associated with higher environmental exposure to the passive smoking of water pipes or cigarettes during the war, as well as exposure to new chemicals and pollutants P=0.0001.

In *Table 3*: DASS Score for Anxiety and Depression in the Damascus centre, GAN Phase I in 13–14 years olds: Anxiety and depression were prevalent and significantly associated with displacement from home P<0.0001, wheezing prevalence P<0.0001and severity P=0.004.

Discussion

For 15 years, since the ISAAC Phase III, there have been no worldwide standardised surveys of prevalence and severity of asthma, rhinoconjunctivitis and eczema in school children (1,6). The GAN study aims to provide this information. Following the ISAAC methodology (cross-sectional questionnaire-based survey), GAN Phase I was carried out between 2015 and 2020 in many centres worldwide. The study included 157,784 adolescents (13–14 years in 63 centres, 25 countries). In Syria, 2 centres participated: Damascus in 2018 and Latakia in 2019.

While ISAAC III was conducted before the war, GAN Syria was conducted 8 years after the beginning of the ongoing war.

In our article, we deal only with the 5 core asthma indicators of GAN I. The Global total was: 11.1% current wheeze, 10.5% asthma ever, 5.2% severe asthma, 47.5% severe wheeze in wheezers, 18.3% exercise wheeze, 27% night cough.

Centres in countries with low- or lower-middle-gross national income (LICs or L-MICs) had significantly lower prevalence of wheezing symptoms and asthma diagnoses (6).

Table 1 Prevalence of current asthma indicators (in the last twelve months), among adolescents in the Global Asthma Network Phase I (GAN Phase I) in Syria

Centre	Date data collection	Number of participants	Wheeze in the past 12 months		Asthma ever		Severe asthma symptoms in the past 12 months			Exercise wheeze in the past 12 months		Night cough in the past 12 months	
			N	%	N	%	N	%	% of wheeze	N	%	N	%
Damascus	Oct-18	1,100	218	19.8%	146	13.3%	148	13.5%	67.9%	245	22.3%	366	33.3%
Latakia	Apr-19	1,215	241	19.8%	133	10.9%	129	10.6%	53.5%	435	35.8%	661	54.4%
Country total		2,315, 19.8%	2,315	12.5%	2,315	12.8%	2,315	12.7%	60%	2,315	26.1%	2,315	30.1%
Regional total		25,327	3,420	13.5%	2,931	11.6%	1,693	6.7%	49.5%	6,602	26.1%	7,616	30.1%

Table 2 Impact of the war on asthma indicators (in the past twelve months), among adolescents in the Global Asthma Network Phase I (GAN Phase I) in Syria

Risk factor	Reply	Number of respondents	Wheeze in past 12 months		Ever had asthma		Severe asthma symptoms in past 12 months		Exercise wheeze in past 12 months		Night cough in past 12 months	
			%	P value	%	P value	%	P value	%	P value	%	P value
Are you more exposed to passive smoking of water-pipe after the war?	Yes	741	23.35	0.0001	13.23	0.065	12.82	0.076	36.57	0.0001	54.12	0.0001
	No	1,158	16.49		10.45		10.19		25.91		42.06	
Are you more exposed to passive smoking of cigarette after the war?	Yes	839	22.29	0.005	12.28	0.434	13.11	0.144	35.52	0.0001	52.56	0.0001
	No	1,114	17.24		11.13		10.95		25.22		42.1	
Are you internally displaced?	Yes	556	21.4	0.288	14.21	0.074	14.39	0.069	30.22	0.622	51.98	0.0001
	No	1,758	19.34		11.38		11.49		29.12		41.98	
Does your wheezing appear after the war?	Yes	92	56.52	0.0001	30.43	0.0001	40.22	0.0001	58.7	0.0001	76.09	0.0001
	No	579	17.96		11.23		10.88		28.32		46.8	
Does your wheezing become more frequent or more severe after the war?	Yes	78	53.8	0.0001	34.62	0.0001	41.03	0.0001	57.69	0.0001	67.95	0.002
	No	542	17.53		10.52		9.96		27.12		48.89	
Have you been exposed to new pollutants, or chemicals after the war?	Yes	62	72.58	0.0001	45.16	0.0001	50	0.0001	66.13	0.0001	77.42	0.0001
	No	1,554	18.66		10.88		10.36		31.34		49.29	

However, LMIC countries expressed higher severity (6,9).

It seems paradoxical that in Syria, which is ranked as LIC by the world bank, the current wheeze prevalence in ISAAC III was 5.2% for 13–14 years old. Surprisingly, 17 years later, either in Latakia or Damascus, it is 19.28% in GAN.

Latakia participated in both ISAAC III and GAN Phase I, giving us the opportunity to compare results. While for ISAAC Phase III, current wheeze was 4.7, 4% for wheezing ever (7), it was 19.8% in GAN for current wheeze and 10.9% for wheezing ever. GAN analysed the trends of asthma prevalence over 10 years and found that the change per decade was 7.7% in Latakia and SE change 4.4 (9).

We added Syria war pollutants and the DASS-Score (Appendixes 1,2). Indeed, in Syria, the war brought new factors (10-12) which were considered in the questions we added (Appendix 1): displacement from home; environmental factors; chemical pollutants of weapons; open fire and fuel combustion like plastic; indoor cooking; higher

Table 3 Indicators associated with depression and anxiety (Damascus Center)

Variables	Characteristics of participants		Depression			Anxiety		
	Characteristics	N	Freq.	%	P value	Freq.	%	P value
Age (years)	13	792	134	16.92	0.909	252	31.82	0.353
	14	308	53	17.21		107	34.74	
Sex	Male	641	84	13.1	<0.0001	159	24.8	<0.0001
	Female	459	103	22.44		200	43.57	
Displaced	Yes	285	86	30.18	<0.0001	127	44.56	<0.0001
	No	740	101	13.65		231	31.22	
Wheezing ever	Yes	286	80	27.97	<0.0001	136	47.55	<0.0001
	No	811	105	12.95		221	27.25	
Wheezing in last 12 months	Yes	218	72	33.03	<0.001	125	57.34	<0.0001
	No	55	6	10.91		12	21.82	
Severe wheezing	Yes	160	53	33.12	0.029	88	55.00	0.004
	No	126	27	21.43		48	38.10	

Freq., frequency.

exposure to passive smoking; and especially stress (8,10-12). These factors were associated with a higher incidence of wheezing in the past 12 months, severity, wheezing ever, as well as cough at night and exercise wheeze (*Table 2*).

The DASS score for anxiety and depression (Appendix 2) was added to the Damascus centre. It proved anxiety and/or depression to be prevalent and to be significantly associated with core GAN asthma variables (*Table 3*).

In the GAN results, it is of concern to see that physician-diagnosed asthma in Syria (8.9%) was much lower than current wheeze (19.28%) or "ever had asthma 12.5%" (6-9), which alludes to underdiagnosis. The same was noted in ISAAC Phase III (7).

In many LIC and LMICs, essential medications for asthma: Short-acting Beta 2-agonists (SABA), Inhaled Corticosteroids (ICS) and combined Inhaled Corticosteroids and Long-acting Beta 2 agonists (ICS-LABA) are not available for all and there are no programmes for asthma management (1,9). Equally, in many LIC and L-MICs, General Practitioners (GPs) and nurses have limited knowledge about asthma diagnosis and treatment (1). This could also explain the high prevalence of uncontrolled and severe asthma in these countries (1). Health authorities should endeavour to make essential medications available for asthma in LMIC countries. We should stress the need for guidelines, updated training modules and curriculum (1,13,14).

In Syria, medications (SABA, ICS and combined ICS-LABA) are offered free of charge in many hospitals as well as in some primary care centres. They are funded by International Development Partners and delivered through the Red Cross – Red Crescent (1). However, this does not cover the needs of all asthma patients. These medications are also available in private pharmacies but are highly priced, and many patients could not offer them regularly, which limits adherence to long-term preventive therapy and leads to more uncontrolled and severe asthma (Civil Societies are helping).

A national committee for asthma in collaboration with the Ministry of Health (MOH), the Tishreen University-Global Alliance against Chronic Respiratory Diseases (GARD) collaborating centre and the World Health Organization (WHO) country office edited a book in 2016 entitled "National practical guide for CRD". This book was distributed to all GPs and residents and was also uploaded on the MOH website www.moh.gov.sy and the Tishreen University website www.tishreen.shern.edu. This book was adopted by the Syrian MOH and Ministry of Higher Education to train GPs in health centres and Residents in hospitals (1). The book was updated in 2022–2023, based on the Global Initiative for Asthma (GINA) and the WHO Package of essential noncommunicable

(PEN) disease interventions for primary health care in low-resource settings (WHO-PEN) algorithms (15,16) and the GAN survey results. This update took national capacities into consideration. A chapter on environmental air pollution including war pollutants was added, as well as one on COVID-19 and CRD. We are planning a national multisector programme in collaboration with GARD and the WHO Country Office. This will include asthma in schools and will take the GAN survey results and recommendations into consideration. It will also include the war and COVID-19 constraints.

The new-onset asthma and the war impact has been previously observed in soldiers serving in Iraq or Afghanistan. Another publication on soldiers taking part in the first Gulf War, following the Iraq invasion of Kuwait, also reported an increased incidence of asthma, particularly in those with the highest stress exposure. This suggested the involvement of psychological factors, among many others (10).

In 2017, a survey was conducted to track uncontrolled and underdiagnosed asthma in shelters during the Syrian conflict. This was a GARD survey in collaboration with GARD-Syria and the Asthma Ontario Surveillance Information System. The results showed that asthma was physician-diagnosed in 8% and was uncontrolled in all subjects. Only 4% ICS, that was 30% before displacement to shelter. While 40% of non-diagnosed asthmatics replied YES to the question "Do you wake up with attacks of cough, wheezing and breathlessness", this suggested underlying undiagnosed asthma (confirmed by lung function testing) that could have been concealed by poorer environmental and psychological conditions (36% of replying yes, suffered from PTSD. Whilst it was 15% in others: $P<0.05$ (8). After this survey, the MOH gave ICS to all asthma patients in the shelter.

Rosenberg *et al.* showed that there is compelling evidence for a link between chronic psychosocial stress and the onset and course of asthma. Alterations in neuroendocrine pathways, as well as immunologic mechanisms, are likely to be involved in these effects, and specific signal transduction pathways—through which stress modulates epigenetic and transcriptional activity in asthma relevant cells—have been suggested (17). Bartelemy also stressed in her thesis the impact that depression and stress had on the onset and severity of asthma (18).

Strengths of our study: We added to the standardised and validated GAN questionnaire questions about the war, environmental pollutants and questions related to psychological impact. Our results highlighted the need for the scientific and humanitarian society to consider—in future studies or in the surveillance of conflict locations—the pollutants of weapons, indoor open fire fuel, crowdedness and stress linked to war and displacement from home. We also highlighted the overall impact of anxiety and depression on the onset and severity of asthma.

Limitations of our study: Due to the war, we questioned a smaller number of adolescents, 1,100 in Damascus and 1,215 in Latakia. However, the response rate was 98%, driven by the motivation to complete the survey. Research during the conflict faced difficulties of completeness (19), although our study met the requirements of the GAN Steering Group for inclusion in the worldwide analysis.

Suggestions for future research and programmes: We suggest that when GPs and Nurses take patient history, they add the 5 core questions of GAN as well as questions about pollution and stress. We suggest that GAN should arrange with GARD (www.gard-breathefreely.org) and the WHO a global programme in schools for asthma prevention, early detection and control. Collaboration with academics, the MOH and the Ministry of Education at a local level as well as collaboration with UNESCO and UNEP could be an asset. We suggest (I) a worldwide survey on the content of curriculum, (II) training modules for asthma, (III) to determine how asthma is detected and diagnosed in primary care and outpatient clinics in hospitals in public and private sectors and (IV) the availability of educational tools for patients. Conversations with patients onsite during follow up and video exchange by mobile/internet proved to be efficient for the adherence to preventers and for mastering the correct inhaler technique (20-23). Digital Intelligence could also help for research on asthma in remote zones (21), and we can say the same for conflict Zones. Digital Intelligence could be considered for allergic rhinitis and asthma programmes (23).

We stress the recommendations of the GAR report 2022 (1) and the GARD call for action (20) to make essential asthma medications available in LIC and L-MIC countries, in all health facilities according to the WHO Essential Medicines list (WHO-EML). We should also underline the importance of ongoing curriculum and training, as well as guidelines, multisectoral programmes and global collaboration (1,20,21).

Many CRDs (including asthma) can be prevented by (I) reducing risk factors, especially active and passive smoking (22,24), (II) reducing exposure to indoor and outdoor air pollution and (III) controlling occupational hazards (1).

Severe asthma is a big concern in Syria and worldwide (25). The high worldwide burden of severe asthma symptoms

could be mitigated by enabling access to effective therapies for asthma (13,14), and by updating Curriculums for Medicine, pharmacy and nurses. We also need to focus on and prioritise the ongoing training of healthcare workers in primary care, according to GINA guidelines and PEN-WHO. Local capacities in developing countries need to be considered (26), as well as involvement of the community and commitment of governments for asthma in a multisector programme (1,13,14).

Patient education onsite or by mobile/internet is key for success and should be included in all guidelines, training modules or programmes for asthma care (1,20,22). Asthma Serious games were also successful (27). We also highlight the relevance of a comprehensive approach that integrates the psychological experience of patients into the care of asthmatic disease (28).

WHO, non-communicable disease facility, based monitoring guidance: framework, indicators and application 2022 are to be considered in asthma programmes in LMIC (29).

All these will help to reach the Sustainable Development Goal 3 (Insure healthy lives and wellbeing for all). The WHO office in Eastern Mediterranean is ready to participate (30) (https://applications.emro.who.int/docs/RD_Vision_2018_20675_en.pdf?ua=1&ua=1).

Before ISAAC and GAN, there were no reliable countrywide statistics on CRDs in Arab countries including asthma available. There were only sporadic statistics that cannot be generalised (31).

GARD, is a good example for collaboration between developed and developing countries for all asthma issues: Research, detection, prevention and management (32). During the COVID-19 pandemic, GARD, stressed on that asthma and other CRDs should be included in all COVID-19 programmes and that CRD ongoing programmes should be continued. Accordingly, it is recommended that asthma patients should continue to use their daily ICS preventers, and add urgently systemic corticosteroids for severe attacks (20,33). This is particularly important, given that non-controlled asthma is associated with severe COVID-19 and a higher mortality rate (20,33,34).

The ARIA-EAACI statement on asthma and COVID-19 recommended the same, in order to improve asthma control and reduce severe asthma and mortality (35).

Conclusions

Globally, in adolescents, the prevalence of the 5 asthma core indicators were consistently lower in LICs&L-MICs. In Syria, who also participated in ISAAC Phase III before the war (2000–2001) in three centres (Aleppo, Tartous, Latakia), and in GAN during the war (2018–2019) in 2 centres (Damascus and Latakia), the prevalence and severity of wheeze was impressively higher in GAN. The wide differences could be explained by environmental exposure to pollutants of the war and stress. Asthma underdiagnosis in Syria should be addressed in curriculum and health multisector programmes.

Collaboration is recommended between GAN, GARD, WHO and academics in developed and developing countries for continued surveillance in tracking the current situation, elaborating curriculum and programmes and following-up on progress.

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Appendix 1

Added questions to Damascus and Latakia centers 13-14 years old:
-Are you exposed to passive smoking of cigarette or water Pipe
War questions:
- Are you more exposed to passive smoking of water pipe after the war
- Are you more exposed to passive smoking of cigarette after the war
- Are you internally displaced
- Are you exposed to new triggers after the war:

Odors of weapon chemicals
Fires
detergents
New fuel for cooking or heating…please describe…..
Do you cook on open fire indoor
- Did your wheezing appear after the war
- Or did your wheeze become more frequent after the war
- Or did your wheeze become more severe after the war
- Did your night cough appear after the war
- Did your Exercise wheeze appear after the war

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Appendix 2

DASS21 Name: Date:

Please rate each statement on a scale of 0 to 3, which indicates how much the statement applied to you **over the past week**. There is no right or wrong answers. Do not spend too much time on any statement.

The rating scale is as follows:

0 Did not apply to me at all
1 Applied to me to some degree, or some of the time
2 Applied to me to a considerable degree or a good part of time
3 Applied to me very much or most of the time

1 (s)	I found it hard to wind down	0	1	2	3
2 (a)	I was aware of dryness of my mouth	0	1	2	3
3 (d)	I couldn't seem to experience any positive feeling at all	0	1	2	3
4 (a)	I experienced breathing difficulty (e.g. excessively rapid breathing	0	1	2	3
5 (d)	I found it difficult to work up the initiative to do things	0	1	2	3
6 (s)	I tended to over-react to situations	0	1	2	3
7 (a)	I experienced trembling (e.g. in the hands)	0	1	2	3
8 (s)	I felt that I was using a lot of nervous energy	0	1	2	3
9 (a)	I was worried about situations in which I might panic and make a fool of myself	0	1	2	3
10 (d)	I felt that I had nothing to look forward to	0	1	2	3
11 (s)	I found myself getting agitated	0	1	2	3
12 (s)	I found it difficult to relax	0	1	2	3
13 (d)	I felt down-hearted and blue	0	1	2	3
14 (s)	I was intolerant of anything that kept me from getting on with what I was doing	0	1	2	3
15 (a)	I felt I was close to panic	0	1	2	3
16 (d)	I was unable to become enthusiastic about anything	0	1	2	3
17 (d)	I felt I wasn't worth much as a person	0	1	2	3
18 (s)	I felt that I was rather touchy	0	1	2	3
19 (a)	I was aware of the action of my heart in the absence of physical exertion (e.g. sense of heart rate increase	0	1	2	3
20 (a)	I felt scared without any good reason	0	1	2	3
21 (d)	I felt that life was meaningless	0	1	2	3

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DASS-21 Scoring Instructions

The DASS-21 should not be used to replace a face to face clinical interview. If you are experiencing significant emotional difficulties you should contact your GP for a referral to a qualified professional.

Depression, Anxiety and Stress Scale - 21 Items (DASS-21)

The Depression, Anxiety and Stress Scale - 21 Items (DASS-21) is a set of three self-report scales designed to measure the emotional states of depression, anxiety and stress.

Each of the three DASS-21 scales contains 7 items, divided into subscales with similar content. The depression scale assesses dysphoria, hopelessness, devaluation of life, self-deprecation, lack of interest / involvement, anhedonia and inertia. The anxiety scale assesses autonomic arousal, skeletal muscle effects, situational anxiety, and subjective experience of anxious affect. The stress scale is sensitive to levels of chronic nonspecific arousal. It assesses difficulty relaxing, nervous arousal, and being easily upset / agitated, irritable /over-reactive and impatient. Scores for depression, anxiety and stress are calculated by summing the scores for the relevant items.

The DASS-21 is based on a dimensional rather than a categorical conception of psychological disorder. The assumption on which the DASS-21 development was based (and which was confirmed by the research data) is that the differences between the depression, anxiety and the stress experienced by normal subjects and clinical populations are essentially differences of degree. The DASS-21 therefore has no direct implications for, the allocation of patients to discrete diagnostic categories postulated in classificatory systems such as the DSM and ICD.

Recommended cut-off scores for conventional severity labels (normal, moderate, severe) are as follows:

NB Scores on the DASS-21 will need to be multiplied by 2 to calculate the final score.

	Depression	Anxiety	Stress
Normal	0-9	0-7	0-14
Mild	10-13	8-9	15-18
Moderate	14-20	10-14	19-25
Severe	21-27	15-19	26-33
Extremely Severe	28+	20+	34+

Lovibond, S.H. & Lovibond, P.F. (1995). Manual for the Depression Anxiety & Stress Scales. (2nd Ed.)Sydney: Psychology Foundation

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