The Effects of COVID-19 Pandemic on the Rate of Interventional Pain Therapies: A National Survey among Egyptian Practitioners

Short Title: National Survey among Egyptian Pain Practitioners.

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Abstract

Background: Chronic pain symptoms are distressing conditions that necessitate regular visits for pain therapists and may require interventions, however, the COVID-19 pandemic obliged these patients and their therapists to limit both the visits and interventions with the transition to telehealth, with little or no preparation or training and this resulted in the extensive use of on-shelf analgesia and corticosteroids

Objectives: Evaluation of the impact of the COVID-19 pandemic on the rates of counseling and interventional pain therapy (IPT), and determine the effects of implementing the infection control programs (ICP) and Personal Protective Equipment (PPE) on these rates.

Study design: Prospective multicenter survey based on an online self-assessed questionnaire

Setting: Departments of Anesthesia, Pain, and ICU, and Physical Medicine, Rheumatology & Rehabilitation at Egyptian University hospitals

Methods: A self-assessed questionnaire was uploaded on Google forms and links were sent to the enrolled therapists with an identification number to allow self-administration and privacy. Feedback was analyzed by two authors who were blinded to the identity of the responders.

Results: 57.9% of responders had increased their patients' contact by Phone and Video conference. Within 1-4 months after the outbreak had begun, 59% had stopped the in-person contact and 38.2% had stopped their intervention practice. Prescriptions of analgesics and oral steroids were increased by about 50% of responders. The majority of responders complained of a shortage of ventilation appliances in their workplaces. About 50% of responders always use ICP, 85% use surgical masks, 61% use gloves, and 45% wear gowns during dealing with patients. About 45.5% of responders increased their consultation rate and about 40% had increased their rate of IPT after the application of PPE.

Limitations: The study was limited to being a national study and so lacked comparative data.

Conclusion: COVID-19 outbreak seriously affected the rates of in-person consultations and IPT for chronic pain patients and increased the rates of consumption

of analgesia and oral steroids. Most responders assured shortage of ICP especially ventilation appliances in workplaces. A high percentage of responders lack interest in ICP and PPE, despite the positive effects of its application on consultation and intervention rates.

Keywords: Covid-19 pandemic, In-person counseling rate, Interventional pain therapy, Infection control programs, Personal Protective Equipment.

Introduction

The outbreak of Coronavirus disease 2019 (COVID-19) is a serious worldwide threat that is presented by a broad range of symptoms; however, atypical infections with extra-pulmonary manifestations have been reported (1).

Chronic pain patients require long-term multidisciplinary management and during a pandemic, there is always a fear of abandonment with increased incidence of anxiety and depression especially during periods of social isolation and these factors subsequently aggravate pain conditions (2). COVID-19 deleteriously impacted chronic pain patients through the influence of SARS-CoV-19 infection on pain (3) due to the association between SARS-CoV-19 infection with myalgias, referred pain, and widespread hyperalgesia (4). Moreover, patients with chronic pain also frequently had multiple comorbidities, which increased the risk of SARS-CoV-2 infection (3).

The COVID-19 pandemic has altered the practice of medicine and had obligated pain clinics to transition from in-person visits to telemedicine, postpone procedures, and cancel face-to-face interventional training sessions (5). Reduced interventional pain management during the pandemic resulted in increased consumption of over-shelf analgesics and prescription of analgesics in many places with subsequent impairment in patients' quality of life (6). However, the applications of the substitutes to face-to-face management varied between countries and social grades, but all over the world, there was regression or stoppage of intervention procedures and rehabilitation services.

The application of personal protective equipment (PPE) to control the transmission of COVID-19 infection spread all over the world with multiple governmental restriction rules during face-to-face dealing. However, the applications of PPE were personal behavior and its impact on the feasibility of dealing with patients and the provision of interventional therapies and rehabilitation procedures was discrepant with no definite outcome. Thus, the current study tried to evaluate the impact of the COVID-19 pandemic on the rates of counseling and interventions at centers of interventional pain therapy

(IPT) and rehabilitation therapy. Also, the study targets to determine the effects of the implementation of infection control programs (ICP) and PPE on these rates in multiple hospitals in Egypt and Arab countries especially Saudi Arabia

Design

Prospective multicenter survey based on an online self-assessed questionnaire

Setting

Departments of Anesthesia, Pain, and ICU, and Physical Medicine, Rheumatology & Rehabilitation at Egyptian University hospitals

Ethical consideration

The study protocol was approved by the Local Ethical Committee at Benha Faculty of Medicine by approval number: RC: 2-1-21. The study protocol was also registered at ClinicalTrials.gov. by the number NCT04946175. For privacy purposes, all feedback responses were analyzed by two authors who were blinded to the identity of these responders. Questions concerning the financial outcome of counseling and interventions were omitted from the questionnaire. No consent for participation was obtained because each physician was free to respond or not.

Subjects

The questionnaire was uploaded on Google forms and links were sent either as an email or as a message using WhatsApp on a private phone number for each pain therapist from Feb to April 2021. All Egyptian pain therapists who were approved by the university or by the General Syndicate of Physicians as pain therapists had received the links provided they had a registered email or phone number, irrespective of their work location. An identification number was sent with the link to allow the participant to log in to the questionnaire. One month lag duration was allowed to receive the feedback and the feedback received after the start of June 2021 was discarded.

Methods

The survey consisted of a series of questions divided into the following 6 domains:

- Domain I consisted of 6 questions assessing physician gender, age, duration of IPT practice, and location where he practices IPT.
- Domain II consisted of 8 questions assessing the impact of the COVID-19 pandemic on IPT as regards how to communicate with patients, the impact of the pandemic on the number of counseling and interventions, and the cause of change if any, and the feedback effect on the prescription of medications.
- Domain III consisted of an 8-points survey about the application of the Infection Control Program (ICP).
- Domain IV consisted of 12-points concerning the application of Personal Protective Equipment (PPE) during the COVID-19 era.
- Domain V was concerned with the outcome of the implementation of ICP and PPE on the rate of counseling
- Domain VI was concerned with the outcome of the implementation of ICP and PPE on the rate of interventions

Sample size calculation

The previous similar questionnaire-based survey had response rates of 8% of 2295 participants (7) and 18.2% of 1430 participants (8). The current study targets have a response rate of at least 40%, to get a study power of 90% with α value of 0.05 and β value of 0.1, the minimum number of responders was calculated to be 130 responders, thus, the online questionnaire was to be sent for more than 500 interventional pain therapists.

Exclusion criteria

Responses were excluded if any questions of Domains II-VI were not answered if the answer was out of the scope of the provided answers or was

given in meaningless words if the physician had stopped practice before the COVID-19 era, if the workplace was used governmentally as a quatrain place and if response was received after the dead time.

Statistical analysis

Data are presented as mean, standard deviation, numbers, percentages, median and interquartile range (IQR)

Results

The message containing the link to the study survey was sent to 600 physicians, but 261 participants replayed for a response rate of 43.5%. Unfortunately, 83 responses were discarded for any of the items of the exclusion criteria, and 178 responses were analyzed (Fig. 1). The personal and workplace data are shown in table 1.

Domain II

All responders decreased their direct personal contact with a median percentage of decrease of 25 [IQR: 25-50%], while increased contact using the phone and video conference with patients by a median percentage of increase of 50 [IQR: 25-50%] and 25 [IQR: 25-50%], respectively. Collectively, 26 therapists (14.6%) decreased their patients' contact, irrespective of the mode of contact, while 103 therapists (57.9%) had increased their patients' contact and attributed this to the increased application of communication using phone and video conference. On contrary, 49 therapists (27.5%) assured no change in their contact rate due to the use of phone and video contacts before the outbreak. Regarding the rate of interventions during the COVID-19 era, 93 therapists (52.2%) had stopped their practice completely, 78 therapists (43.8%) had reduced their rate of intervention by 75%, 6 therapists reduced their practice by 50% and only one therapist reduced their interventional rate by 25% (Table 2).

Once the COVID-19 outbreak began, 15 therapists (8.4%) stopped in-person contact with their patients and 32 therapists (18%) had stopped

intervention practice. On contrary, 51 therapists (28.7%) stopped the in-person contact with their patients and 78 therapists (43.8%) had stopped intervention practice only with lockdown and seven therapists (3.9%) did not reduce their in-person contact with their patients despite the lockdown. Within 1-4 months after the outbreak had begun, 105 therapists (59%) had stopped the in-person contact with their patients and 68 therapists (38.2%) had stopped their intervention practice. The causes of the reduction in practice rate were intermingled, 84 therapists (47.2%) were worried about their safety, 76 therapists (42.7%) were concerned about their family safety, 62 therapists were concerned about their staff safety and 45 therapists were worried about public safety, while 67 therapists were concerned with the need for prescription of steroid therapy. Out of the surveyed therapists, 48 therapists (27%) attributed the rate reduction to the fewer number of patients visiting the clinic. Interestingly, 105 therapists (59%) attributed their reduction in in-person rates to the limited PPE, especially during the 1st wave of the outbreak (Table 3)

Drug prescriptions were seriously affected by the COVID-19 outbreak, 76 therapists (42.7%) increased their rate of prescribing opioids and 100 therapists (56.2%) increased the prescription rate of acetaminophen and 163 therapists (91.6%) had increased prescribing NSAIDs. Regarding prescribing oral steroids, 51 therapists (28.7%) did not increase the use of oral steroids, 73 therapists (41%) increased their prescription by 25% of the dose, 37 therapists (20.8%) increased oral steroid use by 50%, 13 (7.3%) and 4 therapists (2.2%) increased oral steroid prescription by 75% and 100% of the previous dose. Only 13 therapists (7.3%) and 40 therapists (22.4%) did not increase their prescription of muscle relaxants or drugs for neuropathic pain, respectively (Table 4).

Domain III & IV

Only 9 responders (5.1%) often applied cross-ventilation with increased use of suction-ventilation appliances wherever possible, 36 of responders (20.2%) occasionally use cross-ventilation or increase ventilation, while 98 of the responders (55.1%) did not increase ventilation and rarely use cross-ventilation, and 35 responders (19.6%) never increased ventilation nor use cross ventilation. Only 23% of responders used physical barriers and 54.5% of responders were accustomed to increasing the physical distance during in-person contact with their patients. Moreover, only 24% of responders had clothes changed places and applied regular cleaning and disinfection. On the other hand, about 75% of responders had available waste disposal appliances, and about 48% of responders applied regular cleansing of work clothes (Table 5).

Only 28 responders (15.7%) occasionally use surgical masks, while the remaining often-to-always use them. About 12% of responders always use N95 masks, 18% often use them and about 11% occasionally use N95 masks, while about 60% never-to-rarely used N95 masks. Regarding the use of gloves, about 61% of responders always-to-often use gloves in contact with their patients, while about 19% rarely-to-never use gloves during patient contact. Only 32% of responders used eye-protective tools or face shields and about 45% of responders wear gowns and 22% wore coveralls during dealing with patients. About 78% of responders use alcohol hand sanitizer and 65% of responders were accustomed to using soap and running water after dealing with their patients (Table 6).

Domain V & VI

Regarding the impact of the application of PPE on consultation rate, 53 responders (29.8%) documented an absence of change in rate, while 81 responders (45.5%) assured an increased rate of consultations after implementing PPE by 25% in 23 responses, 50% in 36 responses, 75% in 13 responses and 100% in 9 responses. On the other hand, 44 responders assured still decreasing rates by 25%, 50%, and 75% in 19, 22, and 3 responses, respectively. As regards the impact of implementing PPE on the rate of interventions, 73 responders documented no change, and 15 and 19 responders assured decreased rates by 25% and 50%, respectively. However, 71 responders reported an increased interventional rate after implementation of PPE by 25% in 16 responses, 50% in 28 responses, 75% in 21 responses, and 100% in 6 responses (Table 7).

Discussion

All responders assured decreased in-person contact with their patients with a high reduction in their intervention rate. Moreover, about 20% of respondents had stopped their practice within one month of the start of the outbreak and by the 4th month, about 68% of therapists had reduced or stopped their practice. These data spotted the light on the deleterious effect of the outbreak on rates of interventional pain therapy (IPT) both at the level of consultation and interventional procedures and go in hand with that reported not only for pain therapy but also for other medical and emergency consultations and interventions as documented by **Schäfer et al.** (9) who using questionnaire survey observed a dramatic reduction of the number of consultations which was independent of the specialty of the practitioners or the practice location in urban or rural areas. Also, **Cegla & Magner** (10) reported significant affection of patients who had chronic pain from COVID-19, especially during the lockdown and a large number of patients had deterioration of their pain. Moreover, **Smyrnioti et al.** (11) documented a

dramatic decrease in health care visit rates before, during, and after lockdown during the 1st wave of the COVID-19 pandemic. After surveying chronic pain patients, **Kleinmann et al.** (12) documented cancellation or postponing of treatments during the pandemic by 56.4% resulting in significantly more pain and psychological distress with symptoms' deterioration.

About 90% of responders attributed their reduction of practice rate to their concerns about personal and family safety, similarly a web-based online survey of respiratory therapists who were obliged to contact COVID patients and can't reduce their consultation rates found about 60% of them use PPE at home for sake of protection of their families (13). Shortage of PPE appliances and tools was the cause for the reduction of consultation rates of 59% of responders; such attribution was real especially during the 1st wave of COVID-19 whenever, there was debit about the mode of transmission, especially the role of hard material contamination and about the effectiveness of PPE for limiting the transmission, so these therapists believed in isolation away of contact as the best preventive measure for disease transmission. Similarly, **Shanahan & Akudjedu** (14) assured that the shortage of PEE tools was a complaint of radiologists who were obliged to be in contact with COVID patients because of increased demand for CT and MRI examinations of patients, and this increased personal stress and anxiety at work and reflected as increased stress to their family, partners or friends. These data are consistent with that reported by **Sharma et al.** (15) who surveyed ICU health care providers and found that 66% of responders were worried about transmitting COVID-19 to their families/communities and 40% of responders attributed their concerns to the insufficient availability of PPE tools.

For compensation, most of the current responding therapists tried to be still in contact with their patients by using Phone or Video conferences as methods of communication and this is probably to allow continuity of their practice and hope to return to their usual work attitude later on. In line with these data, **Smyrnioti et al.** (11) found most of the surveyed chronic pain

patients did document significant affection to access their pain physicians and medication and in a nationwide cohort of multiple sclerosis clinicians across the United States, nearly one-third of responders reported using telemedicine to provide over 75% of their clinical care (16). Recently, **Alhassan et al.** (17) found the COVID pandemic accelerated the drive towards telemedicine and telerehabilitation and many services were delivered remotely if non-urgent and possible.

The observed effect of the COVID-19 outbreak on the rate of consultations and interventions indicated a negative effect of the outbreak on chronic pain patients; in line with this finding, **Alhassan et al.** (17) documented that patients with osteoarthritis complained of difficult access to the healthcare system and this resulted in delays in joint replacement surgeries due to cancellations of elective surgical procedures. Moreover, the pandemic caused another pitfall in the health of chronic pain patients that was manifested as the increased rate of prescription of opioids, acetaminophen, and oral steroids by about 43%, 56%, and 71% of the current responders, respectively. Similarly, **Morrison et al.** (16) documented that 83.3% of multiple sclerosis clinicians had changed how they prescribe disease-modifying therapies during the COVID-19 pandemic

Revision of the responses regarding the application of ICP showed that irrespective of the mode of ICP, several responders who always and often use ICP was less than 50% of responders, and this points to either shortage of facilities or these responders who never or rarely use ICP are careless or missing the knowledge about the importance of ICP, especially during pandemics. In support of this outcome, **Umpleby & Houghton** (18) documented that IPC is central to optimizing patient management, providing safety for patients and health care workers, and maintaining operational capacity.

About 75% of the current responders assured shortage of ventilation appliances and absence of cross-ventilations in their workplaces; despite its

importance as a PPE tool and this was alleged to be the cause for their limited hours of work or total stoppage. In support of the importance of ventilation appliances, **Sarti et al.** (19) in a retrospective observational study on a COVID-19 cluster among workers in an office in Italy documented that all methods of PPE are insufficient for COVID-19 infection prevention in closed places with poor ventilation and high occupancy. Also, WHO in the last update on infection prevention and control during health care when COVID-19 is suspected or confirmed and when an aerosol-generating procedure was to be performed, it is to be done in a room with negative pressure or an appliance providing a minimum of 12 air changes per hour (20). Moreover, **Umpleby & Houghton** (18) documented that time-space after dealing with COVID-19 patients must be 11-17 minutes to allow a ventilation appliance with 25 air changes per hour to remove 99% and 99.9% of contaminants.

Conclusion:

COVID-19 outbreak seriously affected the rates of in-person consultations and IPT for chronic pain patients and increased the rates of consumption of analgesia and oral steroids. Most responders assured shortage of ICP especially ventilation appliances in workplaces. A high percentage of responders lack interest in ICP and PPE, despite the positive effects of its application on consultation and intervention rates.

Statement of significance

The increased knowledge about and provision of facilities for infection control and personal protection could increase the rate of interventional pain procedures and spare the need for analgesics

Limitation:

The study was limited to being a national study and so lacked comparative data.

Recommendations:

The authorities of the university hospitals and that of the Ministry of Health must provide conferences with hospital staff members to clarify the necessity of the use of PPE. Also, the authorities of these hospitals must institute ventilation appliances in the outpatient clinics, patients waiting for words, offices of their employees, and inpatient wards, especially ICU.

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Tables:

Table (1): Personal and work location data of responders

Variables		Number	(%)
Gender	Males	127	71.3
	Females	51	28.7
Age (years)	<30	8	4.5
	30-39	32	18
	40-49	97	54.5
	50-59	25	14
	≥60	16	9
	Mean (±SD)	45.7 (8.6)	
Duration of IPT practice (years)	<5	6	3.4
	5-9	23	12.9
	10-19	82	46
	20-29	56	31.5
	≥30	11	6.2
	Mean (±SD)	18.75 (7.6)	
Location of practice	Egypt	65	36.5
	Saudi Arabia	42	23.6
	Kuwait	29	16.3
	Emirate	31	17.4
	Oman	11	6.2
Description of practice location	Rural	112	5.6
	Suburban	56	31.5
	Urban	10	62.9
The location where major clinical time was spent	University hospital	32	18
	Community clinic	49	27.5
	Hospital-based private	65	36.5
	Office-based private	29	16.3
	Private practice solo	78	43.8

Data are presented as numbers and percentages

Table (2): Percentage of patients' contact and interventions in comparison to a typical weekly practice of responders

Variables				Number	(%)
Percentage of patients' contact in comparison to typical weekly practice	In-person	100%		7	4
		75%		25	14
		50%		45	25.3
		25%		73	41
		0%		28	15.7
		Median [IQR]		25 [25-50]	
	By phone	75%		24	13.5
		50%		88	49.4
		25%		63	35.4
		0%		3	1.7
		Median [IQR]		50 [25-50]	
	Using video	75%		8	4.5
		50%		75	42.1
		25%		86	48.3
		0%		9	5.1
		Median [IQR]		25 [25-50]	
	% of change of contact, irrespective of the mode of contact	Decrease by	75%	1	0.6
			50%	2	1.1
			25%	23	12.9
		No change		49	27.5
		Increased by	25%	66	37.1
			50%	24	13.5
			75%	13	7.3
		Median [IQR]		25 [0-25]	
Percentage of decreased intervention rate in comparison to typical weekly practice		100%		93	52.2
		75%		78	43.8
		50%		6	3.4
		25%		1	0.6

Data are presented as numbers and percentages; median and interquartile range (IQR)

Table (3): The reduction of patient contact and pain interventions along with the etiologies over time following the outbreak of COVID-19

Variable	In-person contact		Interventions	
Time	Number	(%)	Number	(%)
Once started	15	8.4	32	18
1-m later	21	11.8	14	7.9
2-m later	24	13.5	19	10.7
3-m later	26	14.6	14	7.9
4-m later	34	19.1	21	11.8
On lockdown	51	28.7	78	43.8
Never reduced	7	3.9	0	0
Causes of reduction of practice rate				
Concerns about	Personal safety		84	47.2%
	Family safety		76	42.7%
	Staff safety		62	34.8%
	Public safety		45	25.3%
	Corticosteroid use		67	37.6 %
Fewer patients are coming to clinic			48	27%
Limited PPE			105	59%

Data are presented as numbers and percentages; PPE: Personal protective equipment

Table (4): Percentages of change in drug prescription.

Analgesics	**Opioids**		**NSAIDs**		**Acetaminophen**	
Increased prescription by	Number	(%)	Number	(%)	Number	(%)
100%	10	5.6	5	2.8	6	3.4
75%	13	7.3	25	14	13	7.3
50%	19	10.7	74	41.6	18	10.1
25%	34	19.1	59	33.1	63	35.4
0%	102	57.3	15	8.4	78	43.8
Other drugs	**Oral steroids**		**Muscle relaxants**		**Agents for neuropathic pain***	
Increased prescription by	Number	(%)	Number	(%)	Number	(%)
100%	4	2.2	36	20.2	17	9.6
75%	13	7.3	41	23	26	14.6
50%	37	20.8	66	37.1	39	21.9
25%	73	41	22	12.4	56	31.4
0%	51	28.7	13	7.3	40	22.4

Data are presented as numbers and percentages; NSAIDs: Non-steroidal anti-inflammatory drugs; *: Agents for neuropathic pain included amitriptyline, doxepin; gabapentin, pregabalin according to the requirement, availability and legality of the use because some drugs are prohibited in some countries

Table (5): Percentages of Application of infection control program

	Always	Often	Occasionally	Rarely	Never
Physical barriers	18 (10.1%)	23 (12.9%)	43 (24.2%)	65 (36.5%)	29 (16.3%)
Physical distance	33 (18.5%)	64 (36%)	52 (29.2%)	16 (9%)	13 (7.3%)
Clothes change places	20 (11.2%)	23 (12.9%)	38 (21.3%)	52 (29.3%)	45 (25.3%)
Overshoes use	42 (23.6%)	60 (33.7%)	31 (17.4%)	20 (11.2%)	25 (14.1%)
Regular cleaning & disinfection	17 (9.6%)	26 (14.5%)	39 (21.9%)	56 (31.5%)	40 (22.5%)
Regular cleansing of clothes	39 (21.8%)	47 (26.4%)	53 (29.8%)	22 (12.4%)	17 (9.6%)
Available waste disposal practice	79 (44.4%)	54 (30.3%)	27 (15.2%)	10 (5.6%)	8 (4.5%)

Data are presented as numbers and percentages

Table (6): Percentages of Application of personal protective equipment

PPE	Always	Often	Occasionally	Rarely	Never
Surgical masks	108 (60.7%)	42 (23.6%)	28 (15.7%)	0	0
N95 masks	21 (11.8%)	32 (18%)	19 (10.7%)	44 (24.7%)	62 (34.8%)
Gloves	58 (32.5%)	51 (28.7%)	35 (19.7%)	21 (11.8%)	13 (7.3%)
Eye protective tools	15 (8.4%)	43 (24.2%)	57 (32%)	26 (14.6%)	37 (20.8%)
Face shield	19 (10.7%)	37 (20.7%)	74 (41.6%)	27 (15.2%)	21 (11.8%)
Gowns	47 (26.4%)	32 (18%)	44 (24.7%)	32 (18%)	23 (12.9%)
Coverall	17 (9.6%)	27 (15.2%)	33 (18.5%)	42 (23.6%)	59 (33.1%)
Alcohol hand sanitizer	65 (36.5%)	73 (41%)	21 (11.8%)	13 (7.3%)	6 (3.4%)
Soap & running water	47 (26.4%)	69 (38.8%)	42 (23.6%)	20 (11.2%)	0

Data are presented as numbers and percentages

Table (7): Impact of application of personal protective equipment on rates of consultation and interventional pain therapy

Points	% of change	Decrease	No change	Increase
Impact application of PPE on consultation rate	25	19 (43.2%)		23 (28.4%)
	50	22 (50%)		36 (44.4%)
	75	3 (6.8%)		13 (16%)
	100	0		9 (11.1%)
	Total	44 (24.7%)	53 (29.8%)	81 (45.5%)
Impact application of PPE on IPT rate	25	15 (36.6%)		16 (22.5%)
	50	19 (46.3%)		28 (39.4%)
	75	0		21 (29.6%)
	100	0		6 (8.5%)
	Total	34 (19.1%)	73 (41%)	71 (39.9%)

Data are presented as numbers and percentages; PPE: Personal protective equipment; IPT: Interventional pain therapy

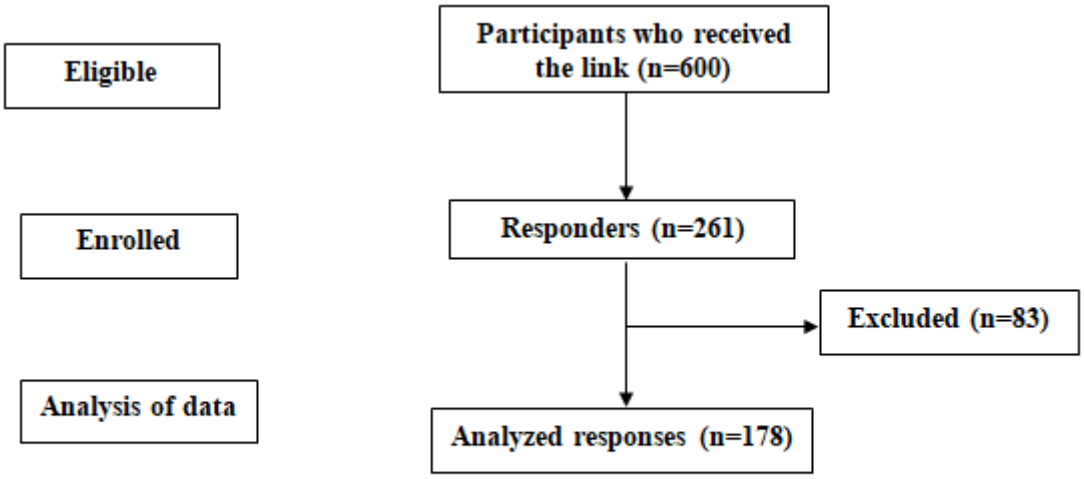

Figure 1: Flow chart of the study