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Positive thinking, resourcefulness skills, and future anxiety among the caregivers of children with intellectual disability: an intervention study

Safia Ragab El Sebaie[1], Maha Mahmoud Abd El Aziz[2] and Safaa Mohamed Metwaly Atia[1*]

Abstract

Background Positive thinking is a mental attitude that focuses on positive thoughts and beliefs in order to improve one's outlook on life and is linked to a variety of positive psychological and health consequences, as well as decreased anxiety and depression. This study aimed to evaluate the effect of an intervention program on positive thinking, resourcefulness skills, and future anxiety among caregivers of children with intellectual disability. A quasi-experimental design was used on 70 caregivers whose children were attending the intellectual education school in Zagazig City. Data were collected through an interview questionnaire sheet composed of sociodemographic datasheet and child characteristics, the Positive Thinking Skills Scale (PTSS), the Resourcefulness Skills Scale (RSS), and the Future Anxiety Scale.

Results The mean score of future anxiety was lower at the post-intervention phase compared to pre-intervention among the participants' caregivers. Otherwise, the mean scores of positive thinking, social resourcefulness, personal resourcefulness, and total resourcefulness were higher at the post-intervention phase compared to pre-intervention among the participants' caregivers. Positive thinking improved among 60.76%, resourcefulness skills among 19.49%, and future anxiety decreased among 21.30% of the caregivers after the intervention.

Conclusion The intervention program was efficient in improving the caregivers' positive thinking and resourcefulness skills and decreasing their future anxiety.

Recommendations A continuous psychosocial training program is recommended to enhance the caregivers' positive thinking and improve other aspects of psychological adjustment.

Keywords Caregivers, Future anxiety, Intellectual disability, Positive thinking, Resourcefulness skills, Intervention study

Background

Intellectual disability (ID) is defined as a considerable loss in capacity to understand new or complex information, as well as difficulty learning and applying new skills, resulting in a diminished ability to cope independently [1]. Males are more likely than girls to be diagnosed with an intellectual disability, which affects roughly 1% of the global population [2]. Families with intellectually impaired children exhibit poorer family functioning,

*Correspondence:
Safaa Mohamed Metwaly Atia
safaametwaly@yahoo.com
[1] Psychiatric and Mental Health Nursing, Faculty of Nursing, Zagazig University, Zagazig, Egypt
[2] Community Health Nursing, Faculty of Nursing, Zagazig University, Zagazig, Egypt

lower marital satisfaction, greater caregiver burden, and a lower feeling of coherence than families without intellectually disabled children (ID) [3].

Furthermore, having (ID) children is connected with adverse effects on employment load and family finances [4], and they face a significant level of societal scorn and stigma [5]. Moreover, providing care for children with intellectual disabilities throughout their lifespan entails a heavy physical, financial, emotional, and personal strain on the caregivers [6].

Positive thinking is defined as having a lot of hope and focusing on the positive elements of situations, positive feelings, and emotions that protect individuals when confronting challenges and assist in having a future positive outlook [7]. It is an approach that improves physical and mental health, enhances happiness, and decreases anxiety [8]. Positive thinking contributes to psychological stability and quality of life, displays a positive attitude, and protects mental health in periods of fear and failure.

People must be hopeful, have positive thinking skills, and have mental abilities in order to prevent diseases, and a lack of these traits may impact individual attitudes, exacerbating symptoms of sadness and anxiety [9]. Positive thinking and avoiding negative ideas are crucial methods for dealing with psychological issues and increasing self-efficacy [10]. Psychological therapies and positive thinking skills training can improve people's ability to manage stress and control emotions by enhancing self-awareness, decreasing anxiety, and increasing their ability to understand adaptation [11, 12].

The ability of an individual to deal with challenges by applying cognitive and behavioral abilities, including personal and social resourcefulness, is referred to as resourcefulness. Personal resourcefulness is the ability to solve difficulties on one's own, whereas social resourcefulness is the ability to solve problems by requesting assistance from others [13]. Resourcefulness, meaning a person's ability to deal with adversity, is currently found to reduce the harmful effects of stress on mental health, and people who are more resourceful have fewer symptoms or lower levels of depression [14, 15]. One of the indicators of caregiver resilience is resourcefulness, and there is a link between it and environmental factors such as caregivers' income, burden, and psychological well-being [16, 17]. However, it is an important psychosocial resource in protecting an individual's wellbeing, such as adaptability, mental health, and quality of life [18].

Future anxiety (FA) is a feeling of dread, uncertainty, fear, worry, and concern regarding unfavorable changes in the future of a person. However, for an anxious individual whose predictions of possible outcomes are more negative than positive, this uncertainty can be a source of concern. In a severe situation, this would be panic that something truly horrible might happen to a person [19]. If the parents have an elevated level of future anxiety, their cognitive and executive functions might be affected. Parents at the cognitive level have limited desires and do not see the future as a field for new accomplishments or happy events. At the executive level, they may take precautions to safeguard their assets in order to preserve the status quo. Examples of these precautions include avoiding dangerous situations, adhering to well-known routes, and using traditional methods to handle daily issue [20].

Previous FA studies in parents of children with developmental disabilities (DD) revealed that mothers' worries were mainly related to the child's future quality of life, independence, education, social interactions, work opportunities, or financial prospects [21]. Many studies found that parents, particularly mothers, raising children with various forms of disabilities experience more anxiety, have more health problems, and are more pessimistic than parents of children without disabilities [22, 23].

Thinking positively is one strategy for managing stress, anxiety, and depression [24]. "Treatment methods or intentional activities aimed at cultivating positive feelings, positive behaviors, or positive cognitions" are known as positive psychology interventions, or PPIs. Positive psychology, a new discipline of psychology, scientifically investigates human abilities and happiness. Feeling satisfied or happy as positive stimuli can inspire the production of art and science as well as generate creative solutions to problems in daily life [25].

Significance of the study

Intellectual disability is considered one of the serious problems facing society that may affect children at an early age and is exacerbated by a lack of educational and cultural resources. The Egyptian study of Metwally et al. [26] found a high prevalence of disability among Egyptian children aged 1–6 years; the percentage of children with Intellectual impairment was 1.4%. This matter may constitute a source of anxiety and fear for caregivers because of the child's characteristics and behaviors that may provoke undesirable mental, emotional, or physical reactions, which exacerbate mental stress, stigma, and negative views. Developing positive thinking among caregivers may alleviate their suffering and improve their psychological state. As well as having a positive impact on the care and upbringing of disabled children.

Aim of the study

Evaluate the effect of the intervention program on positive thinking, resourcefulness skills, and future anxiety among the caregivers of children with intellectual disability.

This was accomplished through the following objectives:

1- Assess the positive thinking, resourcefulness skills, and future anxiety among the caregivers of children with intellectual disability before the program.
2- Develop, implement, and evaluate the effect of the intervention program on the caregivers' positive thinking, resourcefulness, and future anxiety.

Operational definitions

Caregivers: Is a person who meets needs and provide all time care to the child with Intellectual disabilities.

Intellectual disability (ID): It involves limitations in cognitive functioning and skills, including conceptual, social and practical skills, such as language, social and self-care skills.

Hypothesis

The intervention program will enhance the positive thinking and resourcefulness skills of the caregivers of children with intellectual disability and reduce their level of future anxiety.

Methods

Study design

A quasi-experimental design was used in this study.

Study setting

This study was done at an intellectual education school in Zagazig City. This school plays an important role in educating children with intellectual disability and enhancing their abilities by providing them with the basics of counting, reading, recognizing things, self-reliance, and some behaviors such as social interaction. It also helps them develop their talents through drawing, coloring, and playing musical instruments.

The school consists of three floors: the first is for administration and reception. It also contains a music room, a library, a restaurant, a large playground, and chairs for resting. As for the two floors, they are for the educational process and consist of a number of classrooms. There is also a large place for parents to wait for their children until the end of the school day, at half past twelve.

Subjects

A non-probability purposive sampling technique was used in this study. The participant sample consisted of 70 caregivers whose children were attending the intellectual education school in Zagazig City who fulfilled the following inclusion criteria:

a. Children live with their caregivers.
b. The psychological and medical documents available at the school confirmed the diagnosis of children with intellectual disabilities.
c. Caregivers accept to participate in the study, and
d. Being the caregiver of a child for at least 6 months.

Sample size

Sample size was 70 caregivers; it was calculated using Open Epi version 7. It was based on the study results of Bekhet and Zauszniewski [27] where the mean ± Sd of the positive thinking score was 15.43 ± 3.99 at the pre-intervention phase of the study and 17.79 ± 3.66 at the post-intervention phase, with a confidence level of 95% on both sides and a power of study 95%.

Tools of data collection

I- An interview questionnaire sheet formed of three parts

A Sociodemographic data of the caregivers
The researchers designed it to collect information about caregivers' relation to the child, age, gender, education, residence, marital status, occupation, monthly income, number of children, and family history of psychiatric disease.

B Demographic characteristics of the disabled children
This part concerned questions about the child's age, diagnosis, gender, birth order, and comorbid diseases.

C Positive Thinking Skills Scale (PTSS) [28]
This scale is designed to be a direct assessment of intervention fidelity since it includes the positive thinking skills taught throughout the positive thinking training skills intervention. It is made up of eight items. Respondents are asked how frequently they use each of the eight skills on this scale.

Scoring system:

The responses of the participants were scored on a 4-point Likert scale ranging from 0 = never to 3 = always. The scale ranges from 0 to 24, with higher scores suggesting greater use of positive thinking skills.

II- Resourcefulness Skills Scale (RSS)

The instrument was developed by Zauszniewski and Bekhet [29] to assess participants' tendency to engage in self-help and help-seeking actions when confronted with a negative situation. It consists of eight items designed to

assess the frequency of how the eight various skills are used throughout the face-to-face interview. Three items assessed the frequency of how help-seeking or social resourcefulness skills were used (relying on family or friends, seeking professional help, and social exchange), while five items assessed the frequency in which personal resourcefulness skills were used (use of positive self-statements, cognitive reframing, exploring ideas, behavioral change, and organization).

Scoring system:

On a 4-point scale ranging from never (0) to always (3), respondents were asked how frequently they used each of the eight skills. The scale ranges from 0 to 24, with higher scores indicating a greater use of resourcefulness skills.

III- Future Anxiety Scale (FAS) [30]

It was created for adults as a self-report assessment of their disposition to think about their own future with anxiety, insecurity, and aversion, as well as to experience a fear of expected failures. Four buffer items, numbered 4th, 11th, 16th, and 23rd were added. They are reversed items. They are written in a positive tone to make the whole scale look less dismal. They are phrased positively to make the scale as a whole seem less negative. It includes 29 items.

Scoring system:

The 29 items of the Future Anxiety Scale were rated on a 5-point Likert scale ranging from 1 (decidedly false), 2 (hard to say), 3 (somewhat true), 4 (true), and 5 (decidedly true). The higher the score, the more anxious the person is about the future. This scale has four reversed items, numbered 4th, 11th, 16th, and 23rd.

Preparatory phase

The researchers reviewed international, local, current, and past literature through an internet search to gain a complete picture of the studied variables. The study intervention program's basic structure has also benefited from this review.

Validity

The study's instruments were translated and then reviewed for simplicity, application, and content validity by a panel composed of two psychiatrists from the Faculty of Medicine and four experts in community health nursing and psychiatric mental health nursing from the Faculty of Nursing at Zagazig University. A few little modifications they suggested were implemented.

Reliability

The instruments appeared to be reliable, with the Future Anxiety Scale ($r=0.733$), Resourcefulness Skills Scale ($r=0.742$), and Positive Thinking Skills Scale ($r=0.881$) showing strong internal consistency. The reliability test was carried out using Cronbach's alpha in SPSS version 23.

Pilot study

To validate the instruments, a pilot study with seven cases, or 10% of the caregivers, was carried out prior to the main study. The main study sample subsequently did not include the caregivers who took part in the pilot study. The tools' final form was acquired, and based on the findings of the pilot study, an estimate of the time required to complete each tool was made.

Administrative design

The dean of Zagazig University's Faculty of Nursing submitted an official letter to the relevant authorities of the intellectual education school in Zagazig city, requesting formal consent for data gathering.

Field work

It took almost 6 months to gather all the data (from early December 2022 to late May 2023). Four phases comprised the study's execution: assessment, planning, implementation, and evaluation.

Assessment phase

A. Collecting pre-intervention data for the baseline assessment was the focus of this phase. After receiving the required official approvals, the researchers visited the director of the intellectual education school and described the aim of the study in brief, then started to meet the caregivers accompanying their disabled children to school.
B. The researchers gave a brief introduction and described the aim of the research to the caregivers. This was done individually, and written consent for participation was obtained if the caregiver fulfilled the eligibility criteria.
C. The researchers started the interview by filling in the pre-test scales by reading and explaining each item of them to the caregiver and recording his or her response to each item. The time required to complete the interview and fill out the form ranged between 40 and 50 min. The researchers visited the school two times per week.
D. Immediately following the interview, the researchers reviewed the form's fulfillment. Measures were taken to ensure privacy and confidentiality by using a code number for each caregiver rather than their name. The data were preliminary examined to provide a framework for the intervention program design. This phase lasted for 4 weeks.

Planning phase

Following the assessment phase results, the researchers constructed the intervention program and session contents based on the identified caregivers' needs and the related literature. The identified needs, requirements, and knowledge limitations were translated into the intervention sessions' goals and objectives. Furthermore, the researchers created an educational booklet to assist caregivers in following the educational sessions and serving as a reference at home. The booklet content was validated and then distributed to the caregiver. This phase lasted for 6 weeks.

General objective

The general objective of the program was to enhance their positive thinking and resourcefulness skills and reduce their future anxiety toward their children with intellectual disability.

Specific objectives

By the end of the sessions, the caregivers should be able to:

- Describe the types of intellectual disabilities.
- Recognize positive thinking skills and methods that can help them think in a positive way.
- Identify forms of negative thoughts and how they can resist them.
- Acquire knowledge about resourcefulness skills.
- Apply relaxation techniques and some methods for the management of future anxiety.

Implementation phase

Two of the researchers were responsible for the implementation of the intervention program for all caregivers' groups. They were trained to deliver this program and attended many online training sessions and workshops on CBP at the psychiatry center at the faculty of medicine Zagazig University. They only use some of the CBP techniques.

Six sessions of the intervention were provided. Because it was difficult to collect all caregivers at once, the program was implemented in small groups in the school library, with each group consisting of 10–20 caregivers based on attendance. Each study group received the sessions twice each week. They occurred from 10 a.m. to 12 p.m. on Sundays and Thursdays. This phase lasted for 10 weeks. The same content was taught to each group using the same techniques. such as discussions, redefinition techniques, monologue techniques, cognitive restructuring. The length of each session was variable according to caregivers' responses and active participation. To ensure that the caregivers understood the content, each session began with an overview of the previous session's objectives and an outline of the current one. Motivation, reinforcement, and simple language were employed to improve active participation and promote learning. Also, the sessions were supported by using videos, role play, demonstrations, re-demonstrations, and the program booklet. The intervention program consisted of six sessions, as follows:

1. The first session was for giving a brief overview of intellectual disabilities and their common types among children and basic knowledge about positive thinking (definition, ingredients of positive thinking such as optimism, gratitude toward the blessings of life and seeing the bright side, acceptance of the child's disability, awareness of thoughts entering caregivers' minds, and health benefits of positive thinking).
2. The second session was focused on positive thinking skills such as positive self-talk (I can, I'm strong), imagination (strategy reduces anxiety associated with the original situation and positive expectation for better access), and factors that help to think positively (affirm self-confidence for success, evoke positive thoughts for motivation, avoid comparison with other people, identify strengths and weakness points, overcome weakness, and look at things rationally).
3. The third session addressed negative thoughts and their forms, such as personalizing things, catastrophic feelings like "expect the worst" and polarizing "see things either as good or bad," and ways to alleviate caregivers' negative thoughts and replace them with positive ones.
4. The fourth session included training caregivers to argue negative thoughts by programming the subconscious mind with positive repetition techniques to generate creative solutions and stop catastrophic feelings, as well as the mindfulness meditation technique "meditation on mindful breathing, being in the present moment with the child, being loving, kind, and compassionate." A homework assignment was created in collaboration with the caregivers to encourage them to practice these skills daily until the next session.
5. The fifth session involved imparting knowledge of resourcefulness definition, importance, and resourcefulness skills, which consisted of three social skills (help-seeking) and five personal resourcefulness skills (self-help), namely relying on friends or family, exchanging ideas with others and exploring new ideas, seeking professional or expert help, organizing

daily activities, using positive self-talk, and reframing the situation positively.

6. The sixth session implicated reducing future anxiety through relaxation techniques, writing thoughts, exercises, social support, talking to someone, good nutrition, and feeling grateful.

Evaluation phase

The effect of the intervention program was evaluated immediately after it was implemented by comparing the change in caregivers' positive thinking level, resourcefulness skills, and future anxiety using the same tools as the pretest. This phase lasted for 4 weeks.

Statistical design

SPSS 20.0 for Windows was used to collect, tabulate, and statistically analyze all data (SPSS Inc., Chicago, IL, USA, 2011). The mean SD was used to convey quantitative data, and absolute frequencies (numbers) and relative frequencies (percentages) were used to express qualitative data. To compare two dependent groups of normally distributed variables, a paired *t* test was performed. The ANOVA (one-way analysis of variance) test was used to compare more than two groups of normally distributed quantitative data. The Kruskal-Wallis test was used to compare more than two groups of quantitative data that were not regularly distributed. The caregivers "t" test was developed to compare the means of two independent sets of normally distributed quantitative data. The Mann-Whitney *U* test, on the other hand, was employed to compare the means of two independent sets of quantitative data that were not regularly distributed. To analyze the link between research variables, the Spearman correlation coefficient was determined, with (+) indicating direct association and (−) indicating negative correlation. Multiple linear regression (step-wise) was also employed to predict factors influencing future anxiety scores. The Cronbach alpha coefficient was derived to assess the scales' reliability based on their internal consistency. A p value <0.05 was deemed statistically significant; a p value <0.001 was deemed extremely statistically significant; and a p value ≥ 0.05 was deemed statistically insignificant.

Table 1 Frequency distribution of demographic characters of studied caregivers ($n=70$)

Items	No.	%
Relation to the child		
Mother	65	92.9
Father	4	5.7
Sister	1	1.4
Age		
23-≤33	20	28.6
33-≤43	34	48.6
>43	16	22.9
mean ± SD	37.42 ± 8.70	
Gender		
Male	4	5.7
Female	66	94.3
Education		
Illiterate	27	38.6
Primary or preparatory	4	5.7
Secondary or diploma	34	48.6
University	5	7.1
Residence		
Rural	52	74.3
Urban	18	25.7
Marital status		
Single	2	2.9
Married	54	77.1
Divorced	3	4.3
Widow	11	15.7
Occupation		
Working	11	15.7
House wife	59	84.3
Monthly income		
Insufficient and borrowing	16	22.9
Insufficient	36	51.4
Sufficient	18	25.7
No. of children		
≤3	49	70.0
>3	21	30.0
Family history of psychiatric illness		
Yes	11	15.7
No	59	84.3

Results

Table 1 displays that the age of the studied caregivers ranged from 33 to ≤43 years old among 48.6% of them, with a mean of 37.42 ± 8.70. The majority of the caregivers were mothers, housewives, and had no family history of psychiatric disease (92.9%, 84.3%, and 84.3%, respectively), and 77.1% of them were married. About half of the caregivers (48.6%) had secondary or diploma education and had insufficient income (51.4%). About three-fourths of them (74.3%) reside in rural areas, and 70% of them have less than or equal to three children.

Table 2 shows that the age of studied children ranged from 6 to ≤12 in 52.9% of them, with a mean of 12.3 ± 4.2. Their diagnosis was mental retardation, autism, Dawn syndrome, and ADHD among 38.5%, 24.3%, 24.3%, and 12.9%, respectively. About two-thirds of the children (65.7%) were male, 41.4% of them were middle child, and 81.4% of them had comorbid diseases.

Table 2 Demographic characteristics of studied children ($n=70$)

	No.	%
Child age		
6-≤ 12	37	52.9
12-≤ 18	29	41.4
> 18	4	5.7
mean ± SD	12.31 ± 4.22	
Diagnosis		
Down syndrome	17	24.3
Autism	17	24.3
Mental retardation	27	38.6
ADHD	9	12.9
Gender		
Male	46	65.7
Female	24	34.3
Birth order		
First	18	25.7
Middle	29	41.4
Last	23	32.9
Comorbid diseases		
No	13	18.6
Yes	57	81.4

Table 3 demonstrates that there were statistically significant relationships between caregivers' future anxiety, and monthly income ($p=0.003$) and children number ($p=0.001$). It is evident that future anxiety increased among caregivers who had insufficient income, borrowed money, and had more than three children.

Table 4 indicates that there was a statistically significant difference between the means of future anxiety, social resourcefulness, personal resourcefulness, total resourcefulness, and positive thinking at the pre- and post-intervention program ($p<0.001$). The mean score of future anxiety was lower at the post-intervention phase compared to pre-intervention among participants caregiver. Otherwise, the mean score of social resourcefulness, personal resourcefulness, total resourcefulness, and positive thinking was higher at the post-intervention phase compared to pre-intervention among participant caregiver. The mean difference between the pre- and post-intervention phases of future anxiety, social resourcefulness, personal resourcefulness, total resourcefulness, and positive thinking among caregivers was −26.25, 1.71, 3.25, 4.97, and 4.61, respectively.

Figure 1 demonstrates statistically significant improvements in the level of future anxiety, social resourcefulness, personal resourcefulness, total resourcefulness, and positive thinking after implementation of the intervention program at ($p<0.001$). The improvement was more apparent in the positive thinking (60.76%). While in the future anxiety was 21.30% and total resourcefulness was 19.49%.

Table 5 shows that future anxiety has a statistically significant negative correlation with positive thinking, total resourcefulness, personal resourcefulness, and social resourcefulness ($r=-0.749$, -0.360, -0.456, and -0.297, respectively). It also indicates that positive thinking has a statistically significant positive correlation with total resourcefulness and personal resourcefulness ($r=0.502$ and 0.590, respectively). Total resourcefulness has a statistically significant, strong positive correlation with personal resourcefulness ($r=0.859$) and social resourcefulness ($r=0.717$). While personal resourcefulness has a significant positive correlation with social resourcefulness ($r=0.260$).

Table 6 indicates that resourcefulness was a statistically significant positive predictor of a positive thinking score. The model explains 25% of the variation in the positive thinking score, as shown by the value of r-square. Other children's and caregiver's characteristics had no influence on the positive thinking score.

Table 7 shows that positive thinking was a significant negative predictor of future anxiety, while child diagnosis (mental retardation) and the number of children (> 3) were positive predictors of it. The model explains 67% of the variation in future anxiety, as shown by the value of r-square. Other children's and caregiver's characteristics had no influence on the future anxiety score.

Discussion

The majority of the caregivers in the present study were mothers and housewives from rural areas, and more than half of them had insufficient income. It may be attributed to the fact that most of them had a diploma in education and the permanent health condition of their disabled children, which requires more time and effort, prevents them from working, and enhances their family income. These results are in agreement with Indian study results, which found more than two-thirds of the caregivers were females, whereas a lower percentage of the caregivers were males [31].

Also, a study conducted in Japan reported that about two-thirds of mothers caring for intellectually disabled children belonged to a low-income group [32]. In the same vein, the study conducted in Indonesia indicated that the majority of participants' caregivers were mothers, married, most of them were housewives and from poor families, as husbands generally earned very low incomes working [33]. As well, the Egyptian study found that two-thirds of children with intellectual disability were male, and the majority of them were from rural areas [34].

Table 3 Relation between demographic characteristics of studied caregivers and the mean difference score of future anxiety

	Anxiety mean difference	Test of significance	*p* value
Relation to the child		KW = 2.071	0.355
Mother	− 26.83 ± 12.04		
Father	− 18.25 ± 11.87		
Sister	− 21.00		
Age		KW = 3.293	0.193
23-≤ 33	− 22.80 ± 9.68		
33-≤ 43	− 27.05 ± 10.18		
> 43	− 28.87 ± 17.19		
Gender		MW = − 1.304	0.192
Male	− 18.25 ± − 18.25		
Female	− 26.74 ± 11.96		
Education		KW = 5.100	0.165
Illiterate	− 27.33 ± 11.47		
Primary or preparatory	− 32.75 ± 17.50		
Secondary or diploma	− 25.91 ± 12.36		
University	− 17.60 ± 3.28		
Residence		MW = − 1.822	0.068
Rural	− 31.44 ± 12.35		
Urban	− 24.46 ± 11.51		
Marital status		KW = 1.573	0.666
Single	− 18.50 ± 3.53		
Married	− 26.07 ± 12.47		
Divorced	− 30.66 ± 15.14		
Widow	− 27.36 ± 10.45		
Occupation		KW = 8.958	0.111
Craftsman	− 29.00		
Employee	− 14.66 ± 11.03		
Free business	− 14.00		
On the pension	− 17.00		
House wife	− 27.62 ± 11.77		
Not work	− 30.00 ± 12.72		
Monthly income		KW = 11.926	0.003**
Insufficient and borrowing	− 33.25 ± 12.15		
Insufficient	− 26.11 ± 10.63		
Sufficient	− 20.33 ± 11.92		
No. of children		t = − 1.6100	0.001**
≤ 3	− 25.77 ± 2.26		
> 3	− 27.38 ± 1.72		

Kw Kruskal-Wallis test, *MW* Mann-Whitney *U* test, *t* student *t* test

Statistically non-significant ($p > 0.05$), ** highly significant ($p < 0.001$)

Moreover, more than half of the disabled children in the current study were males, and mental retardation diagnosis represented the highest percent of intellectually disabled disease among them. It may be due to the high percentage of parental consanguinity among rural people. These findings are consistent with the Indian study, which indicated that nearly half of the participants had a mild degree of retardation [35]. Similar findings were reported by another Indian study, where 30% of the children had mild mental retardation and less than one-half had moderate mental retardation [36]. In addition, the American statistical report during 2019–2021 revealed that the prevalence of any developmental disability was higher in boys (10.76%) than girls (5.31%) [37].

The current study hypothesized that the intervention program for the caregivers with disabled children

Table 4 Mean scores of studied variables as reported by caregivers throughout study phases($n = 70$)

Items	Pre mean ± SD	Post	Mean difference	% of improvement	Paired *t* test	*p* value
Future anxiety	120.30 ± 10.58	94.04 ± 8.81	− 26.25	21.30%	18.242	< 0.001**
Social resourcefulness	11.15 ± 2.93	12.87 ± 1.67	1.71	23.51%	− 5.925	< 0.001**
Personal resourcefulness	18.82 ± 3.51	22.08 ± 1.43	3.25	22.39%	− 8.269	< 0.001**
Total resourcefulness	29.98 ± 4.78	34.95 ± 2.38	4.97	19.49%	− 9.105	< 0.001**
Positive thinking	14.10 ± 5.11	18.71 ± 2.18	4.61	60.76%	− 7.837	< 0.001**

** Highly significant ($p < 0.001$)

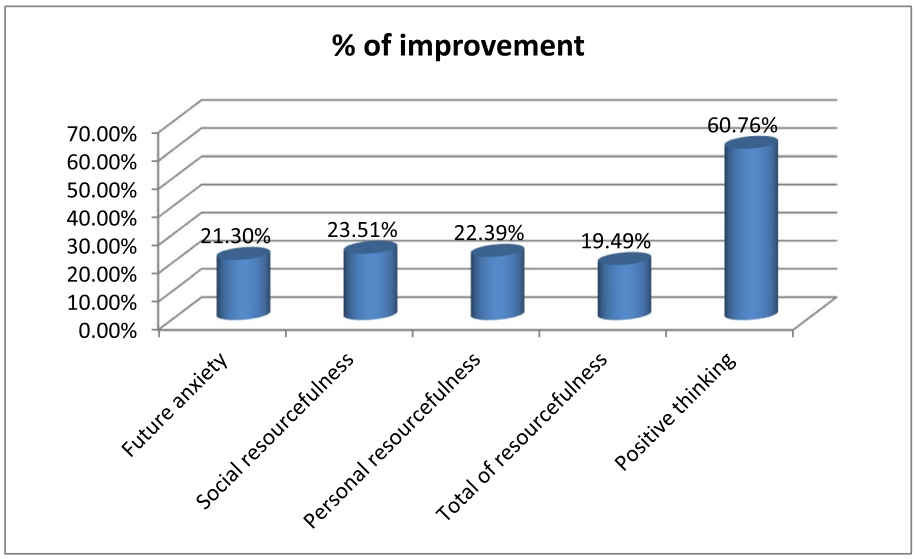

Fig. 1 Percent of improvement among studied variables due to the intervention ($n = 70$)

Table 5 Correlation matrix between study variables

Items	Future anxiety	Positive thinking	Total Resourcefulness	Personal resourcefulness	Social resourcefulness
Future anxiety (r)					
Positive thinking (r)	− 0.749**				
Total Resourcefulness (r)	− 0.360**	0.502**			
Personal resourcefulness (r)	− 0.456**	0.590**	0.859**		
Social resourcefulness (r)	− 0.297*	0.144	0.717**	0.260*	

Statistically non-significant ($p > 0.05$), ** statistically highly significant ($p < 0.001$), *: significant ($p < 0.05$), r: correlation coefficient

would lead to an enhancement in their positive thinking. The study findings revealed a significant improvement in positive thinking among 60%percent of the caregivers. Such success of the program could be attributed to its being based on the real identified thoughts and needs of the caregivers. The independent effect of resourcefulness skills, which reflects the effective role of caregivers' positive thinking, was further confirmed by multivariate analysis, and it explains a significant percentage of the variation of this score.

This finding is consistent with the study in the USA, which found the mean scores for the positive thinking skills scale (PTSS) improved among the participants after their intervention program on positive thinking

Table 6 Step wise multiple linear regression for predicting factors that affect positive thinking

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence interval for B	
	B	Std. error	Beta			Lower bound	Upper bound
(Constant)	1.924	.761		2.527	.014	.405	3.443
Resourcefulness	.541	.113	.502	4.784	.001**	.315	.767

Variables entered and excluded: child age, diagnosis, child gender, birth order, suffering from other diseases, Relation to the child, their age, gender, education, residence, marital status, occupation, monthly income, number of children, family history of psychiatric disease, and anxiety

** Statistically highly significant ($p < 0.001$). R-square = 0.252, ANOVA: F = 22.886, $p < 0.001$

Table 7 Step wise multiple linear regression for predicting factors that affect future anxiety

Model	Unstandardized coefficients		Standardized coefficients	t	Sig.	95.0% Confidence interval for B	
	B	Std. error	Beta			Lower bound	Upper bound
(Constant)	− 33.283	6.273		− 5.306	.000	− 45.807	− 20.759
Positive thinking mean difference	− 2.612	.256	− .722	− 10.210	.001**	− 3.122	− 2.101
Diagnosis (mental retardation)	5.911	1.293	.331	4.571	.001**	3.329	8.493
Children number (> 3)	3.321	1.417	.170	2.344	.022*	.492	6.149

Variables entered and excluded: child age, child gender, birth order, suffering from other diseases, relation to the child, their age, gender, education, residence, marital status, occupation, monthly income, family history of psychiatric disease, total resourcefulness, personal, and social resourcefulness

* Significant ($p < 0.05$)

** Statistically highly significant ($p < 0.001$)

R-square = 0.673, ANOVA: F = 45.357, $p < 0.001$

[27]. In the same vein, another study in the USA showed that caregivers' shame, self-criticism, and perception of patient dependency predict sadness in care-recipients, and that positive thinking training diminishes these associations [38].

Further, the present study found the mean score of social and personal resourcefulness was enhanced at the post-intervention program compared to pre-intervention among the participants caregivers of the disabled children, which reflects the effective role of the intervention program and positive thinking training as positive expectations, motivations, creation solutions, recognizing daily activities, exchanging and exploring ideas, which leads to the enhancement of resourcefulness skills. These findings are consistent with Gonzalez et al. [39] who found a successful increase in resourcefulness among the caregivers of the intervention group and a decrease in their anxiety immediately after 6 weeks of intervention. Also, another study in the USA showed a post-intervention increase in the mean scores of personal and social resourcefulness and positive cognitions [27].

The current study findings also hypothesized that the intervention program would lead to significant reductions in the mean score of future anxiety compared to the pre-intervention among the caregivers. The hypothesis was accepted as a result of the findings of this study, with significant decreases in the mean score of caregivers' future anxiety. This could be attributed to the important role of intervention in alleviating caregivers' negative thoughts, replacing them with positive ones, and stopping catastrophic feelings. As well as seeking help from family and friends and reframing the situation positively.

These results are in line with Naseem and Khalid [24] who stated that thinking positively is one approach to deal with anxiety, tension, and sadness. Also, the study conducted in Iran found that positive thinking training reduced anxiety and depression and improved the quality of life for mothers of children with leukemia [25]. Moreover, the study in China found the training significantly increased the resourcefulness, resilience, and positive response ratings of front-line medical workers, as well as successfully reducing anxiety and depression scores [40].

Further, the current study result revealed that future anxiety was high among insufficient-income caregivers and those who had more than three children in their family. It may be due to the fact that low income is a burden on caregivers and makes them live all the time with worries, uncertainty, and doubts about their ability to provide care and satisfy the needs of their disabled children from one side and satisfy the needs of their normal children from the other side. At the same

time, an increase in the number of children leads to a greater physical and financial burden, so the caregivers in particular mothers, are afraid of what the future holds for their disabled and normal children regarding their future life needs, education, and employment. The Indian study results supported the current results and found that unemployed or non-earning caregivers of disabled children had significantly higher anxiety scores while caring for their intellectually disabled child [41].

Similarly, the study conducted in Romania found the financial problem to be a very important aspect that induces anxiety among parents of disabled children [42]. Also, the study in Eastern Poland [43] discovered that mothers of children with developmental disabilities, particularly those without a professional career, are the groups most at risk of experiencing general anxiety about the future. Moreover, it was inevitable that mothers who had disabled children would face challenges in their social and familial lives. The psychological and physical strain of raising disabled children also causes personal challenges and imbalances for these mothers, as well as elevated levels of anxiety and depression [44].

As regards the relation between positive thinking, resourcefulness, and future anxiety, the present findings revealed that future anxiety had a statistically significant negative correlation with positive thinking and with total resourcefulness. The possible explanation reflects the view that positive thinking is associated with an open mind and positive feelings and expectations. A perception of the future as positive increases hopes and reduces stress and anxiety. In the same context, the study in Iran mentioned that positive feelings broaden an individual's mind to surrounding experiments, create possibilities, increase creativity, and increase happiness, all of which reduce stress, depression, and anxiety [45].

However, Santoso and Rizkiana [46] found that positive thinking skills did not significantly help in reducing future anxiety, but they can control the future anxiety level. They explained that the magnitude of the influence of positive thinking on future anxiety is as much as 43.5%.

As for the future anxiety had a statistically significant negative correlation with total resourcefulness. It may be related to the fact that when resourcefulness improved, the stress decreased and caregivers had more hope, satisfaction, and opportunities to live well, which helped in decreasing anxiety. This finding is consistence with the study in the USA [47] which indicated that increasing positive cognition was associated with increasing resourcefulness and decreased the caregivers' burden. In addition, individuals with high resourcefulness scores can employ problem-solving skills effectively, reduce or eliminate stress-related self-harm, manage immediate requirements, and control undesirable feelings [48].

Moreover, the current study results showed that resourcefulness was a positive predictor of positive thinking post-intervention. This indicated that an increase in resourcefulness skills among caregivers enhanced their positive thinking. Some studies in the USA were in accordance with the current study results and found that as positive thinking increases, resourcefulness increases, and cognitive perception was greatly affected by resourcefulness among participants in their study [49, 50].

The child's diagnosis of mental retardation was a positive predictor of future anxiety among the caregivers in the current research. It may be explained by the fact that mental retardation is a lifelong condition that cannot be cured, and these children are unable to take care of themselves and face the dangers of life. This leads to feelings of anxiety and depression about the future of their children. This finding is consistent with the results of the study done in Ireland, which found the caregivers of developmentally disabled children in their study had strong feelings of pessimism about the future [22].

Similarly, high level of anxiety and depression among mothers of intellectually disabled children, in particular those who have severe mentally retarded children, was found in the Indian study [51]. In the same context, a high level of future anxiety was found among the mothers' caregivers in the study conducted in Poland and indicated that mothers who raise children with developmental disabilities were much worried about their own health and age progress; they were afraid of an unexpected accident or disease that might impair their ability to care for their children and families in the future [43].

Conclusion

The intervention program was effective in improving the positive thinking and resourcefulness of the participants' caregivers and decreasing their future anxiety. Positive thinking skills had a positive impact on caregivers' future anxiety about disabled children by increasing their resourcefulness skills. Also, the most important predictors that increase future anxiety among the caregivers were mentally retarded children, low income, and large family size.

Recommendations

A continuous psychosocial training program to enhance positive thinking among caregivers of children with developmental disabilities is recommended.

Group counseling sessions by community and psychiatric nurses at health centers and outpatient clinics can help

caregivers develop positive thoughts, feelings, expectations, and perceptions toward their intellectually disabled children.

Further training program act on reducing the caregivers' burden by focusing on emotional intelligence, psychological well-being, recreation, and time management.

Further research should be done on a larger sample of mothers in various settings of intellectual disability schools in order to generalize the findings.

Limitations of the study

Future investigations should take into account a few of the study's limitations to determine whether the evidence provided by the current results is maintained; the sample size must first be increased. Also, obtaining information about the child's functioning level could be helpful. Comparing the intervention group to the control group is the second constraint. The third is the absence of follow-up actions to ensure that the outcomes are stable.

Abbreviations

ID	Intellectual disability
FA	Future anxiety
DD	Developmental disabilities
PPI	Positive psychology interventions
PTSS	Positive Thinking Skills Scale
RSS	Resourcefulness Skills Scale
FAS	Future Anxiety Scale

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Authors' contributions

All the authors were involved in the research's initial design. They collaborated on data collection and analysis, writing and editing the final version of the paper content, formatting it, and submitting it for publication.

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Availability of data and materials

The corresponding author can provide the datasets used and/or analyzed for this study upon reasonable request.

Declarations

Ethics approval and consent to participate

The Zagazig University Faculty of Nursing's Research Ethics Committee granted permission to carry out this research under the code ID/ZU.NUR. REC#:0044. Participation in this study was entirely voluntary, since participants were informed that they might opt out at any time. To preserve privacy and secrecy, each participant was assigned a code number rather than their name.

Consent for publication

Not applicable.

Competing interests

The authors declare no competing interests.

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