The Relationship between Sense of Coherence, Resourcefulness and Functional Health Status of Geriatric Patients with Diabetes Mellitus.

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Abstract:

Background: T2DM is a public health problem that is widespread, serious, and growing among elderly people with a major impact on their health and well-being. Sense of coherence (SOC) and resourcefulness are important resources that may empower the person and give a greater capacity to manage different life challenges including the burden of such chronic disease in a health-promoting manner. Aim: Determine the relationship between sense of coherence, resourcefulness and functional health status of geriatric patients with diabetes mellitus. Setting: Five outpatient clinics at The Main University Hospital in Alexandria, namely geriatric medicine clinic, general medical clinic, diabetes clinic, cardiovascular clinic and nephrology clinic. Alexandria, Egypt. Subjects: 120 geriatric patients who are 60 years old and above, diagnosed with T2DM and have no or mild cognitive impairment. Tools: Five tools were used to collect data, short portable mental status questionnaire, socio-demographic and clinical data of geriatric patients with diabetes mellitus structured interview schedule, sense of coherence scale, resourcefulness scale and the Dartmouth Primary Care Cooperative Information Project/World Organization of National Colleges, Academies, and Academic Associations of General Practice/Family Physicians (COOP/WONCA) charts. Results: The result revealed that there is a statistically significant relationship between SOC, overall resourcefulness and all the functional health status scores of the study older adults as higher levels of SOC and resourcefulness were associated with better functional health status among the study participants. Conclusion: a statistically significant relationship between SOC, overall resourcefulness and all the functional health status scores of the study older adults as higher levels of SOC and resourcefulness were associated with better functional health status among the study participants. Recommendations: Develop an in-service training programs for nurses and health care providers (HCPs) at different health care settings on how to assess SOC and resourcefulness skills and orienting them with the role of such concepts on health and well being of older adults and different ways for promoting them.

Keywords: Diabetes mellitus; geriatric patients; sense of coherence; Resourcefulness; Functional health status.

Introduction

Type 2 Diabetes mellitus (T2DM) is currently a major public health problem especially among older adults. It remains a growing epidemic in the Middle East **(Longo et al., 2019; Sourtzi et al., 2019).** It is estimated that in 2019, there were about half a billion people with DM worldwide with about a quarter were over

60 years (International Diabetes Federation (IDF), 2019). In Egypt, around 9 million persons living with DM among adults 20-79 years and it is estimated that it will double to 16.9 million by 2045 **(Saeedi et al., 2019).** Hence, DM is one of the major health priorities and challenges that threatens Egyptian people's economic and social status **(Khalil et al., 2018; Hegazi et al., 2015).**

T2DM has a major impact on all aspects of an older adult's life, affecting physical, psychological and social functioning **(Nguyen et al., 2018; Vares & Aliakbarzadeh Arani, 2016).** Managing a lifelong chronic condition as T2DM requires many adjustments in patient's lifestyle and ongoing effort and coordination from patients, families and HCPs, this implies that, patients need to cope with symptoms, treatment, comorbidity, functional impairments and disease progression unpredictability. Therefore, DM can be considered as one of the most demanding chronic illnesses in terms of management **(Davies, 2019; Lambrinou et al., 2019; Slightam et al., 2018).**

In the modern era of chronic diseases management, a frequent question asked is: why do some patients take steps to effectively reduce the trajectory of their chronic disease while others continue to deteriorate? **(Alcantara et al.,2020;Calanan et al.,2018).** In the same sense, it is of great importance to investigate what differentiates between diabetic older adults who demonstrates movement toward the "health-ease" pole of the "health-ease/dis-ease" (HE-DE) continuum regardless of encountering stressors from those who don't? The salutogenic approach introduced by **Aaron Antonovsky** helps to answer this question. It was developed as a new paradigm for health research as a response to pathogenesis. This approach, in contrast to the pathogenic approach that deals only with sources of diseases and aims to avoid or manage these sources, focuses on the origins of health with an aim to create, maintain and improve health **(Karaca, 2018; Mittelmark & Bauer, 2017).** This approach suggests that some persons have some kind of inner strength that would facilitate the movement toward the "health-ease" pole of the (HE-DE) continuum **(Aderhold et al., 2019; Boeckxstaens et al., 2016).**

In the salutogenic approach, sense of coherence (SOC) was introduced as the core salutogenic construct. It reflects a way of viewing the life that facilitates successful coping with stressful situations **(Eriksson, 2017).** It embodies three dimensions, that is, comprehensibility, manageability, and meaningfulness reflecting that the more a person can understand (comprehensibility), handles (manageability) and makes sense (meaningfulness) of an experience or illness, the greater the capacity of that person to cope with this experience successfully **(Hammond & Niedermann, 2010)**.These three dimensions describes a person`s general resistance resources (GRRs) that considered a key for strengthening SOC **(Idan et al., 2017).**

The concept of SOC has been shown to play a significant role in dealing with chronic diseases. Numerous studies reported a relationship of SOC to chronic diseases self-management **(Li et al., 2017; Silarova et al., 2014).** In addition, studies indicated that SOC could be a resource for older people's well-being and a buffer against functional health status deterioration. **(Wiesmann et al., 2018; Giglio et al., 2015).** Specific to **DM, Odajima & Sumi, (2018)** in Japan suggests that the burden among T2DM people can be modified by improving the level of SOC.

Consistent with the salutogenic perspective, resourcefulness focuses on strengths rather than weakness **(Flynn, 2017).** According to **Zauszniewski (2016),** resourcefulness is a set of cognitive and behavioral skills applied to regulate difficult situations and have been found to promote health and quality of life (QOL). Resourcefulness skills are classified into personal (self-help) and social (help-seeking) resourcefulness. Personal resourcefulness refers to the ability to use internal resources to independently accomplish daily tasks while social resourcefulness means using external resources by seeking help from others when unable to function independently. **(Zauszniewski et al., 2006).**These resources give the individual the ability to handle adversities, endure sufferings and experience a good QOL **(Lin et al., 2017).**Several studies suggest that resourcefulness skills is important in order to achieve proper functioning and optimal QOL **(Musil et al., 2019; Huang,C.Y et al., 2018; Lin et al., 2017).**

Gerontological nurses have a greater responsibility toward strengthening the older adult's coping ability through recognizing and assessing their internal and external assets which can guide them in planning individualized care in order to effectively manage the everyday life stressors including those related to their long life illness. It is suggested that adoption of the salutogenic approach in older adult's DM care lead to better adaptability with the disease and promote functional health status **(Dunning, 2018; Kalra et al., 2018; Quehenberger & Krajic, 2017).** In the literature, little is known about the relationship between SOC, resourcefulness and functional health status of geriatric patients with DM, which indicates the necessity of such a research. Moreover, data derived from the current study will help the gerontological nurses in integrating such salutogenic concepts into the care plan of older adult patients with DM to facilitate their moving toward the health ease pole of the (HE-DE) continuum.

Aim of the study

The present study aimed to determine the relationship between sense of coherence, resourcefulness and functional health status of geriatric patients with diabetes mellitus.

Research questions:

What is the relationship between sense of coherence, resourcefulness and functional health status of geriatric patients with diabetes mellitus?

Materials and method

Materials

Design: The study followed a descriptive correlational research design.

Setting: The study was carried out in five outpatient clinics at The Main University Hospitals in Alexandria, namely geriatric medicine clinic, general medical clinic, diabetes clinic, cardiovascular clinic and nephrology clinic.

Subjects: The study subjects comprised a convenience sample of 120 geriatric patients who are 60 years old and above, diagnosed with T2DM and have no or mild cognitive impairment.

The study sample size was calculated using the Epi info V 7.0 program based on the following statistical parameters; Population size:410, expected frequency:50%, acceptable error:10%, confidence coefficient: 95%, minimum

sample size =118. The actual sample size was 120.

Tools:

In order to collect the necessary data, five tools were used.

Tool (I): "Short Portable Mental Status Questionnaire (SPMSQ) "

It was developed by Pfeiffer, (1975). It is widely used to detect the presence of mental impairment and to determine its degree. SPMSQ was translated into Arabic language and tested for its validity and reliability by **Mahrous, (2012)** in Egypt, the reliability value was 0.89. The Arabic version of this questionnaire was used in the present study to exclude those who have moderate and/or severe cognitive impairment. It consists of 10 items. The scoring system of the scale is based on 10 total points. Elders scoring from 0-2 are considered to have no cognitive impairment; scoring from 3-4 indicates mild cognitive impairment, from 5-7 indicates moderate cognitive impairment and from 8-10 indicates severe cognitive impairment.

Tool II: "Socio-demographic and Clinical data of geriatric patients with diabetes mellitus structured interview schedule"

This tool was developed by the researcher and consists of three parts:

Part 1: Socio-demographic data of the study older adults such as age, sex, marital status, level of education and occupation prior to retirement.

Part 2: Clinical data of the study older adults include data related to medical history and presence of physical impairments.

Part 3: participation in different activities.

Tool III: "Sense of coherence scale "

It was developed **by Antonovsky, (1987) t**o assess sense of coherence. It was adapted by the researcher from a 7-category to a 3-category scale. The scale consists of 13 items. The total score of the scale is 39 and classified as follow: 13-21 indicates low SOC, score 22-30 indicates moderate SOC and score 31-39 indicates high SOC.

Tool IV: "Resourcefulness scale"

It was developed **by Zauszniewski, et al. (2006)** to assess both personal and social resourcefulness. It was adapted by the researcher from a 6-category to a 3-category scale. The scale consists of 28 items. The total score of the scale is 56 and classified as follow: Score 0- 18 indicate low resourcefulness, score 19-37 indicate moderate resourcefulness and score 38-56 indicate high resourcefulness.

Tool V: "COOP/WONCA charts"

It was originally developed by **Nelson, et al. (1987)** a new version approved by the world organization of family doctors **(Van Weel, et al., 1995)** and updated by **Bensten et al. (1997).** It is used to assess six core domains of functional health: physical fitness, feelings, daily activities, social activities, perception of change in health and overall health. It consists of six charts. Each domain is covered by a single question to be answered on a five-point scale ranging from (‘no limitation at all’) to (‘severely limited’); for ‘change in health’ score (1) means ‘much better’ and score (5) ‘much worse’.

Method

- An official letter was issued from the Faculty of Nursing Alexandria University and forwarded to the director of the Main University Hospital and head of outpatient clinics to obtain their approval to collect the data.

- The Arabic version of tool I (Short Portable Mental Status Questionnaire SPMSQ) was used to exclude subjects with moderate or severe cognitive impairment.

- Tool II (Socio-demographic and Clinical data of geriatric patients with diabetes mellitus structured interview schedule) was developed by the researcher.

- Tool III "Sense of coherence scale ", tool IV "Resourcefulness scale" and tool V "COOP WONCA Charts" was translated into Arabic language and tested for content validity by 5 experts in the field and the required modifications was done accordingly.

- A pilot study was carried out on twelve older adults who fulfilled the inclusion criteria.

- The data collection covered a period of 3 months started from the beginning of April 2019 to the end of June 2019.

Ethical considerations:

An informed oral consent was obtained from each study subject included in the study after explanation of the study purpose. Anonymity and privacy of the study subjects were maintained, and confidentiality of the collected data assured. The desire of the study subjects to withdraw from the study at any time was respected.

Statistical analysis:

Data collected were analyzed by computer using the Statistical Package for Social Sciences (SPSS) software version 20. Reliability of the tool was determined by Cronbach Coefficient alpha. Data were presented by descriptive statistics in the form of number and percentages for qualitative variables, and range (minimum and maximum), mean, standard deviation for quantitative variables. Student t-test and F-test (ANOVA) were used for testing relationship between variables. Significant difference was considered if $P \leq 0.05$. Chi-square test was used for categorical variables, to compare between different groups. Fisher's Exact or Monte Carlo correction for chi-square when more than 20% of the cells have expected count less than 5.

Results

Table (1) illustrates the socio-demographic characteristics of the study older adults. The mean age of older adults was 68.51±5.67 years, females constituted 53.3% of the study older adults. 57.5% of the study older adults were married, followed by 36.7% were widows and widowers and few percent of them (3.3 and 2.5%) were single and/or divorced respectively. 43.3 % of them were illiterate, followed by 19.2% basic education, 15% read and write, 14.2% secondary education and only 8.3% completed their university education. More than half (56.7%) of the study older adults lived with their partners, 33.3% lived with their family or relative and a few percent (10%) lived alone. The table also shows that, around one half (49.2%) had no work before retirement and this included the housewives, 26.7% were skilled workers and 24.2% were

employees and only 15% of study subjects continue working. More than half (53.3%) of the study older adults reported insufficient monthly income and Pension was the main source of income for more than two thirds (69.2%) of them.

Table (2) illustrates the distribution of the study older adults according to the current health status. More than half (58.3 %) of them reported no history of DM in their families, while 41.7% had a history of diabetes in their first-degree relatives. The table also displays that 38.3% of the study older adults reported an illness duration ranged from 5 to less than 10 years, followed by 34.2% to those of less than 5 years , 14.2% to those 10 to less than 15 years and the rest (13.3%) were 15 years and more. The same table also shows that, the majority (88.3%) of the study older adults had one or more comorbid diseases with more than three quarters (81.1%) of the study older adults were hypertensive.

Table (3) illustrates the distribution of the study older adults according to their SOC levels. The table shows that 44.2% of the study older adults had moderate SOC, followed by 35% had high SOC. While only 20.8% had low SOC with a total mean percent score of SOC is equal to 57.85 ± 24.10.

Table (4) illustrates the descriptive analysis of the study older adults according to the mean percent scores of sense of coherence components. It was shown from the table that, meaningfulness dimension has the highest mean percent scores (63.23±29.41) followed by manageability dimension (59.58±27.49). Whereas comprehensibility dimensions was the lowest scored one (52.17±24.12).

Table (5) illustrates the distribution of the study older adults according to the resourcefulness scale. It was found that around two thirds (65.8%) of the study older adults of moderate resourcefulness, 20.8% of high resourcefulness and 13.3% of low resourcefulness with a mean percent score of 52.80 ± 16.65. Regarding personal resourcefulness, the table shows that around half (49.2%) of the study older adults of moderate personal resourcefulness, about one third (33.3%) of low personal resourcefulness and 17.5% of high personal resourcefulness with a total mean percent score of personal resourcefulness equal to 49.27±19.75. Concerning social resourcefulness, the table shows that 59.2% of the study older adults of moderate social resourcefulness, 29.2% of high social resourcefulness and 11.7% of low social resourcefulness with a total mean percent score of social resourcefulness equal to 57.50±17.75.

Table (6) shows the distribution of the study older adults according to the functional health status domains. According to the COOP/WONCA scoring system, the higher the score of any domain, the lower the functional health status of that domain. It was shown from the table that physical fitness was the most affected domain of functional health status among the study older adults (72.29 ± 24.21), followed by change in health domain (50.21± 19.85, overall health status domain (49.37 ± 19.84) ,daily activities domain (47.50 ± 25.40) and feelings domain (45.83 ± 28.87). Whereas, the social activities domain was the better scored domain of functional health status of the study older adults (39.37± 27.44).

Table (7) illustrates the relationship between SOC, resourcefulness and functional health status of the study older adults. The table reveals highly statistically significant relations between SOC, resourcefulness and all COOP/WONCA subscales among the study older adults, where older adults with

high SOC, high personal and social resourcefulness demonstrated lower mean scores across all domains of functional health status than those with moderate or low SOC and resourcefulness which means that they have a higher functional health status according to COOP/WONCA scoring system (P<0.001).

Table (1): Distribution of the study older adults according to the socio-demographic data

Socio-demographic data	No. (n = 120)	%
Age (years)		
60 < 75	102	85.0
75 ≤ 85	18	15.0
Min. – Max.	60.0 – 83.0	
Mean ± SD.	68.51 ± 5.67	
Sex		
Female	64	53.3
Male	56	46.7
Marital status		
Married	69	57.5
Widow	44	36.7
Single	4	3.3
Divorced	3	2.5
Level of education		
Illiterate	52	43.3
Basic education	23	19.2
Read and write	18	15.0
Secondary education	17	14.2
University education and higher	10	8.3
Living Condition		
With his / her partner	68	56.7
With family/relative	40	33.3
Alone	12	10.0
Occupation before retdhirement		
No	59	49.2
Skilled work	32	26.7
Employee	29	24.2
Current work		
No	102	85.0
Yes	18	15.0
Type of work (n = 18)		
Skilled work	12	66.7
Employee	6	33.3
Monthly income		
Not enough	64	53.3
Enough	56	46.7
Source of income		
Pension	83	69.2
Relatives	19	15.8
Current work	18	15.0

Table (2): Distribution of the study older adults according to the current health status.

	No. (n = 120)	%
Family history of diabetes mellitus?		
No	70	58.3
Yes	50	41.7
Duration of having T2DM		
5 <10 years	46	38.3
<5 years	41	34.2
10 < 15 years	17	14.2
≥15 years	16	13.3
Associated diseases?		
No	14	11.7
Yes #	106	88.3
Hypertension	86	81.1
Musculoskeletal diseases	35	33.0
Cardiac diseases	31	29.2
GIT & hepatic diseases	25	23.6
Renal diseases	16	15.1
Cerebrovascular accident	10	9.4
Respiratory diseases	2	1.9

#: More than one response was given

Table (3): Distribution of the study older adults according to their sense of coherence level using sense of coherence scale.

Sense of coherence scale #	No. (n = 120)	%
Low SOC	25	20.8
Moderate SOC	53	44.2
High SOC	42	35.0
Total Score		
Min. – Max.	14.0 – 39.0	
Mean ± SD.	28.04 ± 6.27	
Percent Score		
Min. – Max.	3.85 – 100.0	
Mean ± SD.	57.85 ± 24.10	

More than one answer was allowed

Table (4): Descriptive analysis of the study older adults according to the mean percent scores of sense of coherence components.

Sense of coherence components.	Total Score	Percent Score
Comprehensibility		
Min. – Max.	**5.0 – 15.0**	**0.0 – 100.0**
Mean ± SD.	**10.22 ± 2.41**	**52.17 ± 24.12**
Manageability		
Min. – Max.	**4.0 – 12.0**	**0.0 – 100.0**
Mean ± SD.	**8.77 ± 2.20**	**59.58 ± 27.49**
Meaningfulness		
Min. – Max.	**4.0 – 12.0**	**0.0 – 100.0**
Mean ± SD.	**9.06 ± 2.35**	**63.23 ± 29.41**
Overall SOC		
Min. – Max.	**14.0 – 39.0**	**3.85 – 100.0**
Mean ± SD.	**28.04 ± 6.27**	**57.85 ± 24.10**

Table (5): Distribution of the study older adults according to their levels of resourcefulness using resourcefulness scale..

Item	No.	%
A- Personal Resourcefulness		
Low Resourcefulness	40	33.3
Moderate Resourcefulness	59	49.2
High Resourcefulness	21	17.5
Total Score		
Min. – Max.	4.0 – 31.0	
Mean ± SD.	15.77 ± 6.32	
Mean percent score	49.27 ± 19.75	
B- Social Resourcefulness		
Low Resourcefulness	14	11.7
Moderate Resourcefulness	71	59.2
High Resourcefulness	35	29.2
Total Score		
Min. – Max.	3.0 – 21.0	
Mean ± SD.	13.80 ± 4.26	
Mean percent score	57.50 ± 17.75	
Overall Resourcefulness		
Low Resourcefulness	16	13.3
Moderate Resourcefulness	79	65.8
High Resourcefulness	25	20.8
Total Score		
Min. – Max.	12.0 – 50.0	
Mean ± SD.	29.57 ± 9.32	
Mean percent score	52.80±16.65	

Table (6): Distribution of the study older adults according to domains of functional health status.

	Functional health status domains	No. (n = 120)	%	Mean ± SD.
1	**Physical fitness**			
	Very heavy	1	0.8	
	Heavy	10	8.3	
	Moderate	27	22.5	3.89 ± 0.97
	Light	45	37.5	
	Very light	37	30.8	
2	**Feelings**			
	Not at all	17	14.2	
	Slightly	31	25.8	
	Moderately	36	30.0	2.83 ± 1.15
	Quite a bit	27	22.5	
	Extremely	9	7.5	
3	**Daily activities**			
	No difficulty at all	11	9.2	
	A little bit of difficulty	30	25.0	2.90 ± 1.02
	Some difficulty	44	36.7	
	Much difficulty	30	25.0	
	Could not do	5	4.2	
4	**Social activities**			
	No at all	24	20.0	
	Slightly	35	29.2	
	Moderately	30	25.0	2.58 ± 1.10
	Quite a bit	30	25.0	
	Extremely	1	0.8	
5	**Change in health**			
	Much better	6	5.0	
	A little better	18	15.0	3.01 ± 0.79
	About the same	66	55.0	
	A little worse	29	24.2	
	Much worse	1	0.8	
6	**Overall health**			
	Very good	4	3.3	
	Good	26	21.7	2.98 ± 0.79
	Fair	60	50.0	
	Poor	29	24.2	
	Very poor	1	0.8	

Table (7): Association between functional health status with sense of coherence and resourcefulness of the study older adults.

	Functional health status					
	Physical fitness	**Feelings**	**Daily activities**	**Social activities**	**Change in health**	**Overall health**
Sense of coherence scale						
Low	4.64 ± 0.57	4.12 ± 0.73	3.88 ± 0.67	3.56 ± 0.71	3.68 ± 0.56	3.76 ± 0.52
Moderate	4.04 ± 0.76	2.98 ± 0.84	3.02 ± 0.87	2.83 ± 0.96	3.04 ± 0.71	3.02 ± 0.64
High	3.26 ± 1.01	1.88 ± 0.83	2.17 ± 0.79	1.67 ± 0.72	2.57 ± 0.74	2.45 ± 0.71
F (p)	23.302 (<0.001**)	60.461 (<0.001**)	36.707 (<0.001**)	45.057 (<0.001**)	20.332 (<0.001**)	32.918 (<0.001**)
Personal Resourcefulness						
Low	4.38 ± 0.84	3.53 ± 1.01	3.38 ± 0.95	3.23 ± 0.83	3.40 ± 0.67	3.40 ± 0.71
Moderate	3.78 ± 0.93	2.75 ± 1.08	2.88 ± 0.95	2.47 ± 1.12	2.95 ± 0.75	2.95 ± 0.65
High	3.29 ± 0.9	1.76 ± 0.62	2.05 ± 0.74	1.62 ± 0.59	2.43 ± 0.75	2.24 ± 0.77
F (p)	11.099 (<0.001**)	22.233 (<0.001**)	14.434 (<0.001**)	20.125 (<0.001**)	12.729 (<0.001**)	19.412 (<0.001**)
Social Resourcefulness						
Low	4.43 ± 0.65	3.57 ± 1.22	3.43 ± 0.65	3.43 ± 1.02	3.64 ± 0.63	3.64 ± 0.74
Moderate	3.96 ± 0.96	2.99 ± 1.15	3.07 ± 1.05	2.77 ± 1.04	3.08 ± 0.73	3.04 ± 0.78
High	3.54 ± 0.98	2.23 ± 0.84	2.34 ± 0.84	1.83 ± 0.79	2.60 ± 0.77	2.57 ± 0.61
F (p)	4.887 (0.009**)	9.457 (<0.001**)	9.296 (<0.001**)	17.176(<0.001**)	11.017 (<0.001**)	11.452(<0.001**)
Overall Resourcefulness						
Low	4.69 ± 0.48	3.94 ± 0.93	3.81 ± 0.66	3.75 ± 0.58	3.81 ± 0.54	3.88 ± 0.50
Moderate	3.96 ± 0.85	2.94 ± 1.07	2.99 ± 0.95	2.65 ± 1.03	3.0 ± 0.73	3.01 ± 0.65
High	3.16 ± 1.07	1.80 ± 0.65	2.04 ± 0.73	1.60 ± 0.65	2.52 ± 0.71	2.28 ± 0.74
F (p)	15.951 (<0.001**)	24.656 (<0.001**)	20.980 (<0.001**)	27.871 (<0.001**)	16.265 (<0.001**)	29.554 (<0.001**)

F: **F for ANOVA test**

p: p value for comparing between the studied categories

*: Statistically significant at $p \leq 0.05$

**: Statistically highly significant at $p \leq 0.01$

Discussion:

Poor DM management's makes geriatric patients more liable to serious implications such as decreased functional health status, institutionalization, and higher mortality rate **(Ballaziri et al., 2019 &Von Humboldt, et al., 2013).** Recently, it is assumed that following the salutogenic approach in illness management, would improve the disease self-management and functional health status **(Guevara et al., 2018; Chittem, et**

al., 2015). In the same context, the current research aimed to determine the relationship between two salutogenic concepts (SOC and resourcefulness) of community dwelling older adults suffering from T2DM and their functional health status.

The present study revealed that about half of the study older adults with T2DM had moderate level of SOC and only one third of them had high level of SOC (Table 3). This could be a consequence of relatively fair GRRs, such as social relationships and support, religious beliefs and wisdom which give them a purpose in life and life satisfaction. However, some of them faced certain difficulties that affected their view of life as economic difficulties which limit their scope of resources. The level of SOC in the current study was slightly lower than a study conducted in Denmark (**Olesen et al., 2017**) and higher than a study done on institutionalized older adults in India (**Raja et al., 2015**). The different results may be attributed to sociocultural variation.

In examining the specific SOC components, meaningfulness (the motivational component) demonstrated the highest mean score (Table 4). This could be accepted as many of the study older adults had a strong faith that gives them inner strength to endure suffering with deep satisfaction. In addition to, they demonstrated a strong desire to manage their illness correctly to be able to fulfill their duties within their families. Other study participants reported that they have very clear goals and aspirations that haven't been achieved yet such as performing Hajj or Umrah. These results tend to be in line with the findings of **Olszak et al. (2018)** in Denmark and **Wiesmann & Hannich, (2011)** in Germany where the meaningfulness domain had the highest average, while it contradicts other studies done in Europe that revealed that older adults had the lowest sense of meaningfulness score **(Von Humboldt, 2013; Ejdys & Bielan, 2017).**

The current study revealed that two thirds of the study older adults have a moderate overall resourcefulness level, this could be explained as many of the resourcefulness skills could be gained through their life long experiences such as problem solving, decision making and appreciating others opinions and support. Also, the present study revealed that, social resourcefulness showed to be slightly higher than personal resourcefulness (Table 5). This result could be attributed to cultural and religious background that support strong familial ties so, the elderly might have different social support resources from families, friends and neighbors which they can benefit from. The level of resourcefulness in the present study seemed lower than a study done on relocated older adults (Bekhet & Zauszniewski .2016) and higher than a study done on depressed older adults in USA **(Choi et al., 2013).**

Concerning the functional health status of the study older adults, it was observed that, all functional health status domains were affected (Table 6).Similarly, several researches have reported that T2DM could have a deleterious effect on the functional health status of the older adults **(Bansal, et al., 2018; Nguyen et al., 2018; Vares & Aliakbarzadeh Arani, 2016; Sinclair et al., 2015; Vidal-Peracho et al., 2014).** Among the functional health status domains of the study older adults, physical fitness was the highest affected while, social activities and feelings domains were the least affected, this could be explained as the majority of the study older adults had comorbid

conditions with a high prevalence of musculoskeletal and cardiovascular diseases, in addition to, DM complications and physical limitations which can affect their physical ability. However, these conditions didn't affect their psychosocial aspect as they felt socially supported through their strong relationship with others that encouraged them to participate in social activities which in turn, enhanced their positive feelings and emotions. These findings are in harmony with other studies done by **Bansal, et al. (2018)** in India and **Lima et al. (2018)** in Brazil which reported that functional health status is poor in older adults with DM in all domains with the lowest and the highest mean scores were observed in physical health domain and social relationship domain respectively. On the other hand, **Adhikari, (2017)** in South Asia showed that social health score was the lowest domain among older adults. The difference in the above results may be attributed to sociocultural variations.

A significant correlation between SOC and all domains of functional health status was found. Further, the feelings domain showed the strongest correlation with SOC among the study older adults. This result could be interpreted as older adults with higher SOC would be positively oriented toward life which make them more willing to adopt health-promoting behaviors, more compliant with their therapeutic regimen, to be more physically active and engage in meaningful activities. In addition, they would make the best use of their GRRs to deal positively with everyday life stressors including those imposed by disease. Therefore, their functional health status should become better. The present study finding is consistent with the findings of **Knight, et al. (2012)** in South Africa and **Helvik et al. (2014)** in Norway who reported significant association between SOC and the functional health status among older people. Moreover, **Odajima & Sumi, (2018)** in Japan concluded that improving SOC in individuals with T2DM via outpatient care reduced the sense of burden from having DM and helped to reduce HbA1c. In addition, **Knight et al. (2012)** reported that the psychological domain of QOL demonstrated a stronger correlation with SOC than the rest of other domains.

A statistically significant relation was found between the overall resourcefulness and all the functional health status domains of the study older adults. It was noted that, as resourcefulness level increases, the functional health status score will decrease which means better functional health status according to COOP/WONCA scoring system .This significant correlation could be explained as higher levels of personal and social resourcefulness provide a variety of skills such as positive thinking, priority setting, anger and stress management and effective use of social resources that can facilitate health related decisions and improve the individual's coping ability. Besides, it enables the person to take actions on his/ her behalf when able to do so or seek others' help when unable to manage alone. Hence, lead to improving and maintaining their functional health status. In the same line, a study of Taiwanese older adults by **Chiu & Spencer, (2010)** reported that older adults with high social and personal control had greater functional health status. Also, a study done by **Huang et al. (2008)** in Taiwan found that personal resourcefulness helped women with T2DM to perform self-care practices, improve psychological adjustment, and achieve a higher QOL. In addition, other studies done in China and Taiwan indicating that prostate cancer patients

with greater resourcefulness are more likely to have good QOL **(Huang,C.Y et al., 2018; Lin et al., 2017).**

Conclusion

Based on the results of the present study, it can be concluded that there is a statistically significant relationship between SOC, overall resourcefulness and all the functional health status scores of the study older adults as higher levels of SOC and resourcefulness were associated with better functional health status among the study participants.

Recommendations

Based on the results of this study, the following recommendations are suggested:

• Develop an in-service training programs for nurses and HCPs at different health care settings on how to assess SOC and resourcefulness skills and orienting them with the role of such concepts on health and wellbeing of older adults and different ways for promoting them.

• Continuous health education programs by the gerontological nurses planned for and offered on regular basis to health care teams to update their knowledge and focus the nursing care on the patient's health assets, as a complement to the traditional approach of addressing the patient's health problems.

• Illuminate the role of the family support in the disease management by HCPs through including family/caregivers in the treatment planning of older patients with DM.

• Communication and coordination with the ministry of social solidarity by gerontological nurses in order to facilitate the access to and participation in the presented social and recreational services such as elderly clubs that can help improve SOC and resourcefulness of the elderly.

Recommendations for future research:

• Studying the relationship between SOC, resourcefulness and functional health status on large samples and different chronic conditions to clarify factors affecting on these variables among older adults.

• Future nursing research should also explore interventional design as interventions for increasing SOC and teaching resourcefulness skills to older adults with DM and other chronic conditions

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